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Elena G. Popkova
Editor

Corporate Social Responsibility to the Green Growth of Business and Economy

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ISSN 2522-8714 ISSN 2522-8722 (electronic)
Advances in Science, Technology & Innovation
IEREK Interdisciplinary Series for Sustainable Development
ISBN 978-3-031-83040-2 ISBN 978-3-031-83041-9 (eBook)
https://doi.org/10.1007/978-3-031-83041-9

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Introduction

Corporate social responsibility underpins the contemporary, responsible approach to business management applied in the progressive business environment in most countries worldwide. In this advanced approach, businesses assume responsibility for the technical characteristics of their products, the timely delivery to the market, the quantitative and price accessibility of their products, the social conditions of labor and sales, and the ecological sustainability of the products marketed and the overall business activities.

In the Decade of Action, the environmental dimension of corporate social responsibility, listed last (in order but not in significance), is of particular interest. The idea of sustainable development emerged from the desire to integrate ecological values into social and business culture. Within the Sustainable Development Goals (SDGs) system, a significant portion belongs to the SDGs of environmental orientation.

From the perspective of the environmental dimension of corporate social responsibility, it is interpreted as a business practice of voluntary assumption of responsibility by businesses for the environmental consequences of their activities before all stakeholders, primarily before green professionals, eco-investors, state regulators of the green economy, environmentally responsible consumers, and representatives of ecological communities.

The problem lies in the insufficient elaboration of the scientific-practical issues of this development. First, these issues include the adaptation of corporate management practices to the green agenda of the economy and business. The green agenda is established at the supranational level and supported at the national level through the launch of corresponding national strategies for the ecological development of the economy.

To engage businesses in implementing national environmental strategies, clear business environment institutions need to be formed that will support sustainable business development and green economic growth through corporate social responsibility. ESG management is the most clearly established institution so far.

However, scientific literature shows a considerable discrepancy in the terminology. In some sources, corporate social responsibility, sustainable development, and ESG are distinguished. In others, they are equated. This impedes the development of a unified scientific understanding of the essence of sustainable business development and green economic growth through corporate social responsibility and ESG.

Second, these issues include the social and legal environment necessary for implementing corporate business responsibility in support of sustainable development and green growth. This environment encompasses state regulation of the green economy, demand within it, and the training and competition in the labor market for green professionals. Due to the uncertainty of its requirements, the social-legal environment of the green economy in many contemporary economic systems is forming and evolving haphazardly, which renders it suboptimal.

Third, the specific mechanisms by which businesses demonstrate corporate social responsibility are of particular importance. Cooperative and managerial mechanisms for sustainable development and green economic growth of businesses and the economy deserve attention. Cooperation may be undertaken not only by businesses but also by consumers. In the broader context of the green economy, cooperation implies the consolidation of efforts by integration entities for the most comprehensive and expeditious realization of shared environmental priorities.

When employing cooperative mechanisms in the green economy, it is important to clarify the aspects of business participation in integration entities that are not fully elaborated in scientific literature. Specifically, it is important to delineate the boundaries of influence of businesses on integration entities and of these entities on the parties engaged in cooperation within them. With the haphazard application of cooperative mechanisms, the potential of environmental regulation and standardization is not fully realized; the line between them and corporate social responsibility becomes blurred.

Fourth, it is necessary to develop detailed applied technologies for sustainable development and green economic growth of businesses and the economy. These may include narrowly specialized green technologies, industry-specific solutions, and digital technologies and automation tools of a broad profile adapted to the green economy. Although numerous existing technologies are described in available scientific literature, they are fragmented and require systematization.

Furthermore, it is necessary to adapt applied technologies to the specificities of the economic systems of countries and regions where they are intended for implementation. Insufficient development of the linkage between green technologies and social, legal, and business institutions hinders their integration into economic practices and diminishes the effectiveness of their application in implementing corporate social responsibility.

This book aims to ensure a comprehensive elaboration of all issues mentioned, thereby filling the gaps at the intersection of existing layers of scientific research. The book aims to develop a comprehensive theory, scientific methodology, and practical recommendations for sustainable development and green growth of business and economy based on corporate social responsibility. This book's contribution to the literature on corporate social responsibility lies in refining its environmental dimension in consideration of the contemporary green agenda and priorities of sustainable development.

The novelty of this book lies in the systemic examination of the social, legal, and managerial aspects of businesses' manifestation of corporate social responsibility. Thanks to this, the book shaped a holistic view of the optimal environment of contemporary economic systems that fosters corporate social responsibility. The theoretical significance of the book lies in the organization of the terminological apparatus of corporate social responsibility for sustainable development and green growth of business and economy.

The practical significance of the book is expressed in the multitude of case examples from international practice, including countries in West Africa, Russia, Kazakhstan, Kyrgyzstan, and others. The book contains innovative authorial solutions for managing green innovations and technologies in implementing corporate social responsibility. Special attention is devoted to ESG issues as a promising tool for demonstrating corporate social responsibility in support of sustainable development and green growth of businesses and the economy.

The managerial significance of this book is underscored by the comprehensive array of practical solutions it offers and the technological developments presented for the demonstration of corporate social responsibility in support of sustainable development and green economic growth across various sectors of the economy. Specifically, the book covers sectors within the green economy, such as industry, agriculture, education, tourism, commerce, energy, and others.

This book is divided into four thematic parts. The first part examines sustainable business development and green economic growth through the lens of corporate social responsibility and ESG. The second part delves into the social and legal aspects of corporate business responsibility in support of sustainable development and green growth. The third part proposes cooperative and managerial mechanisms for sustainable business and economic growth. The fourth part develops applied technologies for sustainable business and economic growth.

The book is primarily intended for scholars engaged in studying corporate social responsibility. For them, the book provides a theoretical understanding of the possibilities and causal relationships of manifestations of corporate social responsibility by economic entities in support of sustainable development and green economic growth. Additionally, the book offers scientific and methodological support and innovative technologies for enhancing contemporary practices of corporate social responsibility in its environmental dimension.

Furthermore, the book is of interest to stakeholders in the green economy. For them, the book presents examples from international practice of implementing corporate social responsibility. Managers of environmentally responsible businesses will find proposals for implementing green innovations and technologies in support of sustainable development. State regulators of the green economy will find scientific understanding and proposals in the book for highly effective practical application of prospective measures to stimulate corporate social responsibility.

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Contents

Sustainable Business Development and Green Economic Growth Through the Prism of Corporate Social Responsibility and ESG

The Prospect for Accelerating Green Economic and Business Growth Based on Corporate Social Responsibility

Elena G. Popkova

Abstract

The research focuses on determining the prospect of accelerating the green growth of the economy and business. To identify the consequences of implementing managerial measures for green economic and business growth, the author applies a method of analyzing cause-and-effect relationships. Using this method, the author established that green economic and business growth occurs at a slow pace when managed using a directive approach due to the following identified shortcomings of this approach. The identified deficiencies of directive management pointed to the preference for an alternative approach to managing green economic and business growth based on corporate social responsibility. To determine the prospect of accelerating green economic and business growth based on corporate social responsibility, the author utilized the foresight method, which is used to formulate authorial recommendations. In conclusion, it is inferred that promoting corporate social responsibility by the government and society opens up broad prospects for accelerating green economic and business growth. The proposed corporate approach to managing green economic growth holds theoretical significance as it redefines the role of private business in this process and expands its involvement by demonstrating corporate social responsibility. The developed corporate approach to managing green economic and business growth also holds practical significance. The author's recommendations proposed in accordance with the new approach will make it possible to comprehensively realize the potential of the corporate social responsibility of private businesses in supporting green economic growth.

Keywords

Green growth · Economic growth · Corporate social responsibility · Climate-resilient technologies · Eco-products · Waste reduction · Clean energy · Decarbonization

JEL Classification

M14 · O44 · Q56 · Q57

1 Introduction

The industrial revolutions of the last two centuries formed a significant ecological footprint of the economy. This footprint largely determines current economic activity: the quality of life of the population in socio-ecosystems, the resource potential for further economic growth, and society's demands for the ecological integrity of business activity and its products. The Fourth Industrial Revolution brought about the most serious changes in the state of the environment to date, which led to a final universal awareness of the necessity of ecological changes in the economy.

This found reflection in adopting a new course of economic development—a course towards green growth. First, this course implies the development of environmentally friendly production in industry through the reduction of industrial waste and, in particular, through the reduction of carbon emissions (i.e., decarbonization). Second, it implies the transition to clean and environmentally safe (whose consumption carries a low environmental impact, including carbon footprint) and renewable energy. Third, it includes achieving climate resilience of natural agriculture to ensure food security.

However, despite mass approval and support, contemporary economic systems have achieved limited success in the path of green growth. This is evidenced by the fact that

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_1

economic indicators of economic systems improve much faster than their ecological indicators. Thus, low-carbon industrial production is planned to be created in the distant perspective of 2050 or later. In most economic systems, clean energy does not replace but only complements the energy of fossil fuels. Agriculture continues to remain heavily dependent on natural-climatic conditions, threatening food security.

In this regard, the urgent scientific and practical problem is to accelerate the green growth of the economy and business. The essence of this problem lies in accelerating the pace of economic growth with improved ecological characteristics of economic activity. This defined the research goal: to determine the prospect of accelerating the green growth of the economy and business.

2 Literature Review

The theoretical foundation of this research is composed of the following scientific concepts:

- The concept of green growth of the economy and business, which is understood as the increase in business activity and its outcomes (primarily GDP and exports) on a macroeconomic scale, and the disclosure of the potential for the development of economic activity while observing environmental constraints related to minimizing the environmental costs of economic activity and utilizing its capabilities to improve the state of the environment (Dotsenko et al. 2020; Galoyan et al. 2023);
- The concept of corporate social responsibility, which is interpreted as voluntary (outside of government regulation) responsibility of business to society, particularly for the state of the environment, expressed in active combat against climate change, improving the environmental properties of products, increasing the ecological efficiency of production, and minimizing the impact of climate change on society and the economy (Sabden and Turginbayeva 2017).

In contemporary management practice, a directive approach is applied to the green growth of the economy and business, assuming, first, that the green economy is a public good, the creation of which is not advantageous for private business. Therefore, this good should be provided by the state (Sultanova et al. 2019). Second, financing of the green growth of the economy should be carried out by the state due to limited possibilities of attracting private investments in ecological projects and their profitability (Morozova et al. 2018).

Third, the involvement of businesses in ensuring the green growth of the economy should occur under strict external control. Environmental standards, norms, quotas, taxes, and other requirements mandatory for compliance by all business structures should be introduced by the government. From the side of society (i.e., representatives of environmental communities and environmentally responsible consumers), high demands on the environmental properties of products should be made (Vardar et al. 2023).

The literature review revealed that, although the described directive approach received detailed theoretical elaboration and was described in numerous existing publications, the applied questions of implementing this approach are studied insufficiently. Thus, the consequences of applying the directive approach to the green growth of the economy remain unclear. Additionally, the contribution of corporate social responsibility to green economic growth is not thoroughly investigated and explained in existing publications. This is a gap in the literature, which is addressed in the present research.

3 Materials and Methods

To determine the consequences of implementing management measures for the green growth of the economy and business, the author employs a method of analyzing cause-and-effect relationships. Through this method, the author established that green economic and business growth occurs at a slow pace when managed using a directive approach due to the following identified drawbacks of this approach.

The first drawback is associated with the fact that, although the green economy represents a public good, there are numerous economic green goods provided by private businesses. For example, services of urban and personal (electric cars) electric transport, residence in areas with improved climate and ecosystems (resort towns and rural areas), eco-products, and natural agricultural products. The directive approach does not encompass the management of economic green goods, which hinders their production and distribution.

The second drawback is that the assumption of full responsibility for financing the green growth of the economy and business by the state reduces the efficiency of budget spending and restrains the flow of investments into the development of the green economy. Insufficient financial support hampers its development. The third drawback is that strict external control undermines the business's internal green initiatives and limits its flexibility. Instead of green development, environmental regulation restrains economic growth as such.

Thus, in industry, high environmental barriers reduce the efficiency of industrial production and lead to their closure. In the fuel and energy complex, the directive for developing clean energy leads to cost increases and, consequently,

to a decrease in the overall availability of energy resources. In the agro-industrial complex, in response to the increasing demands of the state and society for organic agricultural products, businesses are reorienting towards producing non-natural food to avoid natural-climatic risks. Consequently, the supply decreases in organic food markets, causing shortages and increasing prices.

The identified shortcomings of directive management point to the relevance of developing an alternative approach to managing the green growth of the economy and business. This research proposes to base this alternative approach on corporate social responsibility. To determine the prospects for accelerating the green growth of the economy and business based on corporate social responsibility, this research employs the foresight method, which helps formulate author recommendations.

4 Results

Through the examination of contemporary international experiences regarding the manifestation of corporate social responsibility by businesses in the industry (Popkova 2022; Popkova and Shi 2022), energy (Alekseev et al. 2019; Bogoviz et al. 2017), and agriculture (Karbekova and Samieva 2022; Litvinova et al. 2017; Yuldashev et al. 2021), it has been revealed that the high level of responsibility achieved by the present time motivates businesses to actively participate voluntarily in projects for the development of the green economy. This opens up broad prospects for accelerating the green growth of the economy and business based on corporate social responsibility and makes it possible to propose a corporate approach to managing the green growth of the economy and business.

The main principles of the corporate approach are proposed as follows. The first principle is the provision of economic green goods based on corporate social responsibility. Instead of mandatory requirements, it is proposed to incentivize private business's green initiatives by including them in the registry of eco-product suppliers, establishing a highly effective system of eco-labeling of products, providing government stimulation of demand for such products, and placing government orders for them.

The second principle is the development of private green investments as a manifestation of corporate social responsibility. The role of the state in this lies in creating favorable conditions and transparent rules of the game in the markets of the green economy. For example, the government may launch special environmental economic zones in various territories. In these special economic zones, participants may be granted access to unique and advanced infrastructure; the most favorable tax conditions may apply. However, participants must meet requirements regarding the placement of green investments and the production of eco-products.

Third, state and social incentives for private green business initiatives as embodiments of corporate social responsibility are proposed. These initiatives should represent investment-innovation projects for developing and implementing green technologies. In the industrial sector, it is expedient to create green value-added chains, with recycling at their core. Transitioning to low-carbon industrial production should involve the installation of advanced purification facilities at industrial sites.

In this context, the role of the state and society lies in providing guarantees of profitability for large-scale and long-term investments made by businesses. These guarantees may include the application of mechanisms of public–private partnerships and a consistently high demand for eco-products in society. In the fuel and energy complex, the cluster mechanism is possible. Establishing ecological clusters, where business structures share the common practice of using clean energy, will facilitate the successful development of green brands.

In the agro-industrial complex, it is proposed to develop climate-resilient agriculture based on smart technologies. This can be achieved by creating green innovative networks and ecological technoparks. It is also advisable to establish and develop collaboration between businesses and local universities and research institutes in the field of training green professionals, commercializing university green technologies and innovations, and providing joint environmental monitoring based on carbon sites. These measures will make it possible to establish large-scale production of natural agricultural products and ensure food security.

5 Discussion

The results obtained contribute to the development of the scientific concept of green economics and business growth, the management of which requires a new corporate approach based on corporate social responsibility. This approach is proposed in this research. Its distinguishing features compared to the existing directive approach are as follows:

- The green economy provides not only public goods (in contrast to (Sultanova et al. 2019)) but also economic goods, the supplier of which is private business demonstrating corporate social responsibility;
- Sources of financing for green economic growth are diversified: they are not limited to budget financing from the state (in contrast to (Morozova et al. 2018)) but also include a significant flow of private environmental investments made on the terms of corporate social responsibility;

- Private business assumes a central role in ensuring green economic growth, while the role of the state and society becomes secondary (in contrast to (Vardar et al. 2023)). Innovations should replace traditions (state norms, standards, directives, and social demands): green technologies implemented at the initiative of private business as part of their corporate social responsibility.

6 Conclusion

Thus, the main conclusion drawn from the conducted research is that the encouragement of corporate social responsibility by the state and society opens up a broad perspective for accelerating the green growth of the economy and business. The proposed corporate approach to managing green economic growth holds theoretical significance as it reinterprets the role of private business in this process and expands its involvement through the demonstration of corporate social responsibility.

The developed corporate approach to managing green economic and business growth also bears practical significance. The recommendations put forward in accordance with the new approach will make it possible to realize the potential of the corporate social responsibility of private businesses in supporting green economic growth. The social significance of the author's recommendations is linked to the fact that their implementation will accelerate green economic growth, thereby enhancing the quality of life for the population.

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Peculiarities of Evaluating the ESG Bonds Yield on the International Market

Olga V. Khmyz and Tatyana G. Oross

Abstract

Despite the global economic and financial turmoil of recent years, the global economy continues to follow a green course. Some slowdown observed in the global ESG bond market in 2022 was practically overcome in 2023. Experts assess the prospects for this segment of the global debt market as promising. One of the attractive factors in favor of ESG bonds for investors is the yield they offer, which is characterized by a certain specificity of return generation. Therefore, it seems important to analyze the peculiarities of evaluating the yield of ESG bonds and determine the influence of the main factors on the level of ESG bonds yield in the contemporary turbulent conditions of the world economy. During the analysis, the authors used standard methods of scientific research, as well as multivariate regression analysis using the least squares method. The research sample included more than 550 issues. The main hypothesis is that conventional bonds have higher returns than ESG bonds, which means lower spreads to the T-bonds yield curve. The research showed a continuation of the upward trend in the global ESG bond market, confirmed the hypothesis, and indicated the specifics of the attractiveness of ESG bonds for investors compared to conventional debt instruments. The presence of a greenium enables companies issuing ESG bonds to more actively implement ESG projects and increase their profitability.

Keywords

ESG bonds · Green bonds · Sustainable development goals · Greenium · Global ESG bond market

JEL Classification

G12 · C12

1 Introduction

The ongoing deterioration of the general climate condition, despite the steps taken to curb the adverse effects of CO_2 emissions and other harmful substances, as well as global pollution of the atmosphere, soil, and water, requires continued efforts by official structures and private entities. More environmentally neutral technologies and alternative energy sources are increasingly proliferating, despite the new factors of global financial and economic turbulence that have emerged recently. Implementing environmental-friendly activities still requires significant financial resources, which are being attracted through the increasingly traditional toolkit of ESG bonds. These securities have shown themselves to a fairly positive extent in the global financial market, bringing benefits to issuers and investors, which leads to an increase in the volume of such instruments and the expansion of the tools themselves (on a limited scale). According to Pictet Asset Management, sustainable bond issuance could reach $ 4.5 trillion per year by 2025 (Pictet Asset Management 2022). In the world economy, ESG bonds are designed to solve the current problems associated with the search for equilibrium in relation to using green energy sources and the global strategic objectives of achieving sustainable development and protecting the environment.

Sustainable development issues continue to be actively discussed in specialized literature (Mariani et al. 2019; Wang and Wang 2022), including the impact of the COVID-19 pandemic (Bahra and Thukral 2020; Khmyz et al. 2023b). Quite a lot of research has been devoted to ESG bonds (Hubel and Scholz 2020; Lindner and Chung 2023). In the aspect of our analysis, these scientific works can be grouped into two blocks according to the criterion of

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_2

perception of the profitability specificity of these financial instruments in the form of a discount to yield, or the green premium (CBI 2020)—with a greenium (Goldstein et al. 2019; Löffler et al. 2021) or without significant differences from conventional bonds (Xie et al. 2019; Zerbib 2019). According to the Climate Bonds Initiative approach and as previously proven (Khmyz et al. 2023a), there is the availability of greenium. Therefore, the size of the discount is one of the main criteria when choosing ESG bonds by investors.

To form an optimal approach to assessing the discount on ESG bonds in the international debt market and select the most appropriate regression model, it is first necessary to analyze the global ESG bond market in terms of the concentration of their varieties, currencies, countries, and other criteria.

As of mid-2023, there were about 10,000 ESG bond issues in circulation in the world, totaling nearly $ 3 trillion (CBI 2023b). They can be broken down into the following main subcategories:

- Green bonds (about 60% of all ESG bonds);
- Sustainable development bonds (about 20%);
- Social bonds (about 15%);
- Bonds linked to predefined sustainable development goals (about 5%);
- Transition bonds (less than 1%).

About 70% of the total volume of ESG bonds in circulation falls on the TOP-10 countries (CBI 2023a): the USA, France, China, Germany, the Netherlands, Belgium, Japan, Italy, and Luxembourg. Euro and US dollar account for 75% of the volume of circulating ESG bonds (HSBC 2022). However, a significant share, with a large margin from the first two currencies, is occupied by the Chinese yuan (6%), the pound sterling (3%), and the Japanese yen (3%).

Along with financial reasons that increase the attractiveness of ESG securities, standardizing regulation (Commission 2023b; Eurosif 2022) also significantly contributes to the development of the market in the form of an increasing number of taxonomies introduced on the supranational (Commission 2023a; ICMA 2023) and national (October 25). CP22, 20: Sustainability disclosure requirements (SDR) and investment labels. 2022; People's Bank of China 2022; Srivastava and Trivedi 2023) levels. According to Economist Intelligence Unit (EIU), green bonds that comply with the EU ESG taxonomy regulations will be able to generate a higher greenium (EIU 2023). Nevertheless, their comparison and analysis deserve a separate study, although some convergence is noted (Shen and Goh 2022).

Considering the significant presence of ESG bonds in the US market, as well as the increased demand for the US dollar by issuers of such bonds when raising funds, for the purposes of the research, it is appropriate to generate a sample of the latest initial placements of US dollar ESG bonds by issuers from the TOP-10 countries in terms of sustainable development bonds circulation volume. Statistical data for the analysis were obtained from the official websites of specialized entities and organizations, such as the Climate Bond Initiative, International Capital Market Association, Cbonds, and others. The sample covers the period from the beginning of 2022 to May 2023—the period of rising interest rates on US Treasury bonds.

2 Methodology

Based on the criteria outlined above, the authors formed a sample of initial placements of ESG bonds. To form a standardized sample, emissions that fall under the following criteria were excluded:

- Maturity—less than one year (such securities are too short-term; they are money market instruments);
- Non-market issues (it can be difficult to identify the originators in such issues);
- Structural instruments, including asset-backed (characterized by difficulties in identifying the composition of participants; financial engineering can be used);
- Issues with a negative spread to the yield curve of US Treasury bonds at placement (as a potentially non-market transaction).

The exception also included issuers whose issues exceed 25% of the total number of placed bonds (which could potentially distort the overall statistics on the ESG bond market). These are FHLB, Freddie Mac, and Federal Farm Credit Banks.

As a result of filtering the sample, the number of issues subject to investigation, as well as corresponding to the above criteria, was reduced to 574.

When analyzing key indicators for primary placements, it is efficient to conduct a study of cross-sectional data. The following issuance parameters were defined as analyzed indicators (Table 1).

To identify a potential discount in the yield on ESG bonds, it is advisable to use the spread to the yield curve of US Treasury bonds at placement as a dependent variable (Y). The research hypothesis is that conventional (non-ESG) bonds are placed at a higher yield compared to ESG bonds. Therefore, the spread to the US Treasury yield curve when placing ESG bonds should be smaller. It was the spread (not effective yield) that was used as a dependent variable to exclude estimation distortion due to the changing macroeconomic situation in the US economy since the beginning of 2022 (a significant increase in interest rates). The spread to the yield curve of US Treasury bonds was

calculated based on the interpolated value of the yield of US Treasury bonds for a period corresponding to the circulation period of the considered issues.

The "ESG bonds" indicator is the target indicator for assessing the presence of a discount on ESG bonds. To complete the SPREAD estimation, several additional indicators that have the potential to influence the SPREAD value were integrated into the model.

The volume of bonds placed (VOLUME) indicator is included in the model perimeter because, as usual, larger companies that can borrow large volumes in the debt market have a higher business reputation and recognition from investors due to stable cash flows. Thus, the possible impact of this indicator on the spread is negative (i.e., there may be an inverse dependence).

We suggest that an increase in the bond tenure (TENOR) will also increase the spread required by investors for the higher risk investors take when investing in "longer" bonds. With rising interest rates and heightened expectations about the future direction of the US Fed's monetary policy, a higher duration of bond issuance could lead to a stronger negative revaluation of the trading portfolio.

The indicator "Sector of the economy" (INDUSTRY) implies a higher premium in terms of the spread when referring the issuer to the financial sector in comparison with the real sector of the economy.

The "Credit Rating" indicator is the numerical value of the ratings of the three leading rating agencies (Moody's, S&P, and Fitch). To obtain the resulting variable, the authors translated the ratings into a numerical equivalent in accordance with Table 1. The final value was calculated as the minimum between the ratings of Moody's, S&P, and Fitch. The better the issuer's credit quality, the lower the risk premium required by the market.

The indicator "Type of bonds" (TYPE) suggests two options—conventional bonds and Eurobonds. Eurobonds are characterized by an additional premium to the spread according to the nature of the instrument (issuers with a country of risk different from the country of registration of the prevailing share of investors in such instruments are subject to deeper study and more thorough credit analysis; they are also associated with the sovereign and other risks of another country). Conventional bonds by issuers with similar credit quality offer lower yields and, as a result, the spread required by investors.

Table 1 Estimated parameters of ESG bonds issuances

Parameter	Mean
SPREAD (Y)	spread to the US Treasury yield curve at placement moment, b.p
ESG (X1)	for ESG bonds—0 for conventional bonds—1
VOLUME (X2)	the volume of placed bonds, $ million
TENOR (X3)	maturity of placed bonds, years
INDUSTRY (X4)	for issuers from the real sector of the economy—0 for issuers from the financial sector—1
RATING (X5)	for issuers with a credit rating from Moody's, S&P, and Fitch (if there are several ratings, the lowest rating level is used) at "AAA"—0 for issuers with a credit rating "AA+"—1 "AA"—2 "AA-"—3 "A+"—4 "A"—5 "A-"—6 "BBB+"—7 "BBB"—8 "BBB-"—9 "BB+"—10 "BB"—11 "BB-"—12 "B+"—13 "B"—14 "B-"—15
TYPE (X6)	for bonds form—0 for Eurobonds form—1
COUNTRY (X7)	for US issuers—0 for non-US issuers—1

Source Compiled by the authors

The indicator "Country" (COUNTRY) assumes two options—the USA and other countries. The authors suggest that dollar borrowings can be cheaper for US issuers compared to other borrowers.

Considering the analyzed cross-sectional data, the authors used the least squares regression.

3 Results

When compiling an econometric model and determining the most significant parameters in terms of P-value, the following regression model was formed:

$$\text{SPREAD} = 21,6089 \cdot \text{ESG} - 0,0115 \cdot \text{VOLUME} + 6,2643 \cdot \text{TENOR} + 17,6228 \cdot \text{RATING}$$

where:

SPREAD—spread to US Treasury yield curve at the placement moment, b.p.;

ESG—ESG bonds (0) or conventional bonds (1);

VOLUME—the volume of placed bonds, $ million;

TENOR—maturity of placed bonds, years;

RATING—credit rating from Moody's, S&P, and Fitch (if there are several ratings, the lowest rating level is used), where AAA corresponds to 0 and B- corresponds to 15.

The p-values for these parameters do not exceed 0.002. The value of the non-centered R^2 is 82%, which confirms the accuracy of the generated regression model.

The resulting model makes it possible to interpret it as follows in terms of attitude to the international ESG bond market:

- ESG status for bonds reduces the spread to the yield curve of US Treasury bonds at placement by an average of 21.6 b.p. (the greenium effect);
- An increase in the volume of placement for each $1 billion reduces the spread to the yield curve of US Treasury bonds in case of placement by an average of 11.5 b.p. (inverse dependency);
- An increase in the maturity of bonds for each year increases the spread to the yield curve of US Treasury bonds at placement by an average of 6.3 b.p. (direct dependency);
- Downgrading the credit rating by one notch on average increases the spread to the US Treasury yield curve by 17.6 b.p.

Thus, it is possible to confirm the presence of the greenium effect on bonds in the international financial market based on the results of the generated regression model.

Based on the generated model, we can conclude that a borrower with an AA+credit rating can theoretically raise financing in the form of ESG bonds under no worse conditions than if a borrower with a credit rating one step higher (AAA) placed conventional bonds with comparable parameters (issue maturity, volume, etc.).

4 Conclusion

Despite the slowdown in global economic growth, energy problems (including in developed countries), and rising inflation, more countries are joining the concept of carbon-free development and creating various green and similar taxonomies. More investors are attracted by environmentally friendly projects and ESG bonds. The issuers of these dedicated securities are state governments and municipals, private structures, and international organizations. The spectrum of investors is also wide. Although interstate institutions were the first and continue to be the leading issuers of ESG bonds, the market for corporate sustainable bonds is actively developing, which has led to the emergence of innovative tools to raise funds for a wider range of projects – social, transition, and contributing to the achievement of sustainable development goals. Due to their relative youth, ESG bonds are considered an innovative tool and a way to finance target projects in a corresponding direction.

The main feature and trend of the global ESG bond market is the presence of a discount to yield compared to similar bonds without reference to ESG or greenium. The presence of a greenium enables issuing ESG bond companies to implement ESG projects more actively and increase their profitability. During the research, the authors found that the greenium's size is influenced by such factors as the ESG status, the volume of placement, the maturity period, and the credit rating.

Along with the specific characteristics of ESG bonds that attract investors to them (e.g., the greenium analyzed in this research), it is necessary to note the continuation of government support measures. Together with the increasing inclusion of ESG principles in investment declarations, government support for ESG investment, and the development of related taxonomies, the discount on ESG bond yields stimulates the development of the market for these instruments. Therefore, financial and non-financial factors contribute to improving access to financing for green initiatives and projects.

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Simulation and Automation of Industrial Production Processes Under the ESG Agenda Conditions

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Abstract

The research aims to develop measures to improve the business process of an industrial enterprise in the ESG agenda context and justify their effectiveness. The authors use the method of comparative analysis. The research object is industrial enterprises. The presented research highlights the relevance of modeling and automation of industrial production processes in the context of the ESG agenda. The authors reveal the essence of the key elements of modeling and automation of industrial production processes. The types of business processes are listed. Steps for modeling and automating business processes are presented. The authors consider the process "Automation of the collection, accumulation, processing, storage, and display of the information received" on the example of a business unit. Information is presented on the system for the current monitoring of capacities and carrying out commercial calculations installed on the feeders of the central switchgear. When studying the business process "Measurement of electrical energy and power, as well as automatic collection, accumulation, processing, storage, and display of the information received," the authors identified shortcomings. To eliminate the identified shortcomings, the authors proposed developing a project "Creation of an intelligent electricity metering system." The project's objectives and recommended activities to improve the considered process, as well as the economic efficiency after implementing these measures, are described.

Keywords

Modeling · Automation · Business process · ESG · Industrial plant

JEL Classification

D24 · L94 · O12 · O33 · O47

1 Introduction

Environmental issues create conditions for increasing interest and awareness in the field of sustainable development. Gradually, investment, which previously consisted only of the desire to maximize profits, is being replaced by investments, the effect of which is supported, among other things, by sustainability. Environmental, social, and governance (ESG) indicators are the most widespread innovative indicators that contribute to the assessment of sustainable development in the world.

The situation that developed during the COVID-19 pandemic also showed the need to identify the economic, social, and environmental problems of our time. Businesses should rely on more than just getting financial success. Creating a product with long-term value will reduce the impact of negative factors that arise in the process of managing the value creation process, supply processes, and production processes. The publication of information about the participation of an enterprise in the field of ESG occurs using various methods. These include tools such as public reports on sustainable development.

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Industrial enterprises also carry out their detail within the ESG agenda framework. Particularly, there is a need for transformation in internal business processes that contribute to changes in society. Hence, a set of issues arises related to the analysis and management of business processes in an organization with the aim of modeling and automating them. Considering the theory of business processes, it was revealed that many companies today do not have an input, understood as the resources that the company is ready to invest and transform into output. Typically, the input is information or physical materials.

For companies with no input, the beginning of the business process begins with management (i.e., application of technology, procedures, and standards). Such companies are mainly engaged in producing services at their basic facilities; accordingly, the consumer will be the input supplier (Bayere et al. 2020).

The scientific literature understands output as a product or service the consumer needs. All activities of enterprises and companies are aimed at producing the final product, based on which they will be able to make a profit in the future.

The business processes of any organization are built very deeply; a unique business process with its own sub-processes has been created for each product produced.

Sub-processes or secondary processes refer to the production of a specific product or service. As a rule, it comes from the main business process but is not auxiliary.

2 Materials and Method

Features of modeling and automation of business processes, as well as the problems of enterprise development in a global environment, are studied in the works of A. S. Aidiner, E. Tatoglu, E. Bayraktar, and S. Zaim (Aidiner et al. 2019); A. Augusto, R. Conforti, M. Dumas, M. La Rosa, and A. Polyvyanyy (Augusto et al. 2019); A. Bayere, H. Salmela, and T. Tapanainen (Bayere et al. 2020); O. Yu. Fedorov and I. M. Yakhontova (Fedorov and Yakhontova 2016); M. V. Filippov (Filippov 2015); M. Fischer (Fischer et al. 2020); E. P. Garina, E. V. Romanovskaya, N. S. Andryashina, V. P. Kuznetsov, and S. D. Tsymbalov (Garina et al. 2021a); E. P. Garina, E. V. Romanovskaya, N. S. Andryashina, Y. S. Potashnik, and A. P. Garin (Garina et al. 2021b); T. V. Glukhova (Glukhova 2018); G. A. Ikhtisamova (Ikhtisamova and Zinnurov 2018); L. V. Kozilova (Kozilova et al. 2022); E. P. Kozlova, G. A. Morozova, V. P. Kuznetsov, E. V. Romanovskaya, and N. S. Andryashina (Kozlova et al. 2021a); E. P. Kozlova, Y. S. Potashnik, E. V. Romanovskaya, A. P. Garin, and V. P. Agafonov (Kozlova et al. 2021b); S. N. Kuznetsova, E. P. Kozlova, V. P. Kuznetsov, A. A. Shabarov, and A. D. Efremova (Kuznetsova et al. 2021); P. Lara Machado, M. van de Ven, B. Aysolmaz, A. Athanasopoulou, B. Ozkan, and O. Turetken (Lara Machado et al. 2023); E. S. Nazarkina and S. N. Kuznetsova (Nazarkina and Kuznetsova 2021); N. V. Oshovskaya and V. A. Rengach (Oshovskaya and Rengach 2018); A. Yu. Pavlov (Pavlov 2012); E. V. Romanovskaya, N. S. Andryashina, S. N. Kuznetsova, Z. V. Smirnova, and O. G. Ivonina (Romanovskaya et al. 2021); R. R. Timerbayev (Timerbayev 2019); A. M. Vendrov (Vendrov 2005); S. N. Yashin, E. V. Koshelev, E. V. Romanovskaya, N. S. Andryashina, and S. N. Kuznetsova (Yashin et al. 2022).

Business process modeling is the most effective tool to help find ways to optimize the economic activity of an enterprise, a tool for planning and reducing risks that may arise at various stages of an enterprise's life. This tool makes it possible to consider the costs of each individual process and the costs of all processes of the enterprise (Kuznetsova et al. 2021).

The need for business process modeling most often arises due to several reasons:

- A significant increase in the areas of economic activity of the enterprise, a rapid increase in turnover;
- The enterprise has reached a "dead end" and does not see other ways of development;
- The inability to track the technological path of creating a product;
- Decision makers are aware of the need to improve existing processes.

The business process modeling technology depends on the current state of the business unit in question and is selected in accordance with the available technical and information capabilities. When developing automated information systems, more attention is paid to the possibility of their improvement under the current agenda of the enterprise (Glukhova 2018). Such systems are being created, the modeling of which is possible not only in their design but also in the adaptation of existing information systems to the enterprise's requirements.

Modeling and automating business processes in the context of the ESG agenda should also contribute to creating conditions for the enterprise's sustainable development (Vendrov 2005).

The methodology for modeling and automating processes is in a certain sequence. These steps are shown in Fig. 1.

Let us consider each step in more detail.

The description of the initial state is carried out for the business process at the level of the department and at the level of the entire enterprise. Its detailed description is provided. At this stage, general information is collected, which affects all participants in the process. Often, each expert can

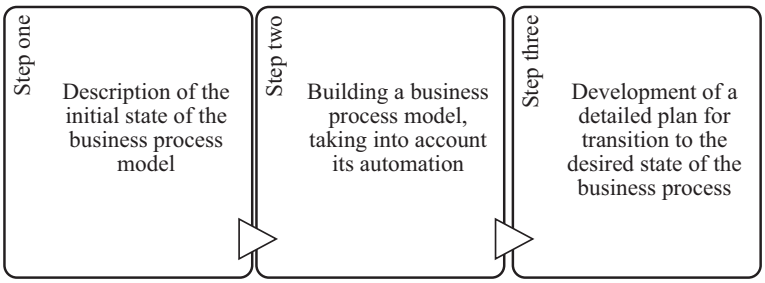

Fig. 1 Methodology for modeling and process automation. *Source* Compiled by the authors

evaluate the considered business process differently. In this regard, one of the key points is the development of a common point of view. At this step, the shortcomings that significantly differ the implementation of this process from its ideal execution are identified.

Building a business process model, considering its automation, consists in describing a completely new algorithm. The possibility of automating the process is being considered, programs for implementation are being selected, and partners are being searched (Kozlova et al. 2021b).

Developing a detailed plan for moving to the desired state of the business process is the final step in improving it. At this stage, the experts will have to work, within which specific actions will be proposed to implement the newly developed business process model.

3 Results

The dynamically changing external and internal environment of the company dictates the need to transform the company's business processes. Let us consider one of the processes on the example of a business unit.

The company has many business processes, while less attention is paid to routine processes. These include the business process related to the measurement of electrical energy. Such a procedure is very time-consuming and costly for a large industrial enterprise (Augusto et al. 2019).

Currently, the Solmo 3 Industrial IVK system, installed on the feeders of the central switchgear, is used to control capacities and carry out commercial calculations.

In the studied business unit, a similar complex was used relatively long. In the process of studying the business process, the following shortcomings were identified:

- The system is not installed at the borders of the equipment's balance sheet and does not make it possible to observe the loads at the connections of subdivisions for the 0.4 kV transformer substation;
- The system is morally and physically obsolete and unstable;
- The functionality of the system software is very limited, which makes it difficult to use it for commercial calculations and analysis of the power supply scheme; additional manual calculations are required for operation;
- The system does not make it possible to observe power quality parameters, analyze voltage drops and open-phase modes, and determine the causes of emergency shutdowns;
- The system does not meet the requirements of the Decree of the Government of the Russian Federation.

In connection with the above disadvantages, the business unit needs to change the business process. For this purpose, it is proposed to develop a project "Creation of an intelligent electricity metering system."

It is proposed to set the following goal of the project—to reduce the payment for the capacity component as part of the final weighted average tariff when purchasing electricity by the production units of the business unit (Ikhtisamova and Zinnurov 2018).

Several activities have been developed to implement this project (Table 1):

- To install metering devices with the function of monitoring power and power quality parameters at the current time;
- To organize an information and computing complex (ICC) of an intelligent metering system (IMS) of electricity;
- To create a communication system with transformer substations (TS) and a system for providing online information to industries through a personal account.

The scope of implementation of the creation of an intelligent accounting system has been determined:

- Upper level of the system;
- Fiber-optic communication lines in the scope of the 1st stage of implementation;
- Information-computer complex with network equipment;
- Electricity metering devices (metering devices and current transformers) at transformer substations: Body building, Chaika building, Production of automotive units (partially).

The terms of reference for implementing the working draft of the intelligent accounting system have been developed (Romanovskaya et al. 2021).

Table 1 Stages of implementation of measures

Stages of work	Million, rub													
	December 23	January 24	February 24	March 24	April 24	May 24	June 24	July 24	August 24	September 24	October 24	November 24	December 24	TOTAL
Conclusion of a contract for pre-project survey and design, project development		0.8				3.2								4.0
Carrying out tender procedures, concluding a contract for the installation of an accounting and communication system														
Supply of top-level equipment						7.1								7.1
Upper-level mounting						0.4								0.4
Supply of metering station equipment						3.8		4.4	4.9					13.1
Installation of metering units								4.0			3.7		3.6	11.3
Supply of materials and communication equipment for fiber optic communication						1.9		4.8	6.9					13.6

(continued)

Table 1 (continued)

Stages of work	Million, rub													
	December 23	January 24	February 24	March 24	April 24	May 24	June 24	July 24	August 24	September 24	October 24	November 24	December 24	TOTAL
The demonstration of the operation of the metering system for consumers of energy resources at 120 EE supply points in the Body Building was completed. Feedback from consumers about the capabilities of the system was received									0.1					0.1
Installation of fiber optic communication and communication equipment								1.1			2.0		5.2	8.3
Commissioning of communication equipment and fiber optic communication								0.3					0.9	1.2
Commissioning and development of as-built documentation for metering and communication devices						0.8		0.7			0.4		1.3	3.2
TOTAL		0.8				17.2		15.3	11.9		6.1		11.0	62.3

Source Developed and compiled by the authors

A draft contract and tender documentation are prepared.

A preliminary selection of contractors for design and construction and installation works is being carried out.

4 Conclusion

As a result of the implementation of these measures, the following will become possible:

- Ensure a reduction in the cost of paying for electricity for the production of the business unit by 9.5 million rubles per year;
- Effective management of energy consumption, the ability to determine the specific rates of electricity consumption of energy-intensive equipment;
- Reduction of losses on inefficiently loaded equipment.

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Features of Enterprise Organization Management: ESG Business Transformation

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Abstract

The authors consider the issue of managing enterprise organization through ESG business transformation. The authors reveal the feature of the enterprise management system through new management technologies. Based on the chosen research topic, the research goal is to determine the features of managing an enterprise organization using the ESG transformation of business in current conditions. The authors note that the Russian management system is currently dominated by bureaucratic management systems that do not contribute to the innovative activities of organizations, which negatively affects their effectiveness. The paper considers the key ways to solve the problems using new efficient control systems on the example of an electric power company. The opinions of individual respondents and experts on the future of ESG are noted. Justified in this research, the ESG transformation of business provided an opportunity to argue and generalize a special conclusion about the economic efficiency.

Keywords

Business transformation · Management system · Management · ESG principles · Enterprise

JEL Classification

Q13 · R11 · R12 · R 58

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1 Introduction

The occurring innovative changes are a significant transformation in the management system of organizations for the production of goods and the provision of services.

The development of science and society is rapidly moving forward. It is an urgent problem for developing activities and management systems in organizations. The close relationship between the relevance of the identified problem and numerous scientific papers on this research topic determines management system and the activities of enterprises in various industries and services.

Based on the chosen research topic, the goal is to determine the features of the management of an enterprise organization using the ESG transformation of business in today's conditions.

With the rapidly changing external environment, the development of industrial enterprises providing services and producing goods, and undergoing significant changes in their activities, private business is growing and the system of work of service companies as part of the management system of the organization is changing (Mak-Mak 2013).

This research is based on assessing the development of Russian companies in terms of ESG practices and readiness for ESG transformation and aims to determine the state of management of ESG issues at different levels of the company.

This research contains the results of a survey and interviews at the beginning of 2022 and the opinions of individual respondents and experts on the future of the ESG agenda in Russia.

2 Methodology

Contemporary management system refers mostly to the national characteristics of the society. These features are based on the psychology of relationships, the traditions of society, living conditions, culture, and other factors of life.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_4

Many researchers identify several criteria related to the concept of management in general. These criteria include the following:

- Preferred decision-making methods;
- Preferred methods of control;
- Features of career growth;
- Features of building motivation systems;
- Features of hiring personnel;
- Leadership style, etc.

In the current operating system of management, there are often unfavorable elements that definitely hinder its sustainable development:

- Low level of managerial competence;
- Insufficiently effective system of organizational culture and peculiarities of mentality;
- Unstable transitional moment in the economy;
- Stereotype of the technocratic approach to management.

The Russian management system is currently dominated by bureaucratic management systems that do not contribute to the innovative activities of organizations, which negatively affects their effectiveness. However, there is also a positive side to the development of innovative management. These innovations include scientific and intellectual potential in the management system and rich experience in regulating the country's economy (Gaponenko et al. 2007).

Thus, in the twenty-first century, there is the possibility of a rational management system, the content of which includes a closed system with specified goals for managing the organization.

A system for managing the organization of service activities using the ESG business transformation is considered.

ESG transformation of business is no longer something new. This trend is gaining increased popularity in the business environment, especially in Russia (Kozeeva 2018).

This business format sets the following tasks:

- Comfortable environment of the society;
- Reduction of environmental impact;
- High-quality management system.

The key content of the ESG system and its principles often become the foundation for a company's sustainable development.

The ESG management concept includes three main principles (Mizikovsky et al. 2023):

- Environmental criteria;
- Social criteria;
- Corporate governance criteria.

This research considers the principle of corporate governance. Not much attention is currently paid to the ESG index in Russia. However, the process has already been launched.

In turn, it is important for an entrepreneur that their business brings maximum income. At first glance, taking care of the environment seems costly, especially for small businesses.

A laboratory has been created in the Novgorod Region that considers ESG principles, the implementation of which is characterized by efficiency, cost-effectiveness, and the possibility of obtaining additional profit by recycling resources.

3 Results

Small and medium-sized businesses in the Novgorod Region are among the leaders in implementing ESG principles.

Nowadays, this industry occupies a special position in terms of resource provision, increasing the competitiveness.

Currently, the position of the considered industry greatly depends on the efficient and rational use of resources that fully ensure the functioning of an industrial enterprise. Stability is argued by the efficient and rational use of its immediate resources, regardless of the fact that the current market situation adjusts to the functioning of an industrial enterprise.

Considering the urgent scientific problem of the considered system in the economic decisions of enterprises, it is worth noting additional features of this branch of the industry. Such a factor can be attributed to the situation of a large cash flow, which characterizes low profitability. For example, from 2008 to 2009, many enterprises experienced restrictions in the direction of spending available financial resources due to unforeseen difficulties.

Russian energy complex is a key element of the country's economy because it can influence the internal structure. This influence also affects the level of the development of the social sector because the energy complex primarily contributes to its economic growth. The level of provision of the population of Russia with energy resources also directly depends on it. The unstable world situation that has been observed in recent years dictates unfavorable trends that hinder its development (Kuznetsov et al. 2020).

Nowadays, the current state of industrial energy enterprises is experiencing difficulties in their activities due to the Western sanctions introduced in 2022, which had a strong impact on the list of forced support measures in Russian energy complexes.

As mentioned earlier, Russian energy complex has faced an incredible list of external challenges in recent years. The

negative elements include the fact that foreign enterprises refused to participate in domestic projects, significantly limited the supply of Russian energy resources, banned the export of foreign equipment and advanced technologies, and introduced many other equally significant restrictions. Despite the most pessimistic forecasts of experts, Russian energy industry fully endures and adequately copes with challenges arising from outside, demonstrating stability and performance in many indicators. This fact only indicates that the domestic energy complex has a fairly solid foundation that makes it possible to minimize all consequences of the imposed sanctions with maximum efficiency, regardless energy market.

Thus, in one of its fuel and energy complex at the end of last year, a public and business scientific journal showed the results of an increase in oil production by 2% compared to the results of 2021. It is certainly worth noting that the occurred circumstances provided a significant impetus to the development of own technologies in Russia. Thus, an innovative project was launched to create a technology for thermochemical impact on unconventional oil-bearing horizons. This technology is unique. The stability of the Russian market for petroleum products, thanks to which the price dynamics has consistently kept below the inflation rate, can also be identified as a positive component. Nowadays, the cost of gasoline in Russia is about two times lower than in Europe. The search for new markets continues, in connection with which there is an active trade activity with friendly countries, to which it is planned to direct over 80% of exports of oil and oil products. As for the gas industry, the planned commissioning of new fields continues. An increase is also visible compared to previous periods. This figure almost reaches 1%. Russian power engineers continue to work actively on the reconstruction of the energy mechanism.

During 2022, particularly important documents and decisions were made on this industry. Therefore, earlier this year, the Government of the Russian Federation updated the improved system for the location of electric power facilities until 2035.

Currently, as well as in previous years, the main priorities of the energy policy of Russia remain. First, Russia maintains the stability of a reliable supply of key energy resources in the domestic market. In other words, the population of Russia, domestic enterprises, and social facilities are almost completely satisfied in their needs.

The second, no less important point is to maintain and increase the export potential of Russia while maintaining its leadership position in the global energy market.

Due to the current epidemiological situation and the adverse consequences arising from it, most Russian industrial enterprises were unable to ensure the competitiveness and sustainability of their development.

In striving to achieve the key goal, it is advisable for the energy complex to make a significant contribution to the development goals of Russia. In this regard, it is advisable to make the transition to the most efficient, stable, and sustainable energy, the so-called energy modernization, as soon as possible to strengthen and overcome the constantly emerging global problems in this area Fig. 1.

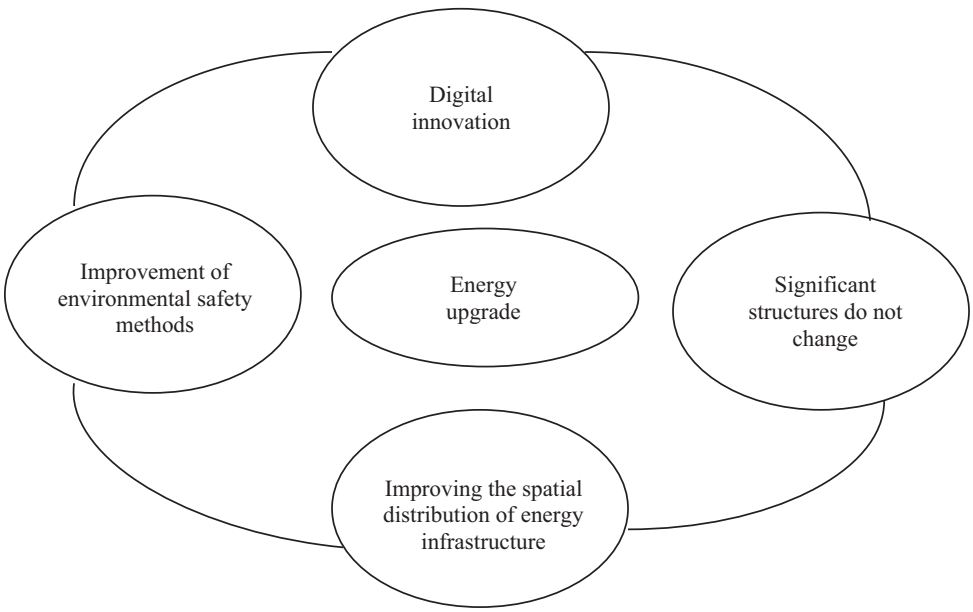

Fig. 1 Key elements of the Russian energy upgrade. *Source* Compiled by the authors

Figure 1 shows the main directions of modernization of Russian energy sector, to which the management should pay increased attention. The authors single out this element because they set the digital trend for an industrial enterprise. This fact also confirms that this aspect is a key direction in achieving the strategic development goals of Russia, while this statement is enshrined at the legislative level. It is undoubtedly scientifically proven that the result of using this approach improves the company's production performance.

Digital innovations and intellectualization of the energy industries bring improved qualities in all processes and areas, providing new rights and opportunities for end recipients and consumers of products and services.

As mentioned earlier, in the current period, the domestic energy industry is going through a rather difficult period of adaptation to digital innovations, in connection with which there are unforeseen changes in the internal structure of the market, competition is toughening, there is an accelerated pace of digitalization, in connection with which the latest digital technologies in the energy industry are emerging. Is very important to be a prepared and professionally competent specialist to endure future changes confidently.

The object of the energy complex analyzed in this study is an inestimably complex system that includes a range of various subsystems and management tools. Complexity of this system is also it includes a large number of elements, enterprises of a different nature, and this mechanism carries a large amount of information, a different list of information transfer methods, as well as various properties.

In order to conduct a practical study, it is worth considering in more detail the description energy complex of the Nizhny Novgorod region.

The energy complex is a complex that includes several diesel generators located in close proximity to each other and connected in parallel to generate a common load.

Thanks to the automated control system possible to simultaneously connect from 2 to 32 diesel generator sets. In this case, the power of the generators can be the same or different from each other. The power complex operates on a common load and can be used as a source of constant or backup power supply.

Each DGU has a special microprocessor controller that communicates with other controllers of the generators that are part of a single power complex, thereby ensuring the optimal parameters of the generated signal.

The best option for using the energy complex is to work as a source of constant energy supply. It consists of two or more generators with controllers that control the parameters of the generated current.

The advantages of the power complex compared with the use of a single generator set become most apparent as the number of operating hours and, consequently, wear and tear increase.

In some cases, energy complexes are used as sources of backup power supply.

The main design difference is the presence of an emergency transfer unit (AVR) (Romanovskaya et al. 2022; Smirnova et al. 2021,2022a, 2022b, 2022c, 2022d).

The latter starts the generators in case of a voltage drop in the main network. When the parameters of the main supply network return to normal, the AVR turns off the generators and transfers consumers to power from the main network.

Components of energy complexes can be located in one or more containers because, in addition to diesel generators, they also contain a common power unit, AVR, automation system, tanks for fuel, and other consumables with automatic refueling.

The advantages of energy complexes are as follows:

- Multi-level redundancy when used as a backup power source (the number of levels depends on the number of DGU included in the complex);
- Technical support without shutting down the entire system (specialists can service each generator separately without shutting down the entire system);
- High wear resistance. Since the load is distributed evenly, diesel generator sets will fail much less frequently than when using one power plant of equivalent capacity.

Along with the prospects for sustainable development and new directions for the Russian economy, they cause the majority of employees and the enterprises to face the same problem, connected primarily with the lack of a unified methodological apparatus for assessing the compliance of the functioning of enterprises with the current requirements of the analyzed system.

The opinions of individual respondents and experts on the future of the ESG agenda are reflected in Fig. 2.

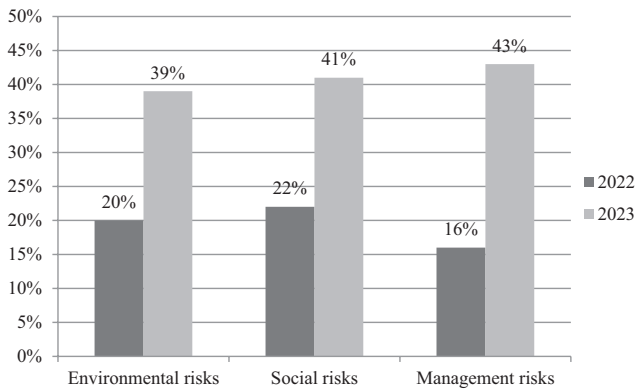

Fig. 2 ESG risk assessment. *Source* Compiled by the authors

Despite external factors, the Novgorod Region retains investment attractiveness and activity: six projects in petrochemistry, energy, manufacturing, and agro-industrial complex with a total investment of about 33 billion rubles have received priority status. New residents from among small and medium-sized businesses are appearing in the territories of advanced development in the districts.

4 Conclusion

ESG transformation of a business is a certain systemic modification of the approach to organizing the activities of environmental safety and labor protection. Implementation of the proposed business strategy for companies in these areas should be viewed through the prism of achieving sustainable development goals. The equally important point is the possession of a sufficient level of digital competencies of employees of an industrial enterprise, on which its future success largely depends. In this case, a systemic modification of the approach to organizing the management of industrial enterprises in conjunction with the activities of highly professional specialists will achieve high results.

The authors' hypothesis is that the contemporary direction of the system analyzed in this research implies a certain restructuring of an industrial enterprise based on the strategic goals and objectives of its sustainable development, as well as immeasurable social responsibility and an effectively developed system of internal corporate governance.

First, an industrial enterprise should be aimed at minimizing the consequences of environmental impact because this direction is necessary, relevant, and especially significant in the current reality.

The second direction, which is a promising energy business, is the social aspect, which carries the key perspectives of modification on issues relating to society and the population. In other words, this item involves improving the population's security and maintaining its health and social well-being.

The last and most important element of this mechanism is corporate governance. The management of industrial enterprises needs to pay as much attention as possible to issues related to effective personnel management, independently develop a new principle of private management practice, and introduce advanced management techniques.

In conclusion, ESG system is based on reorientating the enterprise to advanced digital business models. In this case, almost independently, the most important stage of automation and adaptation of various production processes will take place to integrate a variety of performance indicators, thereby achieving key goals, namely environmental safety, social safety, and effective management.

However, the most important thing in this aspect is close cooperation with all stakeholders (investors, employees, customers, management, and society). This group allows enterprises to impose key guidelines to allow the enterprise to form new vectors for its modification and achieve its sustainable development.

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Experience of Applying ESG Management at the Enterprise

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Abstract

The cement industry is one of the major Greenhouse Gas (GG) emitters. The research provides information about the organization of environmental protection activities at a cement plant. The authors showed the results of the gradual achievement of positive results in the field of ecology through the implementation of ESG principles using the best available technologies. To implement the provisions of the Paris Agreement, the Russian Federation has developed a Strategy for Social and Economic Development with Low GG Emissions until 2050. The criteria for projects of sustainable (including green) development in the Russian Federation (taxonomy of green and adaptation projects) have been established. At most enterprises, the level of GG emissions reaches 800–900 kg/t of Portland cement clinker. The targets are: (1) to ensure that carbon intensity for gray clinker is less than 0.766 t CO_2-eq., less than 0.987 t CO_2-eq. for white clinker, and less than 0.92 t CO_2-eq. for cement when using the dry method or combined production; (2) to replace 10% or more of natural raw materials with waste from various industries. The replacement of process fuels may be considered an eligible project. Calculations show that the most significant effect in reducing CO_2 emissions is the transfer of technology to the use of natural gas instead of coal. In the structure of GG emissions from coal-fired operations, about 36% is formed due to fuel combustion. For example, when switching to gas, a plant with a capacity of 1.8 million tons of cement annually reduces CO_2 emissions by 15% (from 0.804 to 0.684 tons of CO_2 per one metric ton of clinker).

Keywords

ESG principles · Greenhouse gases · Environment · Carbon neutrality · Decarbonization · Sustainability

JEL Classification

O30 · O32

1 Introduction

ESG principles started to develop at the beginning of the twenty-first century actively. Their implementation is aimed primarily at organizing the fight against global warming. Since 2000, the Carbon Disclosure Project (CDP) has been consolidating information from major global companies on GG emissions. The CDP carbon reporting database is the largest in the world and contains the most comprehensive information on corporate emissions and corporate climate change strategies. Annual reports of companies, including Russian ones, are published along with a description of corporate strategies in the field of climate change. The global trend toward the development of green energy has slowed down significantly over the past two years. There have been dramatic changes in the plans of advanced economies in terms of the timing of achieving carbon neutrality. The reason was the energy crisis provoked by the refusal of cheap pipeline Russian natural gas for political reasons. The cost of imported liquefied gas is much higher than pipeline gas, which leads to an increase in the cost of energy generated

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by thermal power plants and, as a result, accelerates inflation. In Poland and Germany, the extraction and consumption of hard coal are actively recovering, which is inevitably accompanied by an increase in GG emissions. On the contrary, Russia is implementing a program of gasification of industry and households to improve the quality of life of Russians and reduce the cost and carbon intensity of manufactured products. By 2050, Russia plans to reduce GG emissions by 60% from the level of 2019 and by 80% from the level of 1990; it is planned to achieve carbon neutrality by 2060 (Government of the Russian Federation 2021). The GG registry is currently being formed. Mandatory reporting has been established for enterprises with GG emissions over 150 thousand tons/year since 2023 and for enterprises with emissions of 50 thousand tons/year in CO_2 equivalent from January 1, 2025 (Federation 2021). As a result, all cement plants in Russia are included in the list of enterprises that control GG emissions. For this purpose, the calculation method is used. A new methodology is applied that considers the possibility of determining the volumes of GG emissions and removals (Ministry of Natural Resources of the Russian Federation 2022). Figure 1 shows the information from the Federal State Statistics Service of the Russian Federation (Rosstat) on GG emissions in 2020 by production sectors without consideration of GG absorption by forests (Federal State Statistics Service of the Russian Federation 2022) (Fig. 1).

According to Fig. 1, the biggest share of GG emissions comes from the energy sector (77.8%). However, the share of industrial emissions is also significant and reaches 11.8%. Of this amount, 14.8% falls on producing products from mineral raw materials, including cement production, which is classified as large-capacity and energy-intensive and accounts for about 4% of the total anthropogenic GG emissions of Russian enterprises. The main share of GG is released during the firing of the clinker mixture in tubular rotary kilns from fuel combustion and thermal decomposition of carbonates used in the raw mixture (e.g., limestone, marl, etc.). In this case, the fuels are natural gas (88%), coal (11%), and shale (1%) (Federal Agency on Technical Regulating and Metrology of the Russian Federation 2022). Energy consumption largely depends on the dry, wet, or combined production method. In this regard, the specific fuel consumption lies in a wide range from 103 to 380 kg of standard fuel (kg of reference fuel) per 1 ton of clinker. Russian cement plants are characterized by low energy efficiency and an extremely small share of the use of alternative fuels (AF). At Western European cement plants, the use of AF in co-firing with natural gas reaches 50% or more. The most commonly used RDF is produced from municipal solid waste (MSW). In Russia, work on organizing the sorting of such waste and the production of RDF is at an early stage.

2 Materials and Method

Environmental work at a cement plant using a water body for water intake for technical needs and wastewater discharge is organized as follows. The structure of the enterprise has an environmental division or an environmental specialist. Usually, the specialist (or a division) is in the service of a chief engineer or technical director. The job description of a specialist ecologist reflects all types of activities aimed at complying with environmental legislation, namely knowledge of regulatory and methodological materials on environmental protection and rational use of natural resources, as well as the requirements of the environmental management system. A person with at least three years of experience in the field of ecology is usually invited to this position. The effectiveness of the work of this specialist can be assessed based on the results of inspections by representatives of the Federal Service for Supervision of Natural Resources (Rosprirodnadzor) and the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor). Knowledge of production technology and environmental protection equipment plays an essential role in achieving positive results. The level of payment for the negative impact on the environment, the absence of administrative violations, positive publications in the media, and the high

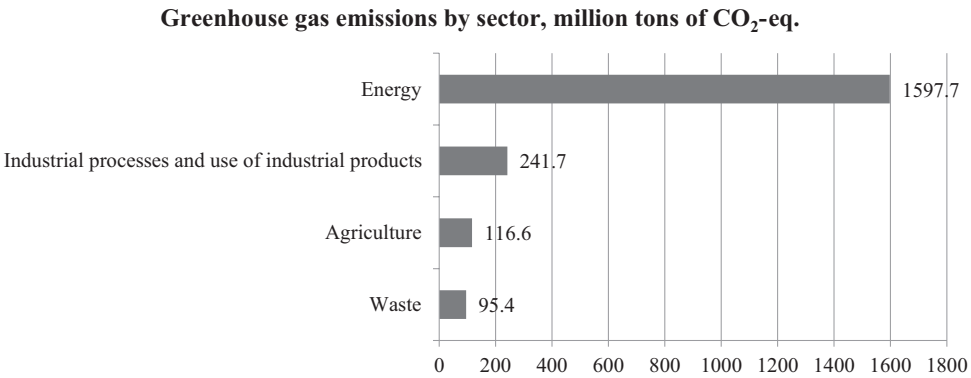

Fig. 1 GG emissions by sector in 2020. *Source* Compiled by the authors

enterprise rating show the effectiveness of environmental activities. If the standard indicators for emissions of pollutants into the atmosphere, discharges into a water body, and waste generation standards are not exceeded, the fee is minimized. This indicates that all permits have been developed on time and that environmental protection equipment is working efficiently. The environmentalist of the enterprise constantly needs advanced training. Over the past decade, many normative and legislative acts have been issued. The categorization of enterprises according to the degree of environmental hazard has changed; all cement plants belong to the first category (the most dangerous). Currently, almost all reporting on ecology is carried out electronically through the personal account of the nature user. The intensity of the digital transformation of environmental activities is growing (Kuznetsova et al. 2022a). An important role in the strategic planning of an enterprise is played by the possession of advanced foreign experience in the field of environmental protection, as well as the methodology for identifying and managing environmental risks (Kuznetsova et al. 2022b; Tsymbalov et al. 2022). The enterprise ecologist is one of the key figures in developing the ESG strategy.

The environmental block of the ESG strategy includes a set of environmental protection measures in the following areas: materials, energy, water and wastewater, biodiversity, waste, compliance with environmental legislation, and evaluation of suppliers considering environmental criteria (Bik 2021).

The social block focuses on ensuring employment of the population (especially in single-industry towns), the formation of conflict-free administrative and labor relations, ensuring physical and psychological safety, improving the health of employees of the enterprise, improving the qualifications of personnel, ensuring the absence of discrimination, ensuring the possibility of negotiations, refusing child labor, observing human rights, interacting with local communities, assessing suppliers considering social criteria, participating in politics, protecting personal data of employees of the enterprise, complying with socio-economic requirements, building relationships with product buyers, etc.

The level and effectiveness of corporate governance of an enterprise are primarily assessed by economic results and the share of presence in the industry market. Procurement management, anti-corruption, anti-competitive behavior, and taxation also play an important role.

3 Results

Let us consider the experience of formation and implementation of the environmental block of ESG strategy on the example of a cement plant. LLC “Serebryansky Cement Plant” (LLC “SCP”) was put into operation on April 1, 2013, by the holding “BaselCement.” The equipment and technology supplier was Sinoma Engineering International (China). The design capacity of the enterprise is 5000 tons of clinker per day; the annual output of clinker is 1,700,000 tons, and of cement is 1,800,000 tons. LLC “SCP” works on dry technology. Nowadays, it has reached design targets in compliance with the established technological standards for marker emissions of pollutants into the atmosphere. For the ten years of operation, the enterprise planned and implemented a set of environmental measures. The first step toward forming an ESG strategy at the enterprise was developing an environmental policy based on compliance with the norms established by law. The company has publicly stated that it bears environmental and economic responsibility for the impact on the environment.

The stated goals were achieved by the phased implementation of the following activities:

1. Conducting an internal environmental audit to identify priorities in solving environmental problems;
2. Development of a science-based long-term comprehensive program of environmental protection measures and its implementation;
3. Preparation and implementation of the environmental standard of the enterprise and international standards of the environmental management system of the ISO-14000 series;
4. Development of environmental monitoring;
5. Increasing the environmental awareness of workers;
6. Environmental support for existing, modernized, and newly mastered technological processes;
7. Continuous improvement of the environmental performance of the enterprise;
8. Efficient use of financial and material resources to ensure environmental safety;
9. Improving environmental accounting to reduce environmental risks and increase investment attractiveness;
10. Development and implementation of a strategic plan for environmental risk management.

An important element in the formation of an environmentally attractive image of an enterprise is the transparency of environmental information. Often, especially before elections to the authorities, candidates disseminate unreliable, politically biased information about the impact of enterprises on the environment. Therefore, it is important to make reliable information about the impact of the enterprise on the environment available to the public. If it is necessary to hold public hearings on projects planned for implementation, it is necessary to take an active position in explaining the goals and expected environmental results.

Useful activities for environmental education and raising the level of environmental education are as follows:

- Patronage of environmental orientation with preschool institutions;
- Conducting excursions for schoolchildren and students at the enterprise;
- Participation in competitions and business games on ecology;
- Holding seminars, conferences, and environmental events with the involvement of employees of enterprises and residents of nearby communities.

Ecological upbringing and education of the younger generation based on enterprises is the most important state task aimed at raising the general cultural level of the population.

After the signing of the Paris Agreement by Russia, the management company developed and approved the Low-Carbon Development Strategy for the enterprises of the "BaselCement" holding until 2025. The central element of any corporate carbon strategy is to reduce the company's carbon footprint, achieving carbon neutrality in a perfect scenario. A zero-carbon footprint can be achieved in various ways, including the following:

- Reduction of direct GG emissions from sources that are directly controlled by the company;
- Reduction of indirect GG emissions through energy supply and supply chain management;
- Compensation (reimbursement) of unavoidable GG emissions by reducing GG emissions from third parties through participation in carbon projects.

A significant share of GG emissions in the holding was accounted for by "SCP" LLC. For each enterprise of the holding with emissions of over 150 thousand tons per year of CO_2, a strategic plan for environmental risk management was developed. According to rough estimates, implementing the strategic plan for environmental risk management at "SCZ" LLC will require funding in the amount of 2.3 billion rubles.

At the first stage, the corporation provided training for the general directors of the holding's enterprises and specialists under the initial course program, including mastering the methodology for calculating GG emissions. In 2016, the responsible specialists of the holding underwent advanced training by participating in training events organized by the Center for Environmental Investments LLC, CCDS, and the Ministry of Economic Development of the Russian Federation. As a result, "SCP" LLC planned a set of measures aimed primarily at reducing direct GG emissions by switching the kiln to use natural gas instead of coal, partially replacing coal with alternative fuel, improving the thermal insulation of individual kiln units, automating the operation of the clinker cooler, using blast-furnace slag to reduce the consumption of natural limestone, extracting heat from the body of the rotary kiln to generate heat, ensuring the operation of the kiln at maximum capacity, etc. Nowadays, a significant part of these measures has been implemented. The plant runs on natural gas and uses biofuel obtained from dried digested sludge from the treatment facilities of Mosvodokanal. According to preliminary estimates, the level of GG emissions decreased by 17%.

With the release of 219-FZ in 2014 (Federation 2014), the question arose of introducing the best available technologies (BAT) at enterprises and obtaining an integrated environmental permit (IEP) by 2025 (Guseva et al. 2018; Skobelev and Mikaelsson 2020). The plant took an active part in the development of an information and technical reference book on BAT and the procedure for preparing an application for obtaining an IEP. In 2016, to prepare recommendations for the Ministry of Natural Resources of the Russian Federation, for the first time in Russia, a business game was held based on "SCZ" LLC for representatives of cement plants, the BAT Bureau of Rosstandart, Natural Supervision, and Rospotrebnadzor.

The plant uses a water body (Pronya River) for water intake for technological needs and discharge of storm and domestic wastewater. Treatment facilities (TF) have two branches of treatment—biological and physical. Years of operation have shown that the biological treatment branch does not always provide the required degree of wastewater treatment from nitrites. For a cardinal solution to the problem, it was decided to create a closed water circulation system. The design work has been completed, and the start of construction work is scheduled for 2023.

4 Conclusion

The strategic plans in the Russian Federation provide for achieving carbon neutrality by 2060. This goal seems achievable through the mechanism for implementing the ESG principles at industrial enterprises that have a significant negative impact on the environment. Large Russian companies focused on the export of their products are already cooperating with international organizations involved in the field of financial regulation of GG emissions.

An analysis of the performance of cement plants shows that there is significant potential for reducing GG emissions. On the example of a large cement plant, the authors showed the main stages of the formation of the environmental block of the ESG strategy and the sequence of implementation of large environmental projects, including the possibility of creating closed-water circulation systems, which makes it possible to avoid the discharge of wastewater into water bodies.

The main directions for reducing the carbon intensity of cement include the transition of cement plants to the use of dry technology, the introduction of BAT into production, the use of natural gas as a process fuel, the partial replacement of natural raw materials with industrial waste, the optimization of the combustion process in kilns, and the reduction of heat losses.

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Peculiarities of Evaluating the ESG Bonds Yield on the Russian Market

Olga V. Khmyz, Tatyana G. Oross, and Anna A. Prudnikova

Abstract

The research identifies the main features of ESG bonds yield assessment in the Russian stock market, which act as predetermining factors when investors choose appropriate securities. Despite external turbulent conditions, ESG financing in the Russian Federation continues to develop, although there was a slight slowdown in 2022. However, the interest in ESG finance and demand for ESG bonds is quite high. One of the main attractive factors is the greenium characteristic, along with other features of ESG bond yield valuation. That is why we pay special attention to the greenium effect. The research used data from the Climate Bond Initiative, the World Bank, the Cbonds information and analytical agency, and the Moscow Exchange (Sustainable Development Sector), which served as the statistical basis for regression analysis using the least squares method. The research sample included almost 40 issues of Russian ESG bonds. The analysis showed that the dynamics of the Russian and global ESG bond markets have been adjusted. The analysis also showed the beginning of the emergence of specificity in the Russian ESG bond market in recent years, associated with external and internal factors.

Keywords

ESG bonds · Green bonds · Sustainable development goals · Greenium · Russian ESG bond market

JEL Classification

G12 · C12

1 Introduction

The relevance of the research is determined, first, by the global environmental direction, which countries (developed and developing) are in no hurry to abandon despite the current geopolitical difficulties. Second, there is an upward trend in the global sustainable finance market (including in the green bond segment). This trend is predicted for at least the medium term. Given the favorable forecasts, it is quite reasonable to talk about a longer-term progressive trend in the development of the global ESG bonds market. Third, the research relevance is due to the development trends of the Russian ESG financing market, which is also currently riding a wave of financial success (with all its difficulties and inconsistencies).

Many scientific articles and books focus on studying environmental and climate problems, the green economy, and the global energy transition (Zhu et al. 2023). Dedicated research is devoted to financial instruments, primarily ESG and green bonds (Bahra and Thukral 2020; CBI 2023). Far fewer scientific works are devoted to Russian environmental and climate problems (and ESG bonds) (Löffler et al. 2021; Stanley 2022).

Simultaneously, it is noteworthy that there is a greenium effect on the international market (i.e., discount in the coupon rate), which motivates borrowers to attract financing in this format (ESG) (Agliardi and Agliardi 2021; Damianova et al. 2018; Khmyz and Solomenkova 2023). However, there is no consensus in the Russian debt market regarding the existence of the greenium effect. The reality of the Russian bond market is different from others. In global practice, ESG bonds are, as a rule, placed predominantly by large issuers, state, and supranational bodies. In the Russian

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_6

debt market, the ESG bond segment was initially formed by placements of medium-sized companies.

In 2022, the importance of responsible investment (and environmental) factors has decreased slightly. The main reason for this decrease is the increased volatility of the global economy and the global and Russian financial markets (Veselova 2021). First, they are ensuring financial stability, overcoming economic challenges, and the uncertainty of business development. The current task of investors was to preserve savings in conditions of increased inflation and minimize potential losses on the investment portfolio. As the economy recovers from macroeconomic shocks and interest rates stabilize, investor interest shifts toward responsible investment (Kislov and Surkova 2021). However, potential deglobalization trends may slow down this process (Khmyz et al. 2023). In connection with the above, it seems important and timely to analyze the features of assessing the profitability of Russian ESG bonds, considering the current realities of the Russian stock market with an emphasis on the greenium effect.

2 Methodology

By mid-2023, 37 issues of ESG bonds from 21 issuers with a total volume of over 400 billion rubles were placed on the Russian debt market (Expert 2023), including green (with a share of 75%), social (24%), and transition bonds (1%) (Cbonds 2023; Nekrasova and Strelnikova 2023). In terms of the global ESG bond market, the Russian market is relatively small. Issuers placed the majority of ESG bonds in 2020 and 2021.

It is also worth noting the high concentration of the Russian market: the five largest issuers of ESG bonds (Moscow, SOPF Infrastructure Bonds, VEB.RF, Sberbank, and Atomenergoprom) account for more than 80% of the volume of placed issues of such bonds. This concentration is explained primarily by the interest and capabilities of issuers (financial and managerial). Simultaneously, with their high reputation, they contribute to the growth of investor interest in ESG securities and the reliability of this segment of the financial market, ensuring its stability. Therefore, these issuers can be called the locomotive of the sustainable development segment.

However, the bonds placed so far have disparate characteristics, including by type of bonds (in the modern Russian debt market, the predominant share of 94% falls on classic issues of ESG bonds, while concessional and structural ones account for only 3%) and type of coupon rate (ESG bonds with a fixed coupon rate account for 69% of all relevant securities placed on the Russian debt market, and the remaining 31% are ESG bonds with a variable coupon rate).

Since the Russian ESG bond market is dominated by classic instruments with a fixed coupon rate, taking these facts into account, it is advisable to reduce the sample of ESG bond placements for our analysis, leaving only issues that meet the following criteria:

- Conventional bonds (standard type of issue, without subordination and other complicating factors for the structure of the issue).
- Fixed coupon rate (the most popular type of coupon rate, which makes it possible to compare price conditions and the potential greenium discount through a spread to the yield of federal loan bonds—OFZ).

The adjusted sample of issues includes 21 issues of ESG bonds by 14 borrowers with a total volume of 265.1 billion rubles.

Given the inability to use quotes on the secondary market due to the limited liquidity of ESG bonds on the Moscow Exchange, as well as the limited number of initial placements of such bonds, it is impossible to use a multifactor regression model for the purposes of this research. As a rule, on the Russian secondary bond market, the issue largely loses its liquidity during trading within several months after the start of circulation, which subsequently makes quotes for this bond completely unrepresentative for the purposes of this research.

As an optimal tool for assessing the presence of a discount when placing ESG bonds, the authors decided to individually study 21 primary placements, comparing the spread to OFZ for such securities during placement with the average spreads to OFZ:

1. For conventional (non-ESG) bonds of the same issuers during the primary placement and on the secondary market (if there is sufficient liquidity);
2. For conventional (non-ESG) bonds of issuers with a comparable credit rating during the initial placement and on the secondary market (if there is sufficient liquidity).

Simultaneously, the approach to calculation based on such statistical data must be completely standardized and correspond to the methodology for comparing average spreads to OFZs, which requires the following inputs:

- The average value of the greenium valuation (+)/premium to conventional bonds (−) is calculated as its average value for the entire sample (21 initial placements);
- The value of the greenium assessment (+)/premium to conventional bonds (−) for each of the 21 issues we count as the difference between the spread to OFZ on ESG bonds at the initial placement and the average value between:

- The average spread to OFZ for initial placements of conventional bonds of issuers with a comparable credit rating before the transaction to place the issue of ESG bonds under consideration;
- The average spread to OFZ for initial placements of conventional bonds of issuers with a comparable credit rating after the transaction to placement of the issue of ESG bonds under consideration;
- Average spread to OFZ on conventional bonds of issuers with a comparable credit rating on the secondary market with a duration of more than one year, as well as with sufficient liquidity of the paper (turnover over 1 million rubles per day).

For the purpose of comparing spreads to OFZ for primary placements, a time range of ± 1 month is used relative to the time of placement of ESG bonds. To conduct a comparative analysis of the secondary market, it is also advisable to use spreads on federal loan bonds with adjustments from the secondary market on the day of placement. Another limitation is the need for comparison while maintaining a sector breakdown. That is, ESG bonds of the corporate segment are compared with counterparts of the same real sector, reflected in the primary and secondary markets. Spreads to federal loan bonds on ESG bonds of financial sector issuers are compared exclusively with bonds on the primary and secondary market of issuers of the same financial sector (banks, leasing companies, etc.). Spreads to federal loan bonds on ESG bonds of issuers of the sub-federal sector are compared exclusively with bonds on the primary and secondary market of issuers of the same sub-federal sector. When comparing spreads to federal loan bonds, only bonds involving senior unsecured debt are used; spreads to federal loan bonds in the secondary market are calculated in accordance with the Cbonds data (Cbonds 2023).

For example, the average spread to federal loan bonds in the secondary market, considering the issue volume, duration, and yield percentage during placement for classic bonds with the highest credit rating in 2022, was 88 basis points (bp) a month before the placement and 98 bp a month later after placement. Whereas for green bonds of Atomenergoprom—75 bp. Consequently, the calculated greenium to classic bonds was 18 bp.

3 Results

Considering the indicated inputs, the estimate of greenium (+)/premium to classic bonds (−) was calculated for each studied issue; the average estimate for the entire sample was calculated (Table 1).

The average value for the sample was 3 bp, with a minimum value of − 6 bp and a maximum of 18 bp. The significant spread of values (positive and negative), as well as the average value, which is close to zero values, limit the ability to clearly confirm the presence of greenium in the Russian debt market.

Based on the above calculation, according to the formed sample, there is no evident tendency for the presence of greenium. If we assume the presence of a greenium in the Russian debt market of ESG bonds, then this value is negligible and insignificant from the point of view of the potential for savings on the coupon rate for the borrower.

At the same time, in 2023, according to the Expert RA survey (the survey covered corporations and regions of the Russian Federation), more than 2/3 of respondents saw the optimal greenium value within 20 bp. (Goldberg and Reed 2023), which in general can be achievable subject to the introduction of incentive measures for investors on the market, but at the moment, there are no sufficiently clearly defined government support measures that would contribute to the systematic operation of the greenimum effect.

Considering the presence of the greenium effect in the global ESG bond market and the corresponding assessment of the cost of attracting financial resources for ESG bonds in developed countries (Khmyz and Solomenkova 2023; MOEX 2023), especially European ones, with a discount compared to traditional bonds of approximately 4 bp.

A number of incentive measures for ESG bonds have been formed on the international market, which contributes to the formation of the greenium effect. Among such measures are regulatory relaxations for financial institutions and funds in terms of investing in ESG bonds compared to conventional bonds. We can also note the issue of optimized taxation in relation to investors participating while the sustainable development bonds are taking placement.

At the same time, there is a trend towards deglobalization, formed in 2022, in conditions of geopolitical tension and increased volatility in financial markets.

In addition to this, in international practice, unlike in Russia, in the contemporary years, we can see an anti-trend in the use of ESG financial products. According to several state authorities, ESG practices are a worldwide attempt to introduce a new political ideology into the financial sector, placing politics above the fiduciary duty to make the best financial decisions for beneficiaries (Binnie and Kerber 2023). Thus, the future fate of greenium in international practice may be in question, which cannot be said to the same extent about the Russian market.

The year before 2022 has also seen growing interest from private investors in ESG investing. This was a global trend that unfolded against the backdrop of new problems faced by the world community in 2022 (increased volatility in the financial market, a widespread increase in inflation, a decline in the quality of life, etc.).

Table 1 Calculation of the "greenium" assessment for the emissions under consideration

Issuer, issue series	Credit rating upon placement	Bonds type	Placement date	Spread to OFZ upon placement, bp	Greenium rating (+)/ premium to classic bonds. (−), bp
KB Center-invest, БО-001P-06	A(RU)/−	Green	November 15, 2019	246	**5**
FPK Garant-Invest, 001P-06	BBB + (RU)/−	Green	December 17, 2019	613	**3**
KB Center-invest, БО-001P-07	A(RU)/−	Green	December 9, 2020	153	**7**
FPK Garant-Invest, 002P-02	BBB–(RU)/−	Green	December 28, 2020	535	**5**
MTS, 001P-18	−/ruAAA	Social	March 26, 2021	43	**5**
Moscow, 74	AAA(RU)/−	Green	May 27, 2021	52	**2**
Atomenergoprom, 001P-01	−/ruAAA	Green	June 25, 2021	67	**3**
Sinara-TM, 001P-02	A(RU)/ruA	Green	July 28, 2021	198	**4**
SOPF Infrastractual bonds, 01	AAA(RU)/ruAAA	Social	September 23, 2021	113	**− 5**
Sberbank of Russia, 002P-01	AAA(RU)/−	Green	November 12, 2021	71	**4**
KAMAZ, BO-П09	A + (RU)/−	Green	November 24, 2021	146	**2**
Ink-Capital, 001P-01	A + (RU)/ruA +	Transitional	December 17, 2021	185	**5**
SOPF Infrastractual bonds, 02	AAA(RU)/ruAAA	Social	December 23, 2021	74	**3**
VEB.RF, PBO-002P-33	AAA(RU)/−	Green	July 21, 2022	156	**5**
SOPF Infrastractual bonds, 03	AAA(RU)/ruAAA	Social	October 18, 2022	130	**6**
Atomenergoprom, 001P-02	−/ruAAA	Green	December 6, 2022	75	**18**
Rostelecom, 001P-06R	AA(RU)/−	Social	December 9, 2022	83	**− 4**
SOPF Infrastractual bonds, 04	AAA(RU)/ruAAA	Social	December 21, 2022	125	**5**
Bank DOM.RF, 001P-01	AA(RU)/ruAA	Green	February 21, 2023	152	**− 4**
ROSBANK, BO-003P-01	AAA(RU)/ruAAA	Social	April 7, 2023	126	**− 6**
SOPF Infrastractual bonds, 05	AAA(RU)/ruAAA	Social	May 26, 2023	126	**− 5**
				Average	**3**

Source Calculated by the authors based on (Cbonds 2023)

4 Conclusion

The analysis showed that, in general, current trends in the Russian and international ESG bond markets are similar. However, we found that in the Russian debt market, the presence of the greenium effect is currently not obvious. On the one hand, corporations, as issuers, see the potential for a discount to the market coupon rate when issuing ESG bonds. Moreover, this motivates them to implement such placements in the hope of achieving better conditions for attracting financing. On the other hand, at the moment, there are no established government support measures that would contribute to the systemic operation of the greenimum effect, for example, optimization of taxation in relation to ESG bonds, as well as reduced risk weights for bank loan portfolios held to maturity (in accordance with the 199-I Instruction (Central Bank of the Russian Federation 2019)).

The lack of greenium limits the potential of the market—participants from the real sector have no motivation to attract green financing, which limits investment in the low-carbon economy.

In the absence of apparent incentives for investors to participate in placements of ESG bonds on the Russian market, the feasibility of an issuer placing a new issue of sustainable development bonds at the moment may be primarily of an image nature rather than an economic one.

The Bank of Russia has historically maintained a conservative policy on stimulus, fearing bubbles. Simultaneously, the Bank of Russia is at the stage of creating a regulatory framework. Market participants expect active action from the Bank of Russia after the necessary legislative framework in the field of sustainable development is finalized because ESG and climate projects certainly have increased social significance nationwide.

Possible recommendations regarding incentives for investors in ESG bonds in the Russian financial market include the following:

- Reduced risk weight for banking portfolios (instruction 199-I) (Central Bank of the Russian Federation 2019);
- Relaxation of requirements for the Lombard List of the Bank of Russia in relation to ESG bonds;
- Expanding the share of these bonds in the overall structure of assets allowed for investment in portfolios of pension savings and reserves;
- Expanding the share of ESG bonds in the overall structure of assets allowed for investment in portfolios of insurance reserves;
- Reduction of the tax rate on ESG bonds for legal entities and individuals.

Until 2022, the Russian ESG bond market looked at the global vector of the development of ESG markets when determining its own development vector. In the context of current global trends towards deglobalization, the further development of the Russian market may have its own path, the implementation of which could potentially provide Russian market investors with the necessary incentives to participate in the placement of ESG bonds, which can subsequently create a systemic and noticeable greenium effect on such bonds and, as a result, motivate issuers to use this type of financing not only as a reputational tool but also as a more effective source funding in terms of borrowing costs.

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Assessment of the Contribution of Basic Types of Security to Sustainable Development

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Abstract

The purpose of the study is to assess the impact of the basic types of security that form the overall national security system on ensuring sustainable socio-economic development. The work was carried out on the basis of a discrete information analytical space of national security developed by us, structured according to the levels of examination, kinds of securable objects, types of security and regulation instruments. The research methodology is based on fundamental scientific works, as well as official documents on the problems of ensuring national, economic, information, food, environmental and other types of security. In addition, the achievements of modern research in the field of innovation management and sustainable development were taken into account. The presented results of the work are obtained based on economic and systemic types of analysis using the tools of set theory, multidimensional information spaces and information modeling. The interrelations between economic, social, information, industrial, energy, food, environmental, transport, military (defense) types of security, as well as the spheres of culture, education, demography and health care are investigated. The role and place are identified, and the contribution of the above-mentioned basic types of security that make up the national security system to ensuring sustainable socio-economic development is assessed. This study is a continuation of our research in the field of sustainable development and green economic growth, https://link.springer.com/chapter/10.1007/978-3-031-28457-1_3

Keywords

Sustainable development · Green growth · National security · Economy · Social responsibility · Regulatory instruments

JEL Classification

O44 · Q01 · Q57

1 Introduction

Green growth of business and economy is inextricably linked with sustainable socio-economic development. The very concept of green growth is a continuation of the direction of green economy and the earlier concept of sustainable development, implying the relationship of economic, social and environmental characteristics. Sustainable development, in turn, involves ensuring a sufficient level of national security and all the individual types of security integrated into it. Thus, in the modern world, economic growth is impossible without energy, information, environmental, food and a number of other types of security. An additional confirmation of the above is the National Security Strategy (National Security Strategy 2021, paragraph 3), of which states that an appropriate level of national security is an essential condition for sustainable socio-economic development.

Thus, the provision of each individual type of security should be interconnected with the general provision of all types of security that form the national security system.

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Only such an integrated approach will ensure sustainable social and economic development of the national economy.

As we have shown in our published works (Tulupov 2019; Tulupov et al. 2023a, 2020, 2022), to date, the problems of the interrelation of various types of security in the field of developing a mechanism for ensuring sustainable socio-economic development, as well as their impact on ensuring national security in general, have not been sufficiently investigated.

2 Methodology

In one of the works (Tulupov et al. 2023b), we have developed and presented a discrete model of national security in a matrix-morphological form. The geometric representation of this model is a multidimensional information and analytical space of national security, which, in the first approximation, with three-dimensional structuring, includes the following coordinate axes:

(1) the types of security provided—economic, public, food, industrial, energy, in the fields of health and demography, culture and education, environmental, information, transport, military (defense);
(2) types of protected objects—man, fauna and flora, inanimate nature, social group, organization (firm, enterprise), locality (city, town, village, settlement, etc.), region (subject of the federation), state;
(3) regulatory instruments—legislative (Constitution of the Russian Federation, Codes, federal laws and all the relevant hierarchy of regulatory legal documents from federal, sectoral to regional and local government level); administrative (licensing, expertise, certification, audit, impact assessment, etc.); informational (cadastre management, monitoring, mapping, various information systems); economic (targeted financing, subsidies, grants, taxes, subventions, transfers, benefits, quotas, loans, payments, fines, duties, refundable deposits, insurance, etc.).

To determine the role and place of certain types of security in ensuring the national security complex, we describe the proposed multidimensional space through the totality of its coordinate axes or bases of division by the expression of the information set:

$$\{O_i; R_j; S_k | i = 0 \div 8; j = 0 \div 4; k = 0 \div 11\} \quad (1)$$

where: O_i—variants of protected objects; R_j—regulatory instruments under consideration; S_k—the type of security in question.

For a visual representation, the national security model is structured and presented by us in the form of a three-dimensional space in which the variants of the division criteria under consideration are i = from 1 to 8, j = from 1 to 4, k = from 1 to 11. For a more accurate assessment, we increase the detail of structuring, considering the instruments of regulation R in the form of separate axes, and also introduce additional aspects of consideration presented in the article (Tulupov 2023), which makes the national security space multidimensional.

The position of any evaluated object, regulator, or security method in the presented discrete space can be described by the coordinates that it occupies in the national security information model:

$$\begin{aligned} &\{O_i; R_j; S_k | \forall i = 0 \div 8; \forall j = 0 \div 4; \forall k = 0 \div 11\} \\ &\in \{O_i; R_j; S_k | i = 0 \div 8; j = 0 \div 4; k = 0 \div 11\} \end{aligned} \quad (2)$$

The corresponding coordinates satisfying the criteria of the type of security under consideration in the information space of the national security model can be expressed quantitatively in information units (IU) (Mudretsov et al. 2019; Myaskov and Tulupov 2019; Tulupov and Petrov 2018; Ziyadullaev et al. 2021). In this case, the state of a particular object under consideration or the method of its assessment, provision, depending on the aspect of consideration, can be represented by a point (if only one value is considered on each coordinate axis), a segment (if more than one value is on one of the axes), a fragment of a plane (if more than one value is on two axes) or a geometric shape (when more than one value is on all axes).

The amount of information in the IU or the reliability of the assessment of the security of a particular object or sphere of influence of a particular approach to ensuring security is expressed by the projection of a multidimensional figure on the corresponding coordinate axes of the national security space and is quantitatively obtained from the expression:

$$V = l_O \times l_R \times l_S \times \ldots \times l_N (IU) \quad (3)$$

where: l_O; l_R etc.—the number of options that correspond to the type of security under consideration on the basis of division O, R, S, etc., depending on the degree of structuring of the national security model N.

3 Results

Considering economic security in the structure of national security, we note that this type of security is provided for a person, a social group, an organization, a city, a region and a state (O = 6) with the help of the entire nomenclature of regulators presented (R = 4). Fauna and flora are not subjects of economic activity; therefore we do not distinguish these aspects in this type of security. Economic security has

an impact on such types of security (S = 10) as public (economic stability ensures prosperity and a proper standard of living, reduces inequality and social conflicts), health, culture and education (in developed economies, medicine, education and, in general, the cultural level at a higher level compared, for example, with developing countries), industrial (see passport of the specialty "industrial economics"), food (economic well-being affects a high level of food security), energy (economic stability is influenced by fuel- and energy supply to consumers), environmental (in economically developed countries, more attention is paid to ecology, while in developing countries there is not enough money for this area), transport (disclosed within the framework of a separate direction "transport economics"), and military (socio-economic conflicts lead to the emergence of internal and even external military threats).

The results of the analysis of the need for each type of security for the selected objects of the national security system are presented in Table 1. The mutual influence of various types of security is presented in Table 2. At the same time, it should be noted that all types of security are interconnected, directly or indirectly affect each other. Therefore, when compiling the Table 2 took into account only the options of obvious influence.

Public security affects a person, a social group, an organization, a city, a region and a state (O = 6) and is regulated by legislative, administrative, economic and information tools (R = 4). Security in the fields of healthcare, demography, culture and education is also aimed at the above components (O = 6, R = 4). Industrial safety is provided for the entire range of selected objects (O = 8) with the help of all possible regulatory instruments (R = 4). Industrial security is ensured with respect to the entire nomenclature of the selected objects (O = 8) with the help of all possible regulatory instruments (R = 4). Energy security is associated with all objects except the animal and plant world (O = 7). Environmental safety is fully ensured for all facilities (O = 8) using a wide range of regulators (R = 4). Information security is relevant for a person, a social group, an organization, a city, a region and an entire state (O = 6). By analogy, the situation is with transport security. Military or defense security is provided not only for humans, but also for certain natural territories, as well as objects of inanimate nature (O = 8) using a wide range of regulators (R = 4).

Using the tools of formulas (1–3), we calculate the contribution of certain types of security to national security:

- economic security: 68 IU;
- security in the field of health and demography: 41 IU;
- security in the field of culture and education: 34 IU;
- social security: 41 IU;
- industrial security: 45 IU;
- food security: 48 IU;
- energy security: 64 IU;
- environmental security: 72 IU;
- information security: 41 IU;
- transport security: 21 IU;
- military (defense) security: 45 IU.

It is clearly seen from the presented values that the information sets described by one or another type of security are intersecting. That is, if economic security has an impact on national security with a result of 68 IU, it does not mean

Table 1 Ensuring security depending on the object of consideration

Type of security, S	Security object, O							
	Person (personality)	Fauna and flora	Inanimate nature	Social group	Organization (firm, enterprise)	City, locality	Region	State
Economic	+			+	+	+	+	+
Social	+			+	+	+	+	+
In the field of demography and healthcare	+			+	+	+	+	+
In the field of culture and education	+			+	+	+	+	+
Industrial	+	+	+	+	+	+	+	+
Food	+	+		+	+	+	+	+
Energy	+		+	+	+	+	+	+
Environmental	+	+	+	+	+	+	+	+
Information	+			+	+	+	+	+
Transport	+			+	+	+	+	+
Military (defense)	+	+	+	+	+	+	+	+

Source Developed and compiled by the authors

Table 2 Mutual influence of certain types of security in the national security system

Type of security, S	Economic	Social	In the field of healthcare	In the field of culture and education	Industrial	Food	Energy	Environmental	Information	Transport	Military (defense)
Economic		+	+	+	+	+	+	+	−	+	+
Social	+		−	+	−	−	−	+	+	−	+
In the field of demography and healthcare	+	−		−	+	+	−	+	−	−	+
In the field of culture and education	+	+	−		−	−	−	+	+	−	−
Industrial	+	−	−	−		−	+	+	−	−	+
Food	+	+	+	−	−		−	+	−	−	+
Energy	+	+	+	−	+	+		+	−	−	+
Environmental	+	+	+	−	+	+	+		−	+	−
Information	+	+	+	+	−	−	−	−		−	+
Transport	−	−	−	−	−	+	−	+	−		−
Military (defense)	+	+	+	−	−	−	−	−	+	−	

Source Developed and compiled by the authors

that other types of security account for the remaining 32 IU. The components of national security affected by economic security may also be influenced by other types of security. The same component of national security can be affected by several factors under consideration at once. Thus, it is through integrated interaction that the proper provision of sustainable socio-economic development is achieved, an integral component of which is green business growth.

4 Conclusion

The analysis has shown that the greatest contribution to ensuring sustainable socio-economic development is provided by economic, energy and environmental types of security. The significant weight of economic security confirms the point of view of modern researchers (S.Y. Glazyev, A.E. Gorodetsky, V.K. Senchagov), who consider this type of security as basic or essential for ensuring national security. The large impact of energy security indicates the high vulnerability of the economy of any country to insufficient fuel and energy supply. This fact is confirmed by a recent example when the sanctions imposed by the European Union on Russian energy resources have primarily affected the socio-economic well-being, the change in the structure of industrial production (the closure and transfer of energy-intensive industries to other countries, the reactivation of dirty coal-fired power plants) of European countries. Such actions influence not only the labor market, but also entail an increase in the adverse impact on the environment. The significant weight of environmental parameters on national security can be explained by the high environmental requirements imposed in the modern period, including efforts to provide most types of security.

Food security affects almost up to 50 IU in the national security model, i.e. it has an impact on every second case or half of all the characteristics of ensuring sustainable socio-economic development.

Industrial, information, social and military (defense) types of security, as well as security in the field of demography and health care have a less significant, but also sufficient (from 41 to 45 IU) impact on national security.

The contribution of security in the sphere of culture and education is also noticeable (34 IU) in terms of ensuring national security, and security in the field of transport has the least impact (21 IU). At the same time, ensuring the latter is also necessary, since this type of security affects more than a fifth of the structural components of sustainable socio-economic development.

Thus, the analysis has shown that only a comprehensive systematic approach to ensuring basic types of security in the national security system guarantees decent inclusive green growth of business and economy in accordance with the basic principles of sustainable development.

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ESG Concept in the Context of the Regional Ecological Development

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Abstract

The main environmental problems of paramount importance are the increased volume of waste produced, accumulation and disposal of toxic garbage, and climate change due to greenhouse gas emissions into the atmosphere, particularly carbon dioxide. Russia has a status of the "major economy," which is focused on extractive industries and natural resources. As a result, the country has many problematic issues in the field of environmental pollution, namely the negative impact of regional enterprises and hazardous waste management. In this regard, the research explores the scientific category "ecological portrait of a region" against the background of the ESG concept. The research considers the national project "Ecology" and the ESG concept from the perspective of a regional ecological portrait establishment. The authors determine the essence of the term "ecological portrait of a region" and the stages of drawing up an ecological portrait of the region. Moreover, the authors present indicators for each stage that can be used to assess the environmental safety, management, and efficiency of the region. Additionally, they describe the relevant aspects of a regional ecological portrait. The research results allowed the authors to conclude that eco-efficiency is an express indicator of a regional ecological portrait.

Keywords

Regional ecological portrait · ESG concept · Environmental safety · Environmental management · Environmental efficiency · Eco-efficiency · National project "Ecology"

JEL Classification

O13 · P18 · P28

1 Introduction

Contemporary social and economic development of humans is based on achieving a balance of three main elements: economic growth, social integration, and environmental protection. Achieving the balance of these three elements brings the enterprise to sustainable development. These elements are the basis of the ESG (ecology, social policy, and corporate governance) concept (Mazhorina 2021).

Among the three components of the "ESG" triad, the environmental one is of prime importance because the environmental requirements of consumers increase, the requirements of state regulatory authorities become tougher, and public awareness of environmental issues grows. The main aspect is energy efficiency. This gives rise to the urgency of drawing up a regional ecological portrait (Mazhorina 2021).

2 Methods

In 2018, the government accepted the national project "Ecology," which is aimed at minimizing the negative effect on the environment. The considered project comprises eleven federal project works. They can be classified into six subgroups (Table 1).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_8

Table 1 Subgroups of the national project "Ecology"

Subgroup	The subgroup name	Project
The 1st subgroup	Waste	"Preserve our pure homeland," "Infrastructure for safe management of waste of different hazard classes"
The 2nd subgroup	Fresh air	"Preserve fresh air!"
The 3rd subgroup	Water and its Objects	"How can we restore the Volga?", "How to preserve pure water?", "How can we protect the lake Baikal?", "What are the steps to preserve unique water objects?"
The 4th subgroup	Ecotourism and Biological Diversity	"How to preserve the biological diversity and develop eco-tourism?"
The 5th subgroup	Wood	"How can people restore wood?"
The 6th subgroup	BAT (Best Available Technique)	"Applying the BATs"

Source Complied by the article authors

The purpose of realizing the given project is to solve the following significant tasks (Anufriev et al. 2022):

1. To preserve the biological diversity;
2. To ensure the ratio of 100% balance of the disposal and reproduction of forests;
3. To manage the production and consumption waste effectively and remove the unauthorized dumping grounds near the cities' borders;
4. To improve the drinking water quality for all people on the planet, notwithstanding their place of residence (big cities or settlements);
5. To significantly reduce air pollution, especially in large industrial centers.

3 Results

In trying to achieve the project goals, it is advisable to apply the ESG concept, which began to form in the 1970s as a response to the environmental, particularly the climate, crisis and economic inequality between developed and developing countries. The abbreviation ESG stands for as follows:

- Ecology (E), i.e., responsible environmental management;
- Social policy (S), high social responsibility;
- Corporate governance (G – governance).

The ESG conception can be correlated with ESCG factors (Table 2).

Working with the unit of assessment E, we are to assess the environmental risks in a region's activities. This unit of assessment comprises different categories.

The base for assessing the environmental component in the ESG conception is the wide-ranging analysis of the eight groups of indicators:

1. The indicators concerning climatic change. Considering this group of indicators, we are to assess the different risks connected with climatic change within the list of current risks for a region, integration degree of the global climatic change agenda into the regional activities. It is also necessary to assess the presence of a climatic change adaptation program and the participation in international voluntary initiatives in sustainable development, climate action, or voluntary certification.
2. The indicators concerning biological diversity. Using these indicators, one can assess the arrangements a company makes to maintain biodiversity. They are applied for assessing the biodiversity impact degree, the availability of biodiversity conservation programs, realized activities in the protected areas or wetlands of the Ramsar Convention and in the territories characterized by enhanced biological value, and the number of species

Table 2 The content of the ESG concept

Block	ESG		ESCG factors	
	Abbreviation	Definition	Factor	Content
Unit of assessment E	E	Ecology	Environment	Responsible environmental management
Unit of assessment S	S	Social policy	Society	High level of social responsibility
Unit of assessment G	G	Governance	Corporate governance	Qualitative corporate governance

Source Complied by the article authors

on the territories influenced by the region's economic activities.
3. The indicators concerning energy performance. We can list the quality of energy consumption management, the availability of the programs for energy efficiency improvement, and energy intensity.
4. The indicators connected with garbage and packing material. These indicators pay attention to regional programs and policies for disposing of household garbage and industrial waste, as well as the share of recycled and disposed waste.
5. The indicators connected with land use. This group of indicators estimates the land reclamation program for those regional enterprises that pollute land due to their industry specifics.
6. The indicators concerning air pollution. These indicators are designed to evaluate emissions of pollutants into the atmosphere and greenhouse gas emissions in CO_2 equivalent.
7. The indicators concerning water use. Applying these indicators, a researcher is to evaluate water consumption, the use of recycled water, and the disposal of aqueous wastes in the surface watercourse.
8. The indicators concerning the environmental management system. Working with the given group of indicators, one should pay attention to the availability of an environmental management system and the management quality in the sphere of environmental protection. It is also necessary to assess the program "A green office," a strategy or policy for environmental protection, environmental requirements for contractors and suppliers, and the availability of environmental education programs.

4 Discussion

The authors studied the tasks and the goals of the project "Ecology" and the ESG concept. On the basis of the received results, the authors conclude that the development of a regional ecological portrait is an effective tool for achieving the stated project's goals and solving its tasks. For this purpose, the government of the Russian Federation adopted the document in which they approved the projects' key points for sustainable development in Russia and requirements for verifying the system.

The Ministry of Economic Development of the Russian Federation and the Bank for Development and Foreign Economic Affairs worked out the national methodology, which enumerates "criteria in the following areas: waste management, energy, construction, industry, transport, water supply, agriculture, and conservation of biodiversity and natural landscapes, and establishes requirements for verifying the system, financial instruments for sustainable development, and verifiers" (Ermakov 2021; Krasnoshchekov and Semenduev 2013).

On this basis, it is possible to define a regional ecological portrait as the explanation of a region's activities in three areas from the perspective of environmental safety, environmental management, and environmental efficiency.

Compiling an ecological portrait of the region makes it possible to implement the eco-efficient regime, "the purpose of which is to reduce the impact of regional enterprises on the environment, with the simultaneous steady growth of the region's activities" (Mazhorina 2021; Sozinova et al. 2022).

It is proposed to develop a regional ecological portrait in accordance with the following three directions:

1. Environmental safety of a zone;
2. Regional environmental management;
3. The achievement of the environmental efficiency of a zone.

The first step of developing a regional ecological portrait is devoted to assessing the environmental safety of the regional enterprises' activities. At this stage, a regional ecological portrait is developed from the perspective of the environmental safety of the resources and technologies used at enterprises, as well as the finished products produced.

In the second stage, the environmental management of the region is assessed. A regional ecological portrait is developed from the perspective of such management, which contributes to the environmental safety of a region's activities.

The third stage assesses the environmental efficiency of the region's activities. The results of this stage allow us to complement the ecological portrait of a region from the perspective of the effectiveness of measures and actions aimed at the environmental safety of its activities.

The process of developing a regional ecological portrait implies the obligatory calculations of the environmental safety indicators of any region. The given indicators are divided into some groups: gas, liquid emissions, solid waste, radiation, technological facilities and equipment, supply and delivery, products, production, raw materials, basic and auxiliary materials, and energy sources.

Each group contains a list of indicators that can be used to analyze the level of environmental safety of raw materials, basic and auxiliary resources, energy inputs, technological equipment and facilities, supply and provision of goods, output, production, the level and availability of influence of flowing emissions, solid waste, radiation, and gas (Table 3).

After assessing the environmental safety indicators of a region, the next important step is to calculate and forecast the environmental management indicators of a region.

Table 3 Indicators of the regional environmental safety

Indicator group	Indicator title
Raw material	Harmful and toxic materials and substances availability in the technological process; raw stuff ingredients, which can contain harmful substances; the amount of materials per unit of production, etc
Energy sources	Energy consumption; disposal of untreated and insufficiently treated wastewater into surface reservoirs; water consumption; recycled water use, etc
Equipment amenities	The number of contingencies per year; land for production; how many hours does the equipment functions per year
Supplies	How much fuel is used by all the vehicles; how many truck haulages are there every day; etc
Products	Recycling technology; the share of recycled and disposed hazardous waste; the share of recycled and disposed non-hazardous waste, etc
Production	Accident rate; safety arrangements; technological regulations
Emissions, waste, radiation	Composition and amount of emissions into the atmosphere; discharges; composition and amount of solid waste; radiation level; noise level, etc

Source Complied by the article authors taking into account (Ashmarina et al. 2023; Sozinova et al. 2023a, 2023b, 2023)

The second stage in developing a regional ecological portrait is assessing environmental management, which is implemented at an enterprise. At this stage, it is first necessary to assess the compliance of the company's activities with regulatory legal requirements and the level of the environmental management system operation.

For this purpose, the objectives of environmental policy and the number of pollution prevention measures implemented must be clearly defined. A researcher working with this topic needs to define the exact number of achieved targets and planned indicators, the number of employees having specific training, and the results of testing employees' knowledge on environmental aspects of the region's activities. The environmental standards and the absence of penalties for their violation, as well as the availability of the database with regulatory legal acts and their update, are also a significant part of a researcher's attention.

In addition, it is mandatory to calculate current and capital costs that relate to the environmental aspects of products or processes. If measures have been taken to prevent pollution or recycle waste, then savings are to be shown.

Indicators reflecting the environmental management of the region include the following indicators:

- The number of programs or useful information for the population eager to research environmental issues;
- Motivation to perform environmental activity;
- The availability of environmental training programs;
- The number of emergency conditions per year;
- Land for production;
- The indicators concerning media hype (comments and research papers on environmentally-related cases);
- Resources attracted to ensure public support for environmental programs.

The final (third) stage in developing a regional ecological portrait is to analyze the regional ecological efficiency. For this purpose, the following calculations are made:

1. To calculate the degree of the environmental sustainability of production. It is calculated as the ratio of the environmental costs of a region to the total costs. This category expresses the content of environmental costs of a region in their total costs;
2. To calculate the degree of environmental efficiency. It is calculated as the ratio of the financial result that is fulfilled in production activities to the environmental costs of the region (costs for atmospheric air protection, water resources, and land). The category shows the financial result per unit of environmental costs of a region;
3. To calculate the extent of environmental friendliness of products. It can be considered as the volume of products certified for environmental friendliness and safety to the total costs.

5 Conclusions

The research yielded the following conclusions. The process of developing a regional ecological portrait makes it possible to evaluate the eco-efficient approach of work used at the enterprises of any region. The described approach is aimed both at minimizing the impact on the environment and increasing its profitability.

Eco-efficiency includes ecological and economic proficiency. This term reflects the productivity of natural resources.

As a comprehensive indicator of a region's eco-efficient regime, we must apply environmental accounting and analysis, providing accurate information on environmental costs, savings and analysis of the environmental impact of economic activities to determine the eco-efficiency category under study.

We can emphasize that the studied term signifies the specific influence of regional industrial enterprises on producing goods and the environment from the point of view of energy consumption per one unit of production.

The drive to achieve economic benefits by means of reducing the impact on the environment and the natural resources used is the establishment of the eco-efficiency principle.

The studied category of eco-efficiency expresses a ratio value in a regional ecological portrait. It contemplates the ratio of environmental and financial efficiency.

Thus, drawing up a regional ecological portrait makes it possible to conduct an ongoing assessment of the region's activities from the perspective of environmental safety and develop a strategy aimed at effective management of those elements of activities having a significant effect on the environment.

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Communication Management in the Implementation of CSR of Russian Enterprises of the Eating Out Market: Agents of the Microenvironment

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Abstract

Purpose The article is devoted to the problem of expanding the tools of marketing communications for restaurants by adding a new group of communication channels—horizontal ones. Agents of the microenvironment of the enterprises of restaurant business were chosen as sources of information regarding horizontal channels. The key objective of the study was to substantiate the formation of a list of stakeholders specific to the restaurant industry, whose integration into the communication process seems feasible and viable. *Design/methodology/approach:* The conceptual and theoretical basis of the research is the concepts of integrated marketing communications and marketing management, as well as the theory of stakeholders. The information base of the study is presented by Nielsen analytical reports, as well as the results of the field research conducted by the author. The study was conducted by the method of expert assessments and ABC analysis in order to prioritize stakeholders according to the level of their influence on the communication process. *Findings/value:* As a result, quantitative estimates of the importance of individual subgroups of stakeholders for participation in brand communications are given, and a matrix of success of stakeholder participation in communications is developed. At the same time, it has been revealed that the most promising participants-mediators of the communication process for the restaurant business enterprises are the following subgroups of stakeholders: opinion leaders, media, consumers, senior and middle management, staff, sponsors, partners, intermediaries.

Keywords

Corporate responsibility · Communications management · Horizontal channels · Stakeholder approach · Restaurant marketing

JEL Classification

M31 · M37

1 Introduction

The decrease in the effectiveness of classical traditional and digital sources of communication, the transformation of the consumer's role in brand communications - from a passive recipient to an active communication subject - the growing expectations of consumers of a clear position of brands in relation to socially significant issues and the company's actions for the benefit of society actualizes the problem of identifying alternative sources of communication for business.

At the same time, the advantages of corporate social responsibility (CSR) programs for achieving the communication and business goals of the organization are obvious: strengthening the success of the organization through the implementation of the most important public request, improving the reputation of the company (Doholyan 2015), reducing costs, creating additional sources of profit, reaching a wide range of consumers, as well as forming long-term loyalty (Gulyuk and Novichkova 2018). It should also be noted the possibilities of strengthening partnerships, improving the company's rating in the domestic and international markets, increasing brand awareness and competitiveness (Kurganova and Saprykina 2020). Thus, CSR implemented by an organization can be considered as an effective communication tool. There is also an obvious connection between the CSR concept and the stakeholder

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_9

theory, in which the latter act as "customers" and "consumers" of CSR products. The novelty of the approach of this study consists in analyzing the possibilities of involving stakeholders as a communication source to achieve CSR goals.

In the paradigm of the classical approach to marketing communications management, elements of alternative channels (stakeholders) refer to sources of "unplanned appeal" that are not managed by marketing communications specialists, but represent a potentially valuable addition to the classical pentad (advertising, PR, sales promotion, personal selling and direct marketing) of elements of the communication system (Burnett and Moriarty 2001).

The working hypothesis of the study is the assumption of the expediency of involving stakeholders of the restaurant business in the implementation of a number of CSR programs to fulfill the communication tasks of the organization. In this regard, the purpose of the article is to identify an exhaustive set of external sources of communication (i.e. subjects of the microenvironment of the organization) relevant to the Russian eating-out market, as well as ranking the priority of subgroups of these sources according to the criterion of the prospects of their use to increase consumer confidence in brand communication, loyalty formation and CSR implementation of enterprises.

2 Methodology

The conceptual and theoretical basis of the research is represented by CSR concepts, the theory of stakeholders and the concept of integrated marketing communications (IMC).

It is known that the works of Dahlsrud (2008), Manuylova (2017), Prokopova et al (2020), Tkachenko and Meteleva (2023) and others are devoted to the development of CSR issues, the definition of the essence of the term, and the identification of the benefits of implementing CSR programs for business.

According to the interpretation given by the Commission of the European Communities, the concept of CSR involves the actions of communities that go beyond legal, economic and business obligations, covering a triple result: economic, social and environmental (Dahlsrud 2008).

Socio-cultural, ethical and philanthropic activities can be areas of SCR, to the development and implementation of which it is advisable to involve interested agents of the microenvironment of the organization. Illustrative examples of such programs of CSR implementation that serve the brand communication goals can be: lectures and forums, charity programs, publication in open sources of reliable information about products, events and other activities of the organization, gifts as part of loyalty programs for regular customers, etc. (Prokopova et al. 2020).

Burnet and Moriarty (2001), Sharkov (2004), Zunde (2009), Yudina (2014) addressed the question of the characteristics of the essence of the concept of IMC, its content and sources of communication within the framework of this concept. A review of the management models of marketing communications has revealed three problematic aspects:

- insufficient development of modeling at the level of the management of marketing communications; at the same time, the development of higher-order models (Polusmakova and Trubina 2011, Yudina 2014) or lower-order models (models of the hierarchy of results) is relatively more widely discussed (Alekseenko and Bondarenko 2018; Demetrakos 2016; Polyakov and Fomicheva 2015; Weinstein 2017);
- fragmentariness and narrow specialization of a few management models of marketing communications in certain fields of activity (Fadeeva 2019; Karpovich 2006; Sinyaeva 2019; Volkov and Razina 2012);
- presentation of algorithms and management processes of marketing communications without visual graphical representation ("integrated system of strategic management of marketing communications" by Balabanova and Krutushkina (2012) and "stages of development of an effective communication program" by Kotler and Keller (2006).

The prerequisites for suggesting the applicability of the stakeholder approach to the management of marketing communications in the implementation of CSR are revealed in the works of Plotnikova (2020), Sazonova (2020) and other authors.

The basis of the stakeholder approach to management was laid by Freeman (1984), the works of Rudakova and Pirogova (2016), Sutherland (2017), Tkachenko and Sivokoz (2017), Mazur (2016), Stretton (2012) and other authors are devoted to the development of the theory of stakeholders and the classification of stakeholders. The classification of A. Stretton seems to be the most relevant to the tasks of this article (Stretton 2012).

Summarizing the extensive information base devoted to various aspects of the application of the stakeholder approach, it seems permissible to use this approach in relation to a narrower management direction—marketing communications, focusing on the specifics of the eating-out market.

In order to test the working hypothesis of the study, it is proposed to resort to the method of expert assessments. The criteria for the selection of experts, in addition to their participation in the catering market at the time of the study, are work experience in the industry (more than 5 years) and the current position. The sample of experts included restaurant marketers, consultants in the field of restaurant

marketing, as well as restaurant managers who control the work of marketers of Russian companies—a total of 12 specialists. The distribution of expert questionnaires among respondents was carried out online and offline in August–September 2023.

The basis for the formation of the list of groups and subgroups of stakeholders was the classification made by A. Stretton (Stretton 2012). Some subgroups were excluded of the expert questionnaire at the stage of preparation for the following reasons: as belonging to such objects as projects or programs, i.e. that do not correspond to the object of research—organizations (for example, internal manager, sponsors of programs, etc.); as having an unambiguous antagonistic or "parasitic" orientation (opportunists, litigators), therefore, not assuming prospects for participation in the implementation of marketing communications of the restaurant; as subjects of the macro-environment that influence the objects of research, but are not directly affected by the organization (group "political/legislative forces", group "economic forces", "technological forces").

The following participants of the experiment were replaced or clustered into subgroups: the project and program manager was replaced by the manager (administrator) of the organization, the project and program directors were replaced by the directors (managers) of the organization, taking into account the industry specifics of the organizational structures of the research objects; users are included in the subgroup "consumers" due to the coincidence of these subgroups owing to the specifics of the product in the market under study.

The experts were asked to perform three tasks:

1. To assess the possibility of participation of each subgroup of stakeholders in restaurant communications for the implementation of CSR goals, indicating the importance of the subgroup as a source of communication and the likelihood of communication through a subgroup of stakeholders. Next, the author of the article needed to rank the parameters according to their degree of importance by ABC analysis.
2. To evaluate on a five–point scale the level of compliance of each subgroup of stakeholders with the factors of authority and success (according to the modified Thumen method (Stretton 2012, pp. 219–221): the modification consists in replacing the classical factors of authority (influence on resources and influence on success) by specific ones for the restaurant as an object of research and communication as a subject of research—access of the subgroup of stakeholders to a wide consumer audience, the trust and loyalty of the audience to the representatives of the subgroup.
3. Specify for each subgroup of stakeholders the areas of activity of organizations and persons with whom the expert's restaurant cooperates or potentially admits the possibility of cooperation through this source of marketing communications.

3 Results

Characteristics of the experts who took part in the assessment:

- the field of activity of enterprises: restaurants, cafes;
- region of activity: Rostov-on-Don;
- positions: marketing directors, business owners, restaurant managers, development directors;
- average number of employees of the experts' enterprises: 76 people;
- managerial experience in the field of public catering: from 5 to 20 years;
- level of education, academic degree: higher education, candidate of economics.

The experts were asked to quantify the significance of the participation of each subgroup in communications and the likelihood of the implementation of this communication for the restaurant. The result is a balanced assessment of the potential prospects of each group regarding their participation in marketing communications. After the survey of respondents, stakeholders were ranked by ABC analysis, the result of which is shown in Table 1.

The second task set before the experts was to assess various factors of the authority and success of stakeholders of the participation in brand communications. Each factor is assigned a weight value reflecting the significance of the parameter. The average expert estimates are presented in Table 2.

The factors of authority evaluated in Table 2 demonstrate the attractiveness of involving one or another subgroup in brand communications; the most attractive groups with high ratings are opinion leaders, consumers, media, directors, etc. The factors of success reflect the problematic use of the relevant subgroups of stakeholders as a communication source; the least risky groups with high ratings: managers and directors, sponsors, management of the organization—mainly internal stakeholders.

Based on the obtained data, according to the Thumen method, a matrix of the ability of each of the subgroups of agents of the external environment to influence the success of the organization and implementation of the management of marketing communications, as well as the difficulties of this process, is formed. The results of the assessment are presented in Fig. 1.

Table 1 Ranking of stakeholder categories by the level of influence on communication activities

No.	Subgroup of stakeholders	Weighted importance	Share of subgroup importance, %	Cumulative percentage, %	Subgroup category
1	Opinion leaders	0.114	16.64	16.64	A
2	Media	0.096	14.01	30.66	
3	Consumers	0.094	13.72	44.38	
4	Director (Managing Director)	0.058	8.47	52.85	
5	Team members	0.057	8.32	61.17	
6	Management	0.054	7.88	69.05	
7	Manager (administrator)	0.035	5.11	74.16	
8	Sponsors of the organization	0.029	4.23	78.39	
9	Business partners	0.025	3.65	82.04	B
10	Intermediaries	0.022	3.21	85.26	
11	Contractors	0.021	3.07	88.32	
12	Community groups	0.021	3.07	91.39	
13	The customer of the organization	0.018	2.63	94.01	
14	Suppliers of goods and services	0.013	1.90	95.91	C
15	Internal audit	0.01	1.46	97.37	
16	Competitors	0.006	0.88	98.25	
17	Consultants	0.004	0.58	98.83	
18	Activists	0.004	0.58	99.42	
19	Component suppliers	0.003	0.44	99.85	
20	Environmentalists	0.001	0.15	100.00	
21	Religious organizations	0	0.00	100.00	

Source Compiled by the author based on the results of expert assessments

The position of the subgroups in the matrix, as can be seen from Fig. 1, indicates the prospects of their involvement in communications:

- sector 1 (from 1 to 2.9 on the X axis; from 1 to 2.9 on the Y axis)—weak influence on the organization: component suppliers, internal audit, activists, environmentalists, religious organizations;
- sector 2 (from 3 to 5 on the X axis; from 1 to 2.9 on the Y axis)—possible influence on the organization: social groups, competitors;
- sector 3 (from 1 to 2.9 on the X axis; from 3 to 5 on the Y axis)—moderate influence on the organization: consultants, suppliers of goods and services;
- sector 4 (from 3 to 5 on the X axis; from 3 to 5 on the Y axis)—a strong influence on the organization: intermediaries, contractors, partners, consumers, customers, opinion leaders, management (senior and middle management), media, sponsors.

The third task of the experts was to list the spheres of activity of actual and potential organizations and individuals of the external microenvironment corresponding to the proposed subgroups and relevant for the management of marketing communications of experts' enterprises. A nominal rating scale was used to solve this task. Repeated and synonymous answers given by different experts were excluded. As a result, the following organizations and individuals were identified, corresponding to the subgroups of stakeholders included in priority category A according to Table 1.

- Opinion leaders: bloggers, food reviewers, influencers, guides, beauty masters, DJs, promoters, event organizers, artists;
- Mass media: Urban communities and portals, gastronomic communities, local editions of magazines, online magazines, gastronomic federal publications, local radio stations, TV, press, groups and channels in social networks, news portals of residential complexes;
- Consumers: Potential and actual guests (residents of the city, residents of satellite cities, domestic and international tourists);
- Director: Managing Director, Director;
- Team members: waiters, bartenders, cooks, cleaning professionals, hostesses, night watchmen, technical staff, service manager, marketer, cashiers, commodity experts;

Table 2 Assessment of the factors of stakeholders' authority and success in the management of marketing communications

Subgroup	Factors of authority			Factors of success			
	Access to a wide audience coverage (0.35)	Audience trust and loyalty (0.65)	Weighted estimates (X-axis)	Difficulties of implementing communication by an agent (0.5)	Risk of failure/uncertainty (0.35)	Possibility of conflict (0.15)	Weighted estimates (Y axis)
Suppliers of goods and services	2.88	2.75	2.80	3.13	3.13	2.88	3.09
Consultants	1.88	2.63	2.37	3.13	3.25	2.75	3.12
Contractors	2.63	3.63	3.28	3.5	3	2.88	3.23
Community groups	3.5	3.88	3.75	2.88	3	2.3	2.88
Media	5	3.25	3.86	3.75	3.25	3.75	3.58
Opinion Leaders	4.63	4.25	4.38	4.5	2.75	3.13	3.68
Religious organizations	1.63	3.25	2.68	1.25	1.5	1.63	1.39
Environmentalists	1.63	3.13	2.61	1.5	1.63	1.75	1.58
Component Suppliers	1.88	2.75	2.45	2.88	2.63	2.63	2.76
Competitors	3.38	3.5	3.46	1.75	2.25	2.25	2.00
Business partners	3	3.5	3.33	3.88	3.5	3.38	3.67
The customer of the organization	2.63	3.88	3.44	3.88	3.38	3.38	3.63
Consumers	3.38	4.63	4.19	3.88	3	2.75	3.40
Management	2.75	4	3.56	4.63	4	4	4.32
Sponsors of the organization	2.5	4.13	3.56	4.13	3.75	3.75	3.94
Director	2.88	4.38	3.86	4.38	4.25	4.13	4.30
Manager	2.13	4.25	3.51	4.13	3.5	3.75	3.85
Team members	2.5	3.88	3.40	4.13	3.25	3.63	3.75
Internal audit	1.38	2.63	2.19	2.38	2.38	3.38	2.53
Activists	2.38	2.88	2.71	2.25	2.5	2.63	2.39
Intermedia-ries	3.5	2.75	3.01	3.38	3.13	3.5	3.31

Source Compiled by the author based on the results of expert assessments

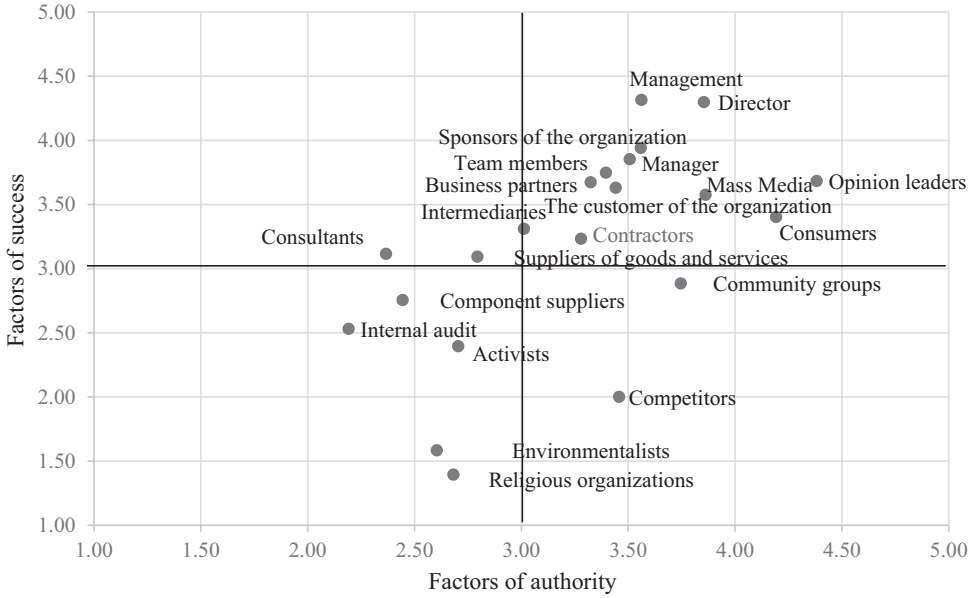

Fig. 1 The matrix of stakeholders' success in participating in the management of marketing communications. *Source* Compiled by the author based on the results of expert assessments

- Management: CEO, Executive director, Finance director, HR Director, Marketing Director, art director, owner;
- Manager: manager, administrator, chef, head bartender;
- Sponsors: investors, co-founders, owners, shareholders, distributors of alcohol;
- Business partners: event organizers, cashless tip services, loyalty programs, local stores of clothing, footwear, perfumes, cosmetics, manufacturers of appliances and consumer goods, hotels, travel agencies, car dealerships, fitness, salons, theaters, barbershops, other service organizations, flower shops;
- Intermediaries: aggregators of ready-made food delivery, geolocation services, advertising platforms on the Internet (WEB 1.0).

The above list of organizations and individuals can serve as a basis for the selection of horizontal communication channels by Russian restaurant business enterprises.

4 Conclusion

Thus, the hypothesis formulated at the beginning of the study has been confirmed: experts have validated the possibility and prospects of stakeholders' participation in brand communications to achieve CSR goals. At the end of the article it is possible to state the main conclusions:

1. An analytical review of literary sources has provided the formation of prerequisites for the application of the stakeholder approach in the framework of marketing communications as a direction of management activity. Thus, a hypothesis has formulated and confirmed about the possibility of including restaurant microenvironment agents in the process of brand communications with end consumers as mediators to achieve CSR goals.
2. Based on the results of an empirical study conducted by the method of expert assessments, the practice of involving microenvironment agents in restaurant communications with consumers has been verified, and a list of stakeholders specific to the restaurant industry who participate or have the potential of their involvement in communications has been determined. Their ranking by priority has been carried out using the method of ABC analysis. The results of the study have confirmed the relevance of the development of the theoretical apparatus of the mechanism of inclusion of stakeholders in the process of communication of the restaurant with the end consumer.
3. The following subgroups have received the expected high ratings of the prospects for inclusion in brand communications: opinion leaders (0.114), mass media (0.096), consumers (0.094), which corresponds to the recognized horizontal approach to communications in the Marketing 4.0 concept. In addition, such subgroups as restaurant director, team members, management, manager, sponsors have received high marks, which has made possible their inclusion in priority group A. It is assumed that agents of this particular group are the most attractive as an alternative communication channel, and this fact requires their inclusion in the management model of marketing communications, as well as the development of ways to stimulate their participation in communications.
4. Using the Thumen method, a graphical interpretation of the perspective of each agent of the

restaurant microenvironment to influence the communication process has been developed—the success matrix of stakeholders.

The conducted research makes it possible to conclude that this problem is new and requires significant improvements and continuation of the study. Thus, the most important and urgent tasks are: classification of methods and tools of communication through stakeholders, development of tangible and intangible measures to stimulate the participation of stakeholders, taking into account the possibilities of controlling the content and timing of the implementation of communications by stakeholders, as well as evaluating the effectiveness of this channel.

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Social Responsibility of Business in the Preservation of Ecological Homeostasis as a Resource of the Economy of Future Generations

Maxim S. Chistyakov, Margarita A. Shumilina, Alexey M. Gubernatorov, Elena Yu. Smirnova, and Olga I. Bogomazova

Abstract

The authors consider the significance of businesses' ecological responsibility as a manifestation of social commitment, closely intertwined with the economic impact as an existential category of activity and the possibilities of the entrepreneurial community. They stress the necessity of maintaining homeostasis—the factor of civilization's characteristic constancy, primarily in ecological terms. The authors substantiated the importance of business responsibility in addressing socially significant elements of the architecture of today's society, closely linked to the ecologization of the existing problem field. The corporate and regional segments of social responsibility are presented within the realm of potential manifestations of economic efficiency. The need for socio-public control is proclaimed as an instrument of disciplining influence and preventing the likelihood of attaining commercial windfalls under eventual conditions of demand for antisocial products and services. In the context of socially significant endeavors, production activity is characterized by a directed agenda, implying the production of environmentally friendly products based on consumer demand while minimizing the likelihood of satisfying requests for antisocial elements in socially alienated goods and services. The fluidity of alienation criteria is acknowledged, contingent upon the national-cultural traditions of different countries. The research concludes with the assertion of a close correlation between aspects of civilization development and the economic efficiency of entrepreneurship, depending on factors of social origin, the potential of which is necessary in the concept of preserving homeostasis of civilizational development.

Keywords

Social responsibility · Environmental responsibility · Maintaining homeostasis · Public opinion · Entrepreneurial community · Economic impact

JEL Classification

Z13

1 Introduction

The dialectical approach of a rational balance between economy and ecology within the paradigm of contemporary realities of civilization's development is perceived as an urgent necessity in preserving the planet's homeostasis as the natural environmental backdrop of today's society and as a resource for future generations' development.

The term homeostasis was initially introduced into scientific parlance by the American physiologist W. B. Cannon (Cannon 1939). The scientist drew attention to the mechanisms maintaining a stable state, which sustain the constancy of characteristics (such as physicochemical and psycho-emotional) of the internal environment (Kryazhimsky 2005, 2007), existentially necessary for the

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organism's existence as a whole (Marx 2010), thus contributing to the emergence of a new lexical unit in terminological circulation.

The contemporary approach to the semantic interpretation of the definition of homeostasis is significantly broader and touches upon many aspects of the theoretical substantiation of variations in processes occurring in the environmental background of the natural environment and practical human activities. This includes the practical application of knowledge and technologies created and accumulated by human civilization, particularly in maintaining economic prosperity and the constancy of favorable conditions in the natural environment and economic system.

The inter-complementarity of subsystems is one of the approaches of the doctrine of homeostasis, describing changes in parameters in correlation with the dynamics of processes in another interconnected system, different from the initial state. Particularly, the technogenic consequences of social integral activities (e.g., the use of non-renewable energy) can be translated as an effect influencing the volatile type of subsystem, directly affecting the system as a whole (i.e., the natural habitat or economic environment) (Chistyakov and Cheimetova 2022).

Based on the presented particulars, the social role of entrepreneurship in preserving homeostasis, approximating primal existential characteristics, appears relevant.

2 Methodology

The methodology of this research is based on the recognized opinion within the scientific community regarding the necessity of preserving civilization's homeostasis through the engagement of mechanisms of social responsibility of the business community, encompassing ecological responsibility. In substantiating the declared topic, scientific works by authors dedicated to issues of social and corporate responsibility of businesses and resource conservation were utilized. Additionally, general scientific methods of cognition were employed, including synthesis, analysis, induction, deduction, comparative analysis method, and statistical methods.

3 Results

The theory of the American sociologist R. Merton stems from the hypothesis of the absence of moral elements in positioning the pursuit of success as the primary value and the disregard for the social and other needs of the community, which is particularly evident in a transitive society where legal regulators of entrepreneurial activities, codes of business ethics (explicit and implicit), prevail.

Describing the consequences of neglecting capital and social responsibility, K. Marx illustrates the correlation between the number of socially irresponsible owners of enterprises exploiting wage labor and the likelihood of revolutionary situations, leading to the transition from a capitalist system to a socialist one and, further, to a communist one (Kosharnaya 2014).

The imperfection of the market mechanism predetermined the strategic significance of segmental state intervention in the economy. Control over socially oriented policies of the business community by public structures is a derivative of this necessity. The main strategic goal of control is minimizing the detrimental impact of entrepreneurial economic activity on the ecological component of civilization.

Opponents of this approach present arguments against it, believing that a negligent businessman, disregarding moral norms and social needs, is doomed under conditions of processes unfolding in a free market system and transparency of the information space. Furthermore, advocates of prohibitive measures argue that entrepreneurial actions are driven by social demands and bear a socially conditioned character.

Expanding on the discussed issue within the context of social demands, it is worth noting the heterogeneity of any society, stemming from various social groups with contrasting spectrums of needs, including antisocial ones (such as drugs, pornography, excessive alcohol consumption, etc.) (Zakharchenko et al. 2018). Minimizing the detrimental impact of social needs (products and services permitted by law for circulation) falls within the sphere of social responsibility of the business community, which, in conjunction with society, should take the form of interest protection (both of entrepreneurship and society), particularly through prohibitive regulatory measures, legislative regulation, and shaping public opinion through mass media, among other means.

Given the breadth and significance of the debate surrounding the social role of business in contemporary society, particularly in conditions of the ambiguous legal and moral legitimacy of post-Soviet entrepreneurship, the scientific community acknowledges the variability and complexity of categories characterizing the multi-aspect and interdisciplinary nature of the issue under consideration. This includes social, economic, moral, philosophical, and other categories, implying the absence of a clearly regulated conceptual apparatus and suggesting the sharpness of scientific debate.

Sociological studies conducted by Kosharnaya (2014) indicate that 75% of respondent entrepreneurs consider the state responsible for social policy and the formation of an individual's dignified way of life. Interestingly, 80.3% of respondents expressed the opinion of rejecting paternalistic approaches (Chistyakov 2014) and the necessity

of individualization in addressing issues of a problematic nature.

Vasyanin (2012), [p. 90] segmented the possibilities of contributing to charity as follows: 44%—aid to homeless children; 17%—addressing environmental issues, education, and cultural development.

Nevertheless, the social orientation and ecological accompaniment of business imply the emergence of the institution of socio-ecological responsibility (SER), involving the interrelation of needs and capabilities of the entrepreneurial community, market preferences, and the necessity of stimulating consumer orientation towards the ecological characteristics of products.

Thus, Frolov and Shulimova (2013) attribute the highest position to SER in the hierarchy of forms of entrepreneurial responsibility, expanding its boundaries to the socio-humanitarian plane as a response to potential global social turbulence.

After analyzing existing scientific research on the topic of socially oriented business responsibility, Mishulina and Matova (2020) conclude about the market category of this manifestation. That is, with certain voluntarily assumed commitments to preserving the natural environment (homeostasis) and human capital, SER should not contradict the business community's ability to realize its potential under certain assumptions of the market economic system.

However, the level of social motivation in business is determined by the institutional environment in its formal and informal manifestations on a national scale and at the regional level of economic activity.

A model examination of business social responsibility and society's impact on nature can be implemented through the eco-economic system (EES) proposed by academician M. Ya. Lemeshyov in the 1970s (Matova 2016). He conducted research in the field of environmental protection and the rational use of natural resources, studying the economic, ecological, and social components of nature management, reflecting the degree of impact, reversibility of processes, and the nature of interaction among economic actors.

An important factor is the development and implementation, based on this model, of an operational system of organizational and economic support for the social responsibility of the business community. It is noteworthy that there is practical experience from successful enterprises implementing measures of social and environmental responsibility, which is confirmed by tested mechanisms for implementing activities in this area.

There are two types of business social responsibility, which also extend to the preservation of ecological stability: corporate (CSR) and regional (RSR). CSR implies a certain internal effect on the company, arising against the background of the impact of social measures and other influences by the enterprise's management. The effect of RSR implies, among other things, the synergy of corporate effects, which enhances the social, economic, and ecological sustainability of the territory. Additionally, the entrepreneurial community significantly contributes to the implementation of regional-scale activities.

The corporate effect may potentially manifest in the following variations:

(1) Reducing the likelihood of punitive sanctions and supervisory directives as a result of implementing various social and environmental responsibility measures and programs;
(2) Decreasing payments of a rent-like nature through increasing the renewable share of energy resources used;
(3) Diminishing internal economic damages through implemented eco-friendly programs contributing to the restoration of the company's internal homeostasis (reducing employee illness rates, improving internal environmental conditions, enhancing environmental awareness and education among staff, etc.);
(4) Enhancing business reputation (goodwill), seen as the intangible asset of a company possessing an indirect material effect, not subject to depreciation but subject to potential volatility based on the policies and philosophies of the enterprise. Goodwill comprises elements of business experience potential, the reputation of the economic entity, regional economic factors (e.g., economic-geographical localization of the enterprise), the presence of highly skilled specialists, management system improvement, and consumer demand satisfaction (Volkov 2012).

Production activities within the realm of social responsibility imply the manufacture of environmentally friendly products tailored to consumer interests while simultaneously neutralizing the potential to satisfy the demand for socially alienated goods and services. Criteria for alienation are flexible depending on the national and cultural traditions of states.

Considering the interdependence of society and entrepreneurship as institutional subsystems, it is noteworthy to mention the presence of motives for alienation from antisocial business activities in the context of social responsibility only if they do not receive social support expressed through consumer demand and excessive profit.

Environmental control by society emerges as a highly significant measure in the context of preserving the planet's homeostasis. The experience of states with developed green monitoring by public structures proves highly beneficial, often deterring companies from disregarding environmental standards in pursuit of excessive profits. The identification of deliberate violations leads to loss of trust in companies and reputational damage.

In the context of environmental responsibility, environmental marketing gains widespread acceptance as a tool for popularizing the use of products that have minimal impact on the environment, animals, and humans. A variation of this involves promoting reusable items (e.g., grocery bags) and installing collection boxes for used household items, batteries, etc., in shopping centers and stores.

Ecological marketing, as a tool for managing the process of promoting environmental preferences in consumer demand, has a strategic nature, exerting a positive influence on improving the environmental situation of the territory, as well as on the eco-reputational and economic indicators of the company (Volosatova 2011).

Thus, corporate activity in social protection and environmental preservation contributes to forming a social culture. An integral part of this culture is the environmental culture of the population, shaped through upbringing and education and through methods and instruments of institutional and corporate influence. Social culture constitutes a component of a healthy lifestyle, the elevation of cultural and moral standards, care for the environment, lifelong learning, determining national security, spiritual growth of public consciousness, and the system of social and other relationships as an institutional element of the state structure.

In the context of global civilizational changes, human capital remains strategically paramount in new economic realities (Mironchuk et al. 2022). In this context, strategic innovative management initiatives, encompassing social and environmental agendas, represent significant elements in the construction of human and intellectual resource potential, conducive to the sustainable functioning of the business model through the generation of singular effects in technological and economic development.

Social responsibility has a dual nature, as entrepreneurship is interested in high levels of welfare and the population's purchasing power. However, private businesses seek to minimize costs for their personnel, for example, through salary funds and creating additional job positions to reduce the burden on existing employees, which engenders numerous corporate-social conflicts. Discrimination based on gender and age criteria is acknowledged.

4 Conclusion

The authors agree with the views of Fetisov and Yakovlev (1993), who noted that the philosophy and culture of entrepreneurial activity are existentially integrated with the economic component when considering the interests of society, including those concerning a favorable external environment, expressed in social responsibility. This responsibility implies resources derived from economic activity. Thus, one can observe a close interconnection of the enumerated aspects of civilization development, manifested in meeting the social and economic needs of society indirectly through the economic efficiency of entrepreneurship, which, in turn, depends on the effective utilization of factors of social origin.

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Risks of the Green Economy

Elena S. Shurshalova, Elena G. Zhulina, Elena G. Kirikutsa, Alla P. Khromenko, and Mikhail S. Komov

Abstract

The concept of a green economy has emerged due to the rise of global threats to the environment and the deterioration of the quality of human life. The green economy has become a strategic development goal for many countries worldwide. Global threats are presented as a symbiosis of risks to human life, ecological and climatic risks, and risks associated with the adverse impact of human activities on the environment. Understanding the need to unite forces and implement measures of the green economy and sustainable development encounters latent resistance from humans, manifested in the dual nature of risks. Potentially new technologies bearing the status of green may carry new, yet undiscovered, adverse consequences in the future. It is essential to consider the regional characteristics of the risks of the green economy, the transition to environmentally friendly raw materials for producing environmentally friendly products, and, for example, in developing new energy sources. Nothing happens without the impact of humans on the environment, even under the banner of the green economy and sustainable development. This research explores the dual nature of risks in the green economy. The research results will provide grounds to conclude the necessity of environmental education for the subjects of the green economy and the development of a system of legal acts establishing methods for regulating and controlling environmental relations in the implementation of green projects.

Keywords

Green economy · Risks · Uncertainty · Dual nature · Green finance · Implications

JEL Classification

F6 · J1 · K3 · Q5

1 Introduction

The contemporary reality is characterized by the systemic nature of risks in human activities. The economy is evolving based on digitization and technological innovations, leading to an increase in the negative impact on the environment, the growth of risks, and a change in the nature of their influence. As rightly noted by Yu. M. Osipova, the new economic reality, according to conceptual approaches of the management philosophy, is directly related to the growth of uncertainty and risk (Osipov and Zotova 2015). The importance of maintaining a balance in the development of the economy, society, and nature places the issue of risks in developing the green economy at the forefront, aimed at ensuring a high quality of life for future generations. Nowadays, in the conditions of global instability and considering current and prospective risks, adjustments need to be made to the implementation of the sustainable development goals in the country.

2 Materials and Methods

The concept of green economy is still forming its categorical apparatus, which is associated with the dynamics of innovative and technological development of society, emerging problems, and opportunities. Various approaches to

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_11

understanding the essence of the green economy reveal its multi-aspect nature and potential for further research. The general economic approach (Zakharova 2011) implies a global shift from one type of relations to another and represents a new structure, namely the economy of the future (Pociovăliteanu et al. 2015). The sectoral approach involves understanding the green economy from the perspective of the development of alternative energy sectors (Porfiriev 2012) and the production of environmentally friendly goods, essentially uniting the methods of achieving the goal of the green economy as a new economic structure. Therefore, to some extent, this approach can be considered instrumental. The technological approach (Bochko 2014) implies even greater detailing, assuming the ecologicalization of technologies in all sectors of the economy. The civilized approach to the green economy reveals its moral-technological essence, justifying the conscious transition of an intellectually developed society to a new ecological structure (Bochko 2014), considering the uneven development between countries and the asynchronous transition to the green economy. The comprehensive approach to understanding the green economy represents a transformation process of achieving positive environmental results in enterprises, industries, and the economy (Sivkova 2023). The issues of the green economy gained particular relevance during the COVID-19 pandemic, highlighting the global importance of the environmental component of human activity and environmental risks. The debate continues on the degree of politicization of the green economy toolkit and its role in addressing geopolitical issues (Leonard et al. 2021). The implementation of green economy ideas will remain relevant in the future.

In Russia, there is no legal act regulating the procedures for transitioning to a green economy and defining the concept of green economic risk and its assessment, which complicates the process of achieving the goals of the green economy. Regardless of the perspective, each carries the risks of green changes. Many studies have already analyzed the shortcomings of implementing the principles of the green economy, its toolkit, and its consequences.

3 Results

The risks of the green economy are traditionally associated with environmental conditions and ecological safety. Global environmental problems have been escalating over the past decades. We increasingly often hear about the negative consequences of global warming, the depletion of various resources, air pollution, ozone layer destruction, and the decline in the population of certain animal and plant species, ultimately negatively affecting the environment and the quality of human life. From the perspective of the green economy concept, implementing a set of measures to ensure environmental safety will lead to a reduction in the severity and quantity of risks.

As a rule, the study of green economic risks is conducted from the standpoint of threats to the environment from human activities, leading to a mismatch in the balance of economic and environmental interests. In the authors' view, it is reasonable to explore the other side of the green economy represented by the consequences of implementing green projects and green financing. As practice has shown, the promotion and implementation of green economic solutions do not always lead to the expected results and become an object that shapes the risk.

The risks of the green economy, in our opinion, have a dual nature. On the one hand, the essence of the green economy concept lies in establishing and maintaining a balance between social policy, economy, and ecology, reducing the risks of such imbalance. On the other hand, the content of green projects, the process of their implementation, and the results pose risks to the environment, the economy, social conditions, and the quality of people's lives.

Let us proceed with analyzing the dual nature of the risks of the green economy.

1. Environmental risk. Describing its essence can be challenging, but in general, it represents the probability of causing harm to the environment and inflicting damage in the future (Novikova 2018).

For example, the metropolitan fleet of electric buses, currently numbering over a thousand units, is set to double by 2023–2024. Replacing one diesel bus with an electric bus reduces carbon dioxide emissions into the environment by 60.7 tons per year. The greening of Moscow's transport system in 2023 also extended to river transport. However, electricity is still generated in coal-fired power plants. The share of coal in Russia's energy balance could rise to 15% by 2050, compared to 13% in 2023. Earlier scenarios aimed for a reduction to 9.8% by 2035 and 4.9% by 2050. This growth in coal generation seems contradictory to climate goals and objectives for achieving carbon neutrality by 2060. Therefore, greening public transport amid the expansion of land areas with severely disrupted soil layers contributes to emissions into the surrounding air.

Speaking of energy, nuclear energy waste is highly toxic, requiring significant expenses for storage and disposal. Solar energy, while considered green, relies on extracting and using various minerals, disrupting the ecological balance in regions where they are mined.

Due to the multi-faceted nature of the environmental risk of negative impact on the environment, it is challenging to describe the duality of all environmental risk components. However, even the example provided indicates the ambiguity of green economic decisions and their environmental impact.

2. Climate risks represent the impact of random natural and climatic factors on socio-economic systems (Macroeconomic Policy Department of the Eurasian Economic Commission 2022), [p. 15]. Disregarding significant global climate changes leads to substantial costs for stabilizing adverse developments. Furthermore, such heedlessness results in a deterioration of the quality of working life, decreased productivity, and lower living conditions for people. Ultimately, these risks affect the economy and society. However, investments in green projects are not always effective for businesses and commercial banks (i.e., they do not yield a direct effect). On the other hand, banks are acutely aware that climate change constitutes a source of financial risk, comprising two components. The first involves risks associated with changes in the market environment, consumer preferences, and government regulations that are not in favor of the entrepreneurial activities of banks. The second component encompasses physical risks, including a reduction in business capitalization and diminished investment flows, which could lead to the emergence of systemic risks.
3. Risk of politicizing the green economy. In 2021, at the international forum of the Russian Union of Industrialists and Entrepreneurs (RSPP), Russian Foreign Minister Sergey Lavrov emphasized the need to avoid the risks of green protectionism. As reality has shown, for example, the situation with the explosion of the "Nord Stream" pipelines, according to scientists from Denmark, Germany, and Poland, could lead to the extinction of the population of Baltic cod and marine pigs.
4. Risks of green financial instruments used for investing in relevant projects. We will not discuss credit, interest, and other types of risks, although they are relevant in the face of climate and physical risks leading to the borrower's insolvency. Instead, we will highlight the increasingly prevalent issue of greenwashing. Companies pursuing profit growth use such green camouflage, ostensibly engaging in environmental protection projects while actually doing nothing. Such examples exist not only abroad but also in Russia. For instance, Azbuka Vkusa, in collaboration with Evian, offered to make the world cleaner by buying six plastic bottles, in exchange for which customers could receive an eco-friendly shopping bag. As a result, sales of environmentally harmful packaging increased. The consequences of this so-called green camouflage vary: it allowed a quarter of companies to increase revenue and improved the reputation of 17% of entrepreneurs. However, most (three-quarters) of business people believe that greenwashing will not yield positive results and may even lead to losses and punitive sanctions. In support of this view, a quarter of entrepreneurs complained that their reputation had been damaged, 8% suffered financial losses, and 42% felt no difference (Sostav 2023).

Thus, on the one hand, one can observe the interest of countries in discussing and taking practical actions to address climate change and other sustainable development goals. On the other hand, Western countries either do not do enough to fulfill the obligations of the signed declaration or deviate from some of their legally binding targets. Particularly noteworthy is the state policy in developed countries, which (1) is not aimed at reducing greenhouse gas emissions, (2) leads to a reduction in international aid to the developing world, and (3) fails to fulfill obligations to assist developing countries in financing energy transformation. Moreover, several developed countries, pursuing their national and supranational interests, use the risk of employing environmental agendas to create additional barriers in trade and conceal protectionist goals.

We agree with A. N. Kazantseva that developed countries are concerned not so much with reducing the use of fossil energy sources and other environmental issues as with the global redistribution of the international energy market (Kazantseva 2022, p. 11)

Let us focus briefly on the micro-level (i.e., the level of a green economy enterprise). Risk management at the enterprise typically consolidates risks into several groups, such as operational, financial, market, ecological, social, and strategic risks. By identifying direct and indirect risks within the ecological group and developing measures to mitigate and counteract them, enterprise risk management addresses the goals of the green economy and sustainable development. The diversity of risks is also evident at the micro-level. For example, profit growth can be achieved by saving costs on environmental activities while implementing a project to develop a new, more environmentally friendly product. Moreover, the need to manage environmental risks becomes more acute during business licensing, with violations of labor protection and safety rules becoming too evident and negative, the release of substandard products, and environmental harm. In this case, managing environmental risk takes on a coercive and obligatory character, limited by the need to minimize the negative consequences of risks.

Thus, the risks of the green economy have a multi-vector nature. However, despite their multi-vector nature, risks lead to increased self-organization of actions by countries, businesses, the population, and individuals toward sustainable development and improving the quality of the environment for future generations. The feature of the current stage of implementing the principles of the green economy

is that the balance of economic, environmental, and social interests (at micro and macro levels) is established in favor of an individual subject or a group of subjects of the green economy. Risk management of the green economy should be carried out at all levels of economic entities.

4 Conclusions

Achieving goals in the green economy is a shared endeavor involving the state, businesses, and each individual. The issue of environmental pollution and the risks of adverse future changes concern the absolute majority of the population. Attaining goals and embracing the principles of the green economy is possible through shaping the consciousness of people of various statuses: the general population, entrepreneurs, managers, and national leaders. Legislative regulation of green economic risks only pertains to regulating the implementation of measures for environmental protection and monitoring its condition. Achieving the goals of the green economy in a country is possible through adopting a series of regulatory acts combining administrative and economic methods of regulating and controlling environmental relations. Effective risk management in the green economy at every level should be based on the understanding and acceptance of the universal need to renounce ways of economic activity and production technologies that negatively impact the environment.

The improvement of green economy risk management should be conducted along the following lines:

- Assessment and management of statistical risks. Development of methods and tools for assessing and managing risks associated with green technologies and investments. This may involve the analysis and modeling of environmental risks, assessing the stability of green markets, and investigating the vulnerability of green projects to climate change and other environmental factors;
- Financial risk management. Development of instruments and approaches to manage financial risks associated with green investments. This may include the creation of green funds and securities, the establishment of insurance products for green companies and projects, and the development of financial leverage for green investments;
- Legal regulation. Development and application of legislation and regulatory acts to manage risks in the green economy. This may include establishing rules and standards for green technologies, regulating financial instruments and investments, and ensuring environmental responsibility and sustainable business;
- Education and workforce development. Training specialists in the field of green economy risk management. This may involve creating specialized educational programs, preparing professional standards, and certifying specialists in this field;
- International collaboration. Collaboration at the international level for exchanging experiences and transferring best practices in managing risks in the green economy. This may include participation in international organizations and forums, establishing partnerships with foreign organizations and companies.

These measures improve green economy risk management, reduce financial and environmental risks, and enhance the resilience of green companies and projects. They also promote the development of green technologies and the efficient use of natural resources.

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Management of Sustainable Development of an Enterprise

Elena V. Kopylova, Sergey M. Imyarekov, and Svetlana M. Soldatkina

Abstract

The research aims to investigate the issue of managing the sustainable development of an enterprise. The research subject is sustainable entrepreneurship development in the chemical engineering industry. The authors employ the principles of sustainable development, which are closely related to the principles of quality management and management concerning environmental and social aspects of organizational activities, as laid out in relevant international and national standards. It was established that effective management of the sustainable development of an enterprise is a priority direction for the economic activity of any entity. The main task, crucial for society and individual entities, is to abandon aggressive and excessive consumption of natural and human resources, thus ensuring the well-being of future generations. Sustainable development should be implemented not only at the global and world levels but also at the regional and organizational levels. The conducted study of managing the sustainable development of the enterprise showed that JSC "Ruzkhimmash" lacks a goal-setting system in the field of sustainability. The authors proposed a set of measures recommended for integration into the process of managing the sustainable development of JSC "Ruzkhimmash."

Keywords

Enterprise · Management · Business goals · Sustainable development · Priority areas

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JEL Classification

C81 · C82 · M31 · L10 · L25

1 Introduction

The principles of sustainable development are closely intertwined with the principles of quality management and management regarding the environmental and social aspects of organizational activities, as laid down in relevant international and national standards.

Nowadays, organizations are entitled to employ various scenarios for integrating the tenets of sustainable development into their operations. However, these scenarios and their corresponding mechanisms must consider the production, managerial, corporate, and sectoral peculiarities of organizational functioning.

The research subject is sustainable entrepreneurship development in the chemical engineering industry. The chemical engineering industry comprises large industrial enterprises, various laboratories, and research institutes. The enterprises in this sector are so large that each of them typically specializes in producing a specific type of product. For instance, "Hydrogas" specializes in the design and serial production of industrial pumps, control valves, and water treatment complexes. "BT Chemmash" manufactures heat exchangers, chemical reactors, filters, and absorbers. "Ruzkhimmash" focuses on the production of railway tanks. "CryogenMash" produces tanks storing technical gas.

This underscores the particular necessity for enterprises to transition to the principles of sustainable development. Currently, society wishes to perceive businesses as entities engaged in limited activities that do not create problems for society, while simultaneously being responsible for steps toward social progress in achieving sustainable development goals at the global and national levels.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_12

2 Materials and Methods

The methodological foundations of conceptual understanding of sustainable development at the organizational level are addressed in the works of Gollay (2021), Khomyachenkova (2011), Klepikov (2007), Nekrasova (2004), Novosyolov and Yudina (2022), and others. Orekhova and Zavyalova (2021) explores issues related to ensuring the sustainable development of enterprises amidst contemporary challenges.

A separate block of studies by authors such as Budylina and Averina (2021) is devoted to the analysis and assessment of sustainable development of enterprises. Economic and managerial aspects of achieving and strengthening sustainability in the activities of enterprises across various industrial sectors are examined by authors like Kondaurova (2015), Lytneva (2016), Vasiltsov et al (2020), and others.

3 Results

Despite the crucial role of this industry, there are challenges within the Russian chemical engineering sector that hinder its progress: low production profitability, morally and technically outdated equipment, the predominance of lower and middle-grade product output, modest investment funds, and a shortage of highly skilled professionals.

Considering the identified issues, Russian chemical engineering enterprises face increased risks across all aspects of sustainable development. The weak and outdated production infrastructure impedes the production of competitive goods and economic stability. The low quality of the production environment creates critical situations and poses risks to the health and lives of personnel, negatively impacting social stability and simultaneously reducing the level of ecological sustainability in the enterprise's activities.

The ability to meet requirements and implement recommendations is determined by the maturity level of systems achieved. Therefore, the maturity level of any sustainable development management system directly influences the organization's ability to achieve its goals. Consequently, it is advisable to analyze the overall effectiveness of JSC "Ruzkhimmash" based on the indicators of business goal attainment. The dynamics of their fulfillment over the five-year period from 2018 to 2022 are presented in Table 1.

Each year (from 2018 to 2022), the indicators of achieving the business goals of JSC "Ruzkhimmash" increased, except 2022 (Table 1). The greatest impact of the COVID-19 pandemic was on achieving goals related to marketing, technical re-equipment of production, and projects for new products (only 27 out of 44 projects were implemented). Consequently, the average overall indicator of achieving business goals in 2022 did not meet the established threshold of 90%. Alongside this, the business goals related to quality, ecology, and occupational safety throughout the analyzed period met the established limits but generally reached the maximum level of implementation at 100%. On the one hand, this indicates a high level of performance in all three aspects of sustainable development. On the other hand, the economic component, which, alongside quality indicators, is determined by business goals related to the technical condition and efficiency of production, as well as marketing, requires significant improvement.

Table 1 Fulfillment of business goals of JSC "Ruzkhimmash" in 2018–2022, %

Business goal	Years				
	2018	2019	2020	2021	2022
Technical re-equipment of production	88.5	91.0	91.4	92.1	87.3
Production	89.7	92.1	100.0	93.5	96.8
Quality	100.0	100.0	97.3	100.0	100.0
Ecology	100.0	100.0	99.7	100.0	100.0
Labor safety and health protection	100.0	100.0	100.0	98.9	100.0
Marketing	90.6	95.1	89.2	97.3	78.4
New product project	82.1	88.0	95.2	100.0	97.6
Average overall implementation rate	93.0	95.2	95.8	96.7	81.6

Source Developed by the authors

Among the business goals related to the social aspect of sustainable development, there is only one goal in the field of occupational safety and health protection. This is an important component of the social activities of JSC "Ruzkhimmash." However, it demonstrates the company's focus solely on fulfilling mandatory legislative requirements without ensuring an adequate level of corporate social responsibility.

Based on the comprehensive characterization of all components of the sustainable development concept of JSC "Ruzkhimmash," it seems appropriate to evaluate the maturity of the enterprise's sustainable development. The most suitable tool for conducting such an assessment is the standard GOST R 54598.1-2016 "Sustainable Development Management. Part 1. Guidance" (GOST R 2015), which is widely used in the practice of conducting comprehensive assessments of domestic enterprises embarking on the path of sustainable development. According to GOST R 54598.1-2016, the principles of the considered concept include involvement, responsible leadership, adherence to ethical norms, and transparency.

As a result of the work on assessing the maturity level of sustainable development of the enterprise, data were obtained and presented in the form of a radar chart in Fig. 1.

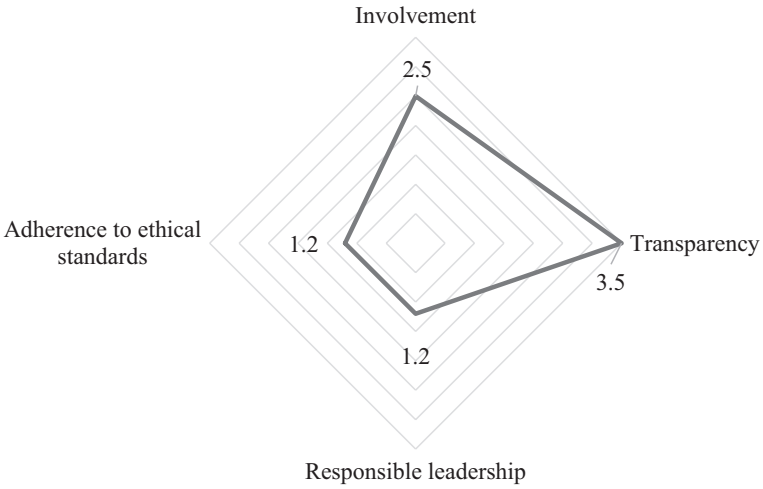

Fig. 1 Results of the diagnosis of the maturity level of sustainable development of JSC "Ruzkhimmash." *Source* Developed by the authors

As seen from the results in Fig. 1, the most successfully implemented local element of sustainable development principles is public reporting, which is made available on the company's official website. Accordingly, this element received the highest score of 3.5. However, this is not the maximum score because the reports are insufficiently informative and require some improvements. The lowest score of 1.2 was obtained for sustainable development traditions, which have not yet been established at the enterprise and require active work in this direction.

Thus, in accordance with GOST R 54598.1-2015, the maturity of sustainable development of JSC "Ruzkhimmash" is considered to be average. The enterprise should strive to achieve "full maturity" in sustainable development.

After analyzing the financial results, it was revealed that despite the overall revenue growth of JSC "Ruzkhimmash," the profit from sales is negative—product sales do not cover the incurred expenses. Additionally, in 2019, there was a sharp increase in the number of claims from 28 to 34 units, indicating non-compliance with customer requirements and a decrease in the quality of finished products, leading to increased costs for the quality of finished products of JSC "Ruzkhimmash." The workforce has been rapidly decreasing over the studied period because demand for products decreased, the number of active workshops decreased, and staff reductions were carried out in non-operating workshops. After analyzing employee satisfaction, the authors identified a negative attitude of JSC "Ruzkhimmash" employees towards the existing system of remuneration and social security and limited information exchange between employees and departments.

Since these indicators have negative consequences, it is recommended to deepen the integration of the sustainable development concept into the activities of JSC "Ruzkhimmash" at the level of adopting a unified policy in the field of occupational safety, health, and environmental protection and at the level of integrating documentation support, process systems, and forming a corporate culture of sustainable development (Ministry of industry and trade of the Russian Federation and Ministry of Energy of the Russian Federation 2014; State Assembly of the Republic of Mordovia 2008; Klepikov 2007).

There is a lack of a goal-setting system in the field of sustainable development in the activities of JSC "Ruzkhimmash." It is recommended that the provisions of the sustainable development concept be integrated into the enterprise's activities, which consist of several stages (Fig. 2).

Despite the equal importance of SDGs 3, 8, 9, and 12 for the enterprise, an analysis of the activities of JSC "Ruzkhimmash" has revealed some uneven implementation of sustainable development principles, which justifies the establishment of priorities in achieving them.

SDG 8 "Decent Work and Economic Growth" has been identified in the "Important—Urgent" sector due to the sustained trend of staff reduction at the enterprise during 2020–2022. Over this period, the headcount of JSC "Ruzkhimmash" has decreased by 40.4%; the attendance rate is also declining, with its proportion in the headcount decreasing from 98 to 92%. Sustainability experts consider this to be one of the most negative trends. In recent years, employees also expressed dissatisfaction with the company's social policies.

At JSC "Ruzkhimmash," all conditions for its implementation are at a sufficiently high level but require constant attention and urgent decision-making. This area of decision-making includes issues related to working with all stakeholders and promptly responding to their requests, increasing the flexibility of production decision-making, etc.

SDG 3 "Good Health and Well-being" was identified in the "Not Important—Not Urgent" sector due to the generally favorable situation in this area of activity at JSC "Ruzkhimmash." However, constant and significant

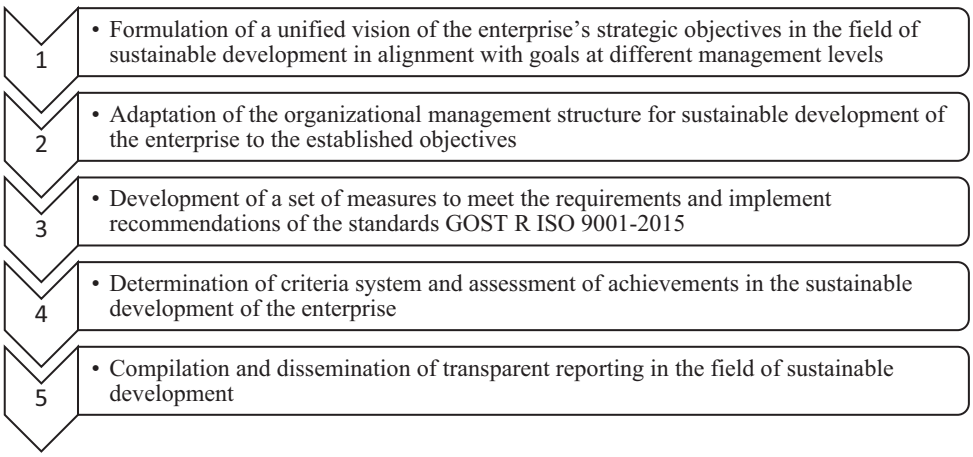

Fig. 2 Stages of implementation of the provisions of the sustainable development concept in the activities of JSC "Ruzkhimmash." *Source* Developed by the authors

transformations are required for the successful achievement of this SDG in the long term. This includes systemic increases in the real incomes of the company's employees and improving their social support.

The fundamental values of JSC "Ruzkhimmash" in the field of sustainable development are reflected in the strategic and target objectives of the enterprise. Therefore, it is entirely appropriate to apply the business goals adopted by the enterprise, supplemented by goals in the field of sustainable development.

The requirements for the sustainable development management system from an economic perspective are outlined in the standard GOST R ISO 9001-2016, enabling the assurance of a high level of product quality and enterprise activities within the framework of the enterprise's quality management system. This creates the necessary conditions for enhancing the enterprise's competitiveness and thereby improving the economic component of sustainable development. The ecological aspect can be addressed by the requirements of the standard GOST R ISO 14001-2016, and the environmental management system based on it fully satisfies the goals in the field of sustainable development. These two systems are already operational in JSC "Ruzkhimmash," and their effectiveness is sufficient for implementing the respective principles of sustainable development. However, to fully apply this concept, it will be necessary to implement the recommendations of the standard GOST R ISO 26000-2012 to improve the social component in the enterprise's activities.

The PDCA cycle (Plan-Do-Check-Act) is implemented directly within the framework of each corresponding management system for specific aspects of sustainable development. The authors believe that its application is most effective when the IMS is functioning. Accordingly, integrating the GOST R ISO 26000-2012 standard on an integrated basis with these systems can significantly strengthen the social component.

The practical implementation of the proposed reference model involves forming a corresponding action plan. In the authors' opinion, its basis should consist of the recommended stages of the integration process and the corresponding specific functions. However, for its successful implementation, organizational and managerial design must be carried out, and necessary conditions must be created at the enterprise.

Practical experience in implementing any changes in the activities of JSC "Ruzkhimmash" shows that the transformation program includes a sequential list of organizational and managerial measures, specifying the leaders and specific performers of these measures, as well as the deadlines for their implementation.

Due to the fact that JSC "Ruzkhimmash" is part of a large holding in integrating the provisions of the concept of sustainable development into its activities, there is a need to coordinate individual measures with higher authorities. This directly causes delays in the implementation of certain measures. Considering this, the deadlines for implementing the program for each of the planned measures are calculated under their implementation in the most optimal mode. It should be noted that within the framework of the measure providing for the expansion of the list of priority areas of the enterprise's activities in the field of sustainable development, it is recommended for JSC "Ruzkhimmash" to improve its activities in several directions further:

- Select additional and refine the adopted goals of sustainable development;
- Orient towards the requirements of additional stakeholder groups;
- Apply good management practices in the field of sustainable development;
- Participate in the activities of public organizations (joining the Social Charter of Russian Business (RSPP) or the UN Global Compact (by decision of the RM Rail holding), etc.

4 Conclusion

Sustainable development represents a pertinent concept of modernity because sustainable development contributes to advancing all sectors of contemporary society without causing harm to the environment. The main task urgently facing society and individual entities is the abandonment of aggressive, excessive consumption of natural and human resources, which ensures the well-being of future generations. Sustainable development should be implemented at the global and international levels and at the regional and organizational levels. The conducted study on managing sustainable development at the enterprise revealed that JSC "Ruzkhimmash" lacks a goal-setting system in the sustainability domain. It is advisable to integrate the recommended set of measures into the process of managing the organization's sustainable development.

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The Impact of ESG Transformation Principles on the Strategic Development of the Banking System of Russia

Alexander D. Chulyukov, Alexander M. Vorotnikov, and Anna V. Ridiger

Abstract

ESG principles have already become integral elements of the strategic development of the Russian banking sector. Their key value lies in creating a sustainable business model that contributes to the development of society and the environment. To implement environmental responsibility, banks employ green technologies, quit using paper transactions, and support nature conservation projects. Considering the ESG trend, banks address the needs of their clients and assist them in solving social problems, cooperating with the government to provide loans for small business development or finance social programs. Finally, recent years have seen banks actively integrate efficient risk management mechanisms to develop strategies for minimizing losses by continuously identifying potential problem areas and developing action plans in crisis situations. The evidence of the impact of ESG principles on the development of the banking sector and its economic growth becomes a result of the updated strategies of Russian banks, considering the ESG trend. The research explores how economic growth in the banking sector can be measured using the ESG strategy. The research objectives include analyzing the history of ESG principle development, defining the meaning of ESG strategy, and demonstrating that the ESG strategy plays a significant role in economic growth. Analyzing the impact of ESG principles on the activities of banks in Russia makes it possible to identify effective managerial and economic strategies for transforming processes in line with the principles of environmental responsibility. Particularly, Sberbank is conducting an analysis of its ESG strategy and developing corresponding measures for its improvement.

Keywords

ESG strategy · Banks · Economic growth · Strategy · Business model

JEL Classification

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1 Introduction

The concept of sustainable development has become increasingly popular among companies worldwide and in Russia, correlating with the development of a responsible approach to the future. The ESG (Environmental, Social, and Governance) program helps companies implement this concept and enhance their effectiveness. It encompasses aspects such as environmental sustainability, social responsibility, and efficient management of internal business processes. This program has gained widespread acceptance because it aligns with the sustainable development concept and demonstrably contributes to enhancing the efficiency of companies.

The integration of ESG principles has become a popular direction in business and society, linked to the international agenda on ESG, societal demands, government and

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_13

business requirements, risk management requirements, changes, and other factors. Research indicates that the banking sector holds a pivotal position regarding the development of ESG principles, as practice indicates that ignoring this trend will lead to unforeseen operational expenses associated with reputational and financial costs for the company. This trend shows that more Russian banks participate in the ESG program every year.

The geopolitical changes of the winter of 2022 and the fall of 2023 did not halt the improvement of sustainable development management in Russian banks, which continue to refine their sustainable development management systems. For example, Rosselkhozbank constantly updates its Corporate Code of Ethics to correspond to the "changing external environment" (Rosselkhozbank 2012). Alfa-Bank also continues its Alfa Chance program, which helps students embark on successful careers. The experience of Russia's largest banks shows that, according to experts' assessments, the high-cost implementation of ESG has had a positive impact on the economic growth of the bank.

1.1 ESG Concept: Basic Postulates

According to scholars from the Higher School of Economics, the concept of sustainable development and the paradigm of assessing risks and opportunities associated with upholding human rights and addressing societal and local community issues "will shape the economic and financial agenda in the near future" (Golovshchinsky and (Ed.) ESG, 2023).

The history of the ESG concept traces back to the twentieth century with the monograph "Social Responsibility of the Businessman" (1953) by H. R. Bowen, a professor at the University of Illinois, USA. In his work, the author posits that every managerial decision of a business should "consider the interests of society in its activities" (Etzioni 2009). This was later termed the concept of social responsibility. It is noteworthy that Bowen's theory serves as a comprehensive theory for several other reflections. For instance, H. R. Bowen, T. Levitt, M. Friedman, R.E. Freeman, J. Galbraith, and K. Davis (1950s–1970s) focused on the internal sources of the concept of social responsibility. According to the authors, the values of the society in which the business operates are the business's priority because it needs to participate in shaping the social value landscape, interacting with stakeholders, guided by its interests and values.

Legal, economic, ethical, and other social expectations of companies were formed throughout the twentieth century. The concept of social responsibility was developed in the 1970s. Carroll's Pyramid is a clear confirmation of this phenomenon, which is based on the following key types of responsibility:

- Economic responsibility: Manufacturers of goods and services aim to satisfy the needs of their customers and make a profit;
- Legal responsibility: Proper conduct of entrepreneurs within a market economy framework and adherence to legislative norms are important success factors;
- Ethical responsibility: Proper business practice conforms to existing moral norms;
- Philanthropic responsibility: A company should strive to ensure that its activities positively impact society through voluntary participation in social programs.

The developed model has its limitations. First, as noted by Crane and Matten, it does not consider conflicting obligations and the manifestation of national and corporate culture (Janse 2020). They arrived at this conclusion by applying it to European companies and noting that different levels of the pyramid have different significance in various European countries. According to them, this was a result of highly diverse historical and religious traditions and norms. Finally, the model is based on the experience of Western countries, meaning that fundamental concepts are not represented at its core, and it cannot be used for every business.

In the 1970s, a new concept emerged—Corporate Social Responsibility (CSR). According to this concept, a company should generate profit and care about society's well-being. In the work "The Evolution of the Corporate Social Performance Model," S. L. Wartick and P. L. Cochran developed a three-layer model comprising the company's management decisions, external environmental factors, and moral principles. There is additional stratification within the blocks (Fig. 1).

It is worth noting that the first two dimensions of corporate social activity remain coherent with the basic principles of Carroll's pyramid. However, the third dimension undergoes significant revision and fundamental change. This becomes evident from the fact that the formulation of the third dimension, which is still in the process of formalization, piques the interest of the researchers. S. L. Wartick and P. L. Cochran emphasize the need to analyze how companies address pressing social issues. The goal of such companies is to demonstrate social sensitivity to changes in the business environment. To minimize risks arising from the changing business environment, companies "implement their social sensitivity" (Blagov 2017).

In 1977, "the first code of corporate social responsibility at the company level was published" (Wartick and Cochran 1985). By the beginning of the twenty-first century, most major companies of the Organization for Economic Cooperation and Development had adopted corporate social responsibility codes.

Thus, before the beginning of the twenty-first century, corporate social responsibility was seen as a business

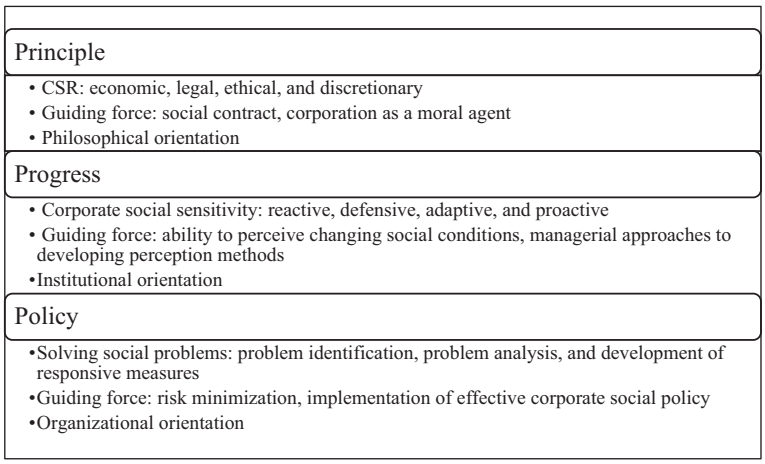

Fig. 1 Three-layer model by S. L. Wartick and P. L. Cochran. Wartick and Cochran (1985 *Source* Developed by the authors based on)

obligation to make voluntary contributions to society that exceeded legal requirements and economic conditions.

The next stage in developing or transforming corporate social responsibility began with the emergence of the ESG (Environmental, Social, and Corporate Governance) program, which was launched in 2004 under the influence of climate change. The ESG principles have been institutionalized by UN Secretary-General Kofi Annan with the support of the International Monetary Fund. His call is dubbed "Who Cares Wins." Notably, one of the main goals of UN sustainable development is combating climate change.

The innovations of this agenda included the consolidation of mandatory topics, which encompass ESG, and external independent audits of companies. By the end of the 2010s, ESG, rapidly gaining popularity, acquired a complex ecosystem. Thus, the following four main levels of the ESG innovation system can be distinguished:

1. Conceptual level. Within this level, experts highlight the emergence of new theories of capitalism, neo-communitarianism, and stakeholder capitalism. For example, A. Etzioni developed the core principles of "neo-communitarianism," which are based on the necessity of compromise between autonomy and individual rights, on the one hand, and the common good, on the other. These principles are key values and normative foundations of society, and none should dominate over the other. Real societies "may tend towards a focus on the common good and insufficient attention to rights protection, or vice versa" (Moiseev 2022).

For instance, regarding the implementation of the common good and the rights of women, people with disabilities, or ethnic minorities, according to the author, Japanese society lags behind the sharply contrasting approach of the USA, which emphasizes an anthropological approach. Such disparities must be reconciled to a common denominator – a center, which Scandinavian countries manage to achieve, where individual rights and the common good are in relative balance. It is precisely the neo-communitarians who "develop theoretical principles and practical policies aimed at seeking a balance between rights and the common good where conflicts exist between them, or ways to complement them" (Bowen 1953).

2. The normative level is represented by international documents and agreements. Examples include the 2015 Paris Agreement on climate, which regulates measures to reduce greenhouse gas emissions from 2020, and the UN Sustainable Development Goals, comprising 17 main objectives pursued by the organization. At the normative level, supra-national and national documents can also be noted: for example, the European Union's Directive on corporate reporting on sustainable development, requirements of the US Securities and Exchange Commission, etc.
3. Monitoring and independent assessment level.
4. Project level: includes ESG initiatives of specific countries, companies, and regions, numbering in the tens of thousands. For example, in Russia, the National ESG Initiative emerged against the backdrop of President Vladimir Putin's address to the Federal Assembly on April 21, 2021, where he instructed to "create an industry for carbon emissions, achieve a reduction in their volumes, and introduce strict control and monitoring" (Europe 2021; Chernyshova 2021). The initiators of the initiative aimed at controlling and reducing emissions into the environment (i.e., adhering to ESG principles and sustainable development goals) are the Russian Presidential Academy of National Economy and Public Administration (RANEPA), Gazprom, Sberbank, Rosneft, Sistema, Synergy, and VEB.

1.2 Impact of ESG Principles on the Strategic Development of the Russian Banking System

By 2020, aspects of sustainable development have taken center stage in the strategies of Russian banks, significantly influencing the socio-political landscape of Russia's domestic policy. ESG banking is becoming increasingly popular in Russia, with international regulation of ESG principles playing a role in this process. The Association of Russian Banks published a document titled "Practical Recommendations of the Banking Community for Implementing ESG Banking in Russia," emphasizing the importance of the ESG strategy for banks and its alignment with national objectives and sustainable development goals. ESG banking aims to ensure the long-term profitability of the real sector of the economy, develop client business and regions of presence, and comply with legislation and international standards. ESG banking represents a "synthesis of concepts of financial leverage, green, responsible, social, sustainable, and ethical banking" (Association of Banks of Russia 2021).

In July 2021, the Bank of Russia issued recommendations on how to consider environmental and social aspects when making investment decisions. In 2022, a decision was made to include a section on implementing sustainable development goals in the draft main directions for "developing the financial market for the next four years" (Marlinskaya 2021). These principles include assessing the impact of a company's activities on the environment and social sectors. New securities issuance standards introduced in November 2021 make it possible to issue green and social bonds if they meet certain conditions. Currently, holders of such bonds are required to provide non-financial reporting on the projects specified in the securities prospectus.

In the latest relevant report, the ESG Ranking of Russian Companies 2022, it is noted that many Russian banks have already transitioned to new ESG principles, affecting their inclusion in the rating. This list includes many banks that have become more environmentally responsible and socially oriented.

In 2021, only two banks in Russia implemented an ESG program into their processes. By 2022, the number of such banks increased sevenfold. This indicates that Russian banks actively integrate ESG principles into their development strategy and economic policy. Furthermore, significant economic growth of these banks is noted. In 2021, Sberbank began working on an ESG program, confirming its desire to become a more environmentally responsible and socially oriented bank. This is evidenced by its participation in the ESG accounting program and consideration of environmental and social aspects when making investment decisions. Considering Sberbank is justified, as the bank is a "bank with expanded universality," where a digital ecosystem has been formed consisting of several business directions: from financial services to entertainment and health.

According to non-financial reporting, Sberbank places great emphasis on sustainable development, supporting various social groups, and addressing accessibility and inclusivity issues through participation in environmental projects, carbon emission reduction, and the adoption of energy-efficient and green technologies. This strategy underpins Sberbank's business strategy, with one of its key objectives being carbon neutrality by 2030. Achieving this goal requires significant changes at all levels of company management, including altering key business processes, implementing new technologies, and transitioning to environmentally friendly energy sources. The corporation is actively developing its business in the field of social responsibility, contributing to economic growth and the creation of new jobs. According to a manager, the majority of people recognize the necessity and importance of environmental and social responsibility, a sentiment supported by a recent study conducted by SberCIB Investment Research. More than half of the surveyed Russians expressed willingness to pay more for safer and environmentally cleaner products.

Sberbank has developed its own ESG strategy and sustainable development initiatives, which consider three groups of factors: environmental, social, and governance. It is complemented by the "Prosperity" category, corresponding to the concept of sustainable development, while the designation of such factors by the World Economic Forum sounds like: people, planet, prosperity, and management principles. Upon analysis, it becomes clear that Sberbank consolidates everything into three areas, nonetheless corresponding to the concept of sustainable development and ESG:

1. Sustainable development: Sberbank aims to ensure the sustainability of its business and society. It strives to create long-term value for customers and partners;
2. Social responsibility: Sberbank actively supports various social groups and organizations aimed at addressing environmental issues and social inequality. The company participates in charitable activities and funds projects aimed at improving people's quality of life;
3. Innovation and prosperity: Sberbank actively implements innovative technologies and methods to enhance the efficiency of its operations and improve service quality. The company is actively involved in developing new products and services that align with sustainable development principles.

The academic interest lies in the element of "prosperity," which is not typically reflected in the ESG principles. However, upon studying the characteristics of this principle, it becomes clear that prosperity implies sustainable connections within the ESG principles. This could entail the link between management and sustainable economic growth, social responsibility, green technologies, etc. Sberbank's approach is comprehensive; it is no coincidence that Sberbank's strategy states that this organization should become a leader in systemic changes at all levels: local, nationwide, and international. Guided by the company's values, leadership is driven by positive changes in the future: an economy that is beneficial for society and the environment, grounded in "the commitment, collaboration, and creativity of employees, clients, investors, shareholders, partners, and the state" (Solutions 2022).

The increase in the Bank's economic growth indicators reflects the incorporation of ESG principles into Sberbank's development strategy. This is related to the fact that ESG strategic narratives presuppose principles of economics, division of labor, and a widespread market. The following two facts serve as evidence of this:

1. By the end of 2021, Sberbank's assets reached 38 trillion rubles, increasing by 15% compared to the previous year (TAdviser. 2024);
2. Net profit increased by 1.7 times compared to 2020, reaching 1.24 trillion rubles by the end of 2021;
3. 14.4 trillion rubles is the amount Sberbank issued in loans to customers in 2021.

The mentioned facts attest to the trust in the bank's products by customers, which may stem from the confidence that the bank adheres to modern trends, observes environmental hygiene, and takes an active social stance.

2 Methodology

After defining the main research objectives, the authors analyzed the companies' economic indicators, ESG (Environmental, Social, and Governance) reporting, and other company reports to identify the impact of these indicators on the financial results of the companies. The authors collected and analyzed all necessary data, including financial statements, ESG reporting, information on the market environment, competitive position, and other related documents. Analysis and interpretation of the collected data were performed using statistical methods and models. The authors assessed the impact of ESG indicators on financial results and evaluated the correlation between ESG indicators and companies' financial results using various analysis methods such as correlation analysis and regression analysis.

3 Results

This research represents an attempt to examine the influence of ESG principles on the development of the banking sector in the Russian Federation and its economic growth. Throughout the research, the authors established key objectives and tasks, analyzed the historical evolution of ESG principles, defined the meaning of ESG strategy, and provided evidence of the important role of ESG strategy in economic growth. The findings of this research demonstrate that updated strategies of Russian banks, based on ESG principles, are already impacting the economic growth of the banking sector and its sustainability. Considering the significant interest in this topic, further research is recommended to explore in more detail the mechanisms by which ESG principles affect the economic growth of the banking sector in the Russian Federation.

4 Conclusion

Finally, in September 2023, Sber proposed the creation of a unified platform for ESG initiatives among BRICS countries, which, according to Sber, "will help formulate a unified strategy for sustainable development" (TASS Russian News Agency 2023). Sber's First Deputy Chairman of the Board, A. Vedyakhin, proposed establishing a "Center for Expertise on Sustainable Development and Climate for BRICS countries" and a "unified registry of climate projects for this group of countries." Significant initiatives in this area could also include the formation of a unified rating agency (the last international certification of Russian banks was conducted in 2022) and the establishment of a common "CleanTech" fund for green technologies. Furthermore, Sber launched the first system for voluntary certification of low-carbon energy in Russia, confirming the origin of electricity from renewable sources. The top manager expressed hope that Sber would become a center of competence on these issues and assist in their implementation.

Thus, the topic outlined in the research is not only a necessity driven by societal demand, global public opinion, and shareholders but also a potential added value that will enrich the product line of banks and meet customers' demands. There is no doubt that when compiling associative maps of the future during the strategic process, ESG principles must be considered, leveraging the advantages of the parallel launched global process—digital transformation. ESG principles significantly alter the business model of banks, allowing them to consider a broader range of opportunities in the medium and long term and becoming important drivers of economic growth.

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Analyzing the Impact of Sanctions Pressure on the Russian Banking System: Turning ESG Cooperation to the East

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Abstract

Since the twentieth century, economic sanctions have become widely employed in foreign policy and diplomacy. However, the imposition of sanctions against Russia since 2014 represents historical uniqueness in terms of its scale and duration: over 16000 economic sanctions have been imposed against Russia, whereas against Iran, which holds the second position, less than 4000 sanctions have been imposed, accounting for only 22% of the total number of sanctions imposed against the Russian Federation. Russia has accumulated significant experience in countering various types of sanctions in legal, physical, and financial sectors. Sanctions against the Russian financial system have been actively utilized recently, the experience of which demands detailed analysis and systematization because the stability of the banking sector influences the state's ability to pursue its interests. Additionally, the search by Russian banks for new partners in the implementation of ESG transformation, a process that continues unabated despite sanction pressure and the conditions of international tension in the geopolitical arena, is of research interest. Russian banks continue this process because it is necessary to comply with international standards of financial stability and corporate governance. It allows them to enhance their attractiveness to investors and clients. Finally, it enables them to maintain competitiveness in the market by improving reputation and trust from clients and partners. It is reliably known about the strategic intentions to create unified ESG competence centers within the BRICS countries. A comprehensive analysis of tools to counter sanctions will help strengthen the strategy of developing the Russian banking system, including implementing ESG principles.

Keywords

ESG · Sanctions · Banks · Countermeasures · Development strategy

JEL Classification

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1 Introduction

Since the twentieth century, economic sanctions have served as a principal instrument of foreign policy and international diplomacy. Their application is not an innovative means of influencing a state's policy. However, the sanction pressure on Russia from 2014 to the present day is historically unprecedented in quantity and duration—more than 16,000 economic sanctions have been imposed (for comparison, less than 4000 sanctions have been imposed against Iran, which ranks second after Russia in terms of the number of sanctions imposed, constituting 22% of the total number of sanctions imposed against Russia).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_14

Russia has undoubtedly accumulated the practice of countering various types of sanctions (against legal entities, individuals, and the financial sector), which have also been imposed simultaneously. It is also worth noting that sanctions against the financial sector were not previously used as actively as they are now against the Russian financial system, which once again demonstrates the possible accumulation of unique experience by Russia in countering various types of sanctions over an extended period. This experience requires comprehensive analysis, evaluation, and systematization because the stability and continuity of the banking sector affect the state's ability to carry out its activities and implement public interests.

Economic sanctions targeting the Russian banking sector have resulted from a change in the management course of the Bank of Russia and other Russian banks. Previously, the Central Bank of the Russian Federation was guided by tactical decisions that made it possible to effectively and timely respond to crises and challenges arising from sanctions. For example, during periods of declining oil prices in 2014–2015, sanction pressure from 2014 to 2022, and the spread of the coronavirus infection from 2020 to 2021, such an approach helped to protect "the financial stability of the national currency and prevent the development of an inflationary spiral" (Volkova 2022). Nonetheless, in May 2022, the head of the Bank of Russia, Elvira Nabiullina, declared a "transition from tactical to strategic decisions" (Volkova 2022). Identifying and justifying tools to counter economic sanctions will make it possible to systematize accumulated experience and strengthen the strategy of development of the Russian banking system, including the strategy for implementing ESG principles, which directly influence the strategic development of the Russian banking system.

The research aims to systematize Russia's accumulated experience in countering sanctions in the banking sector, consolidate and justify the tools to counter sanctions, including those aimed at transformation together with Eastern partners in implementing ESG principles.

The mentioned goal requires the solution of the following tasks:

- To evaluate the effectiveness of sanction pressure on the Russian banking system based on the author's system of evaluation criteria;
- To identify and justify the tools and strategies used to counter sanctions, including in the field of sustainable development;
- To determine the strategic prospects for developing multilateral cooperation with Asia, Latin America, and Africa in the joint development of ESG banking.

The research object is the strategy of countering economic sanctions in the Russian banking system in terms of ESG transformation.

The research subject is a set of tools that make it possible to form a strategy to counter economic sanctions in the Russian banking sector in terms of ESG transformation.

To assess the effectiveness of sanction pressure, the following key (system-forming) banks of Russia were selected: PJSC Sberbank, Tinkoff Bank JSC, Moscow Credit Bank PJSC, VTB Bank PJSC, and Gazprombank PJSC. The authors evaluated each bank using a developed methodology for assessing the effectiveness of countering economic sanctions—the text will indicate multidimensional activities (including those aimed at lobbying the green agenda—they will be marked "ESG") to counter economic sanctions, as it has been proven that counteraction is effective only when a complex set of tools is used.

2 Results

According to the analysis, Sberbank received a rating of 3.4. This indicates that the bank effectively responds to the imposition of economic sanctions and is capable of forming an effective development strategy, including an ESG strategy. The primary factor contributing to the reduction in the overall effectiveness rating is the unprecedented decline in the bank's net profit (over 75%). This means that negative profits were recorded in several areas previously developed by Sberbank. Consequently, Sberbank divested non-banking businesses such as "Samokat," "Citymobil," and "Kuhnya na rayone" [Kitchens in the Neighborhood]. These companies are no longer part of Sberbank's ecosystem. In terms of banking services, Sberbank has launched the following initiatives:

- Development of its own international settlement system, which will serve as an alternative to SWIFT. This will enable the bank's clients to make domestic and international payments without additional fees and risks, the list of which has increased due to the disconnection of Russian banks from SWIFT. Such interaction with clients will allow the bank to maintain leadership in the banking sector by increasing the number of loyal clients after the introduction of the new payment system;
- Special offers for individual cards of the national payment system "MIR": the "Spasibo Bonuses" loyalty system, free servicing, and the ability to withdraw money without interest;
- Offers for savings accounts and deposits resulted from "an 8.2% increase in the funds of individuals" (Sberbank 2022). Thus, offers for savings accounts and deposits can be considered attractive to bank clients;
- The option to open accounts in yuan. A yuan account may be beneficial to business owners who deal with suppliers or clients from China and do not want to incur conversion costs. Additionally, a yuan account reduces

currency risks associated with the unstable position of the ruble against the US dollar;
- ESG: In December 2023, Sberbank plans to launch an electronic platform for trading green energy certificates, as the bank's top management thinks that "the annual turnover of the green certificate market in Russia by 2030–2035 could reach 11.5 billion rubles" (Vedomosti. 2023);
- ESG: During the VIII Eastern Economic Forum, Sberbank's team proposed jointly creating a unified registry of climate projects and an ESG competence center with BRICS partners from the Asia–Pacific region. This indicates that the bank is developing partnership relations in terms of ESG transformation with countries in the Asia–Pacific region despite economic sanctions imposed by Western countries and the USA;
- ESG: In June 2023, Sberbank announced an agreement with Rosseti Siberia to implement green technologies in the Siberian Federal District.

Based on criteria that are not involved in calculations, the authors note that the bank actively engages with individuals and legal entities. Additionally, the bank is developing its own international payment system as an alternative. There is an expansion of the possibility of holding accounts in other currencies, while activity related to supporting the ESG trend and reallocating to Eastern partners is positively received by corporate clients, as indicated by the figures.

Following the analysis, Tinkoff Bank JSC has been assigned a rating of 2.75. This is due to a significant decrease (25%) in the liquidity of the bank's assets, which, in turn, signifies the "bank's ability to timely process payments, return funds from deposit accounts, and meet other obligations" (Central Bank of the Russian Federation 2021). Furthermore, a decline in net profit by 67% has been identified, indicating a significant impact of economic sanctions on the bank's operations. These indicators may also be associated with the departure of the bank's top management in the spring of 2022 and the transfer of key assets to the "Interros" holding (Vladimir Potanin). However, in 2022, the number of individual clients increased by 72%, attributed to the following factors:

- Before introducing the tenth package of anti-Russian sanctions (February 2023), Tinkoff Bank could carry out transfers in dollars and euros. This could have increased the client base; other banks lost this opportunity. After introducing the tenth package of sanctions, the bank restricted transfers in dollars and euros. Instead, transfers in rubles to friendly countries of the Russian Federation are now offered. This means that interactions with CIS countries can be conducted safely through the bank, satisfying the needs of some clients;
- The national payment system "Mir" is actively developing: a competitive advantage of the bank is the ability to issue a virtual card. This enhances the security of funds for individuals. Such security is necessary because banks "aced unprecedented attacks on their servers and databases" during the Russian-Ukrainian conflict (Zarutskaya 2023a);
- Interaction with businesses and new legal entities has been elaborated: expanded assistance during business registration, issuance of MasterCard, Visa, and MIR business cards, and the launch of a business school to enhance business management quality;
- Offers for individuals to open savings accounts and deposits in different currencies with competitive annual rates have been formed. This has also resulted in an increase in clients at the bank;
- ESG: Tinkoff Bank launched an exchange-traded fund in 2021 for investment in eco-technologies, including shares of young companies expected to yield positive results within ten years;
- ESG: The "Sustainability Report 2022" indicates that the bank optimizes resource usage, advocates for an eco-friendly lifestyle, and considers climate change risks;
- ESG: No contacts with Eastern partners are noted, or this work is not publicized in open sources.

Based on the analysis of effectiveness criteria in countering economic sanctions, OJSC Moscow Credit Bank (MCB) has been rated at 3.4. This indicates the bank's effective resistance to sanctions and its capability to formulate development strategies. Two factors stand out regarding negative outcomes: a reduction in the bank's asset liquidity (a key indicator of its operational capability) and a decline in the bank's net profit, which was observed to varying degrees across all analyzed banks. MCB saw a 71% decrease in net profit, which is significant for a bank with over two million clients. Furthermore, there is noted growth in the number of retail clients and the bank's credit portfolio. This is attributed to the following factors:

- MCB is preparing to connect to the Chinese International Payment System (CIPS) as an alternative to SWIFT. Integration into this system will allow individuals and legal entities to make transfers to China without losing money on currency conversion. As reported by RBC, "China-Russia trade in the first three months of 2023 reached $53.84 billion, up 38.7% compared to the same period in 2022" (Gromova 2023). Amid expanding trade relations, CIPS integration will benefit the bank by attracting new clients and facilitating seamless transfers for existing ones;

- ESG: In 2022, the bank ranked first in implementing ESG principles into its operations by publishing the corporate credit portfolio's carbon footprint calculation;
- As an alternative to Apple Pay and Google Pay, MCB launched the sale of payment stickers and rings. This allows bank clients to pay conveniently without a physical plastic card, at any time in any place where cards of the national payment system "Mir" are accepted;
- The bank, like others, is developing "Mir" debit card offerings, with attractive service packages and cashback options;
- ESG: Business interaction has been established: within less than three years, remote account management has been set up, electronic document flow organized, integration with accounting programs carried out, transfers and conversion operations enabled, and salary project management options added. These features are critically important for business operations. MCB provides this service;
- Competitive rates on savings accounts and deposits have led to a 5% increase in retail funds and a 26.6% increase in corporate funds at MCB by the end of 2022 (Zarutskaya 2023b).
- ESG: No contacts with Eastern partners have been noted, or this work is not publicly disclosed. This may be linked to the priority process of connecting to the Chinese payment system.

Following the analysis of sanctions resilience and stability, PJSC VTB Bank was rated at 3.75. The critical factor behind this rating was the significant decrease in net profit (99%). Dmitry Pyanov, VTB's Deputy Chairman of the Management Board, highlighted the following factors contributing to the bank's profit decline (the most significant since 2009) in an interview with RBC:

- The group incurred a pre-tax loss of 960 billion rubles according to IFRS, of which approximately 300 billion rubles, or roughly 31.2% of this amount, stemmed from losses related to VTB's existing open currency position (Koshkina 2023);
- Non-monetary losses due to the strengthening of the ruble in 2022;
- VTB was the first bank to be included in the anti-Russian sanctions on February 24, 2022, thus lacking experience in countering multifaceted sanctions. Additionally, after the onset of the Russo-Ukrainian conflict, the Central Bank of Russia had no limits on withdrawing foreign currency from bank deposits and accounts. This destabilized the bank's operations: "From late February to the end of March, VTB lost 40% of client funds in US dollars, or nearly $19 billion, and about 68% of euro liabilities (7 billion euros)" (Koshkina 2023).

VTB is the only bank that has launched the issuance of new shares (a 67% increase compared to 2021). This was done because the additional share issuance led to an increase in VTB's authorized capital. As noted by D. Pyanov, this is done for the "restoration of the bank's capital" (Koshkina 2023). Despite this, the bank managed to increase the number of retail clients and expand its loan portfolio. Such growth is explained by the decisions and initiatives of the Bank taken after the introduction of the sanctions package:

- ESG: As an alternative to SWIFT, VTB allowed money transfers to China using banking details through remote channels or at bank branches (the detailed operation scheme is hidden). This allows the bank's clients to settle with Chinese suppliers in the national currency without losing money on currency conversion;
- VTB was one of the first to introduce the MIR payment system. Thus, there are opportunities to obtain a MIR card as a social card, a card for residents of St. Petersburg, or a Troika card. This makes it possible to use public transport services with certain state benefits. The joint development of the state and business in this direction has been carried out considering the interests of society. For example, "in 2022, 64% of trips by Moscow residents were made on public transport, which is 2% more than in 2021" (Portal and "Moscow transport", 2023);
- Socially significant payments (pensions, scholarships, and salaries) credited to pension, salary, and social cards are provided free of charge by the bank (both issuance and servicing);
- For businesses, VTB assists with business registration, offers 12 months of free service when opening a business, and makes it possible to issue an enhanced qualified electronic signature at the time of business registration, which is a complete analog of a physical one. This can be useful for document processing and organizing the work of individual entrepreneurs or LLCs;
- Interest rates on savings accounts and deposits are competitive. However, the bank is interested in restoring capital, which is why the best offers apply to deposits up to three years without the possibility of withdrawal;
- ESG: VTB has already developed an expertise center for green financing in promising sectors (lending, factoring, green bonds, and creation of new green instruments);
- ESG: According to the "Sustainable Development Report" for 2022, it can be concluded that the strategy of corporate social responsibility and ESG is aimed at the territory of Russia. However, joint activity with China does not negate but proves that VTB is working on attracting foreign investments into domestic high-tech green production.

PJSC Gazprombank, the third-largest systemically important bank, was awarded a rating of 4 based on the effectiveness of its response to economic sanctions. The primary factor contributing to the decrease in the final rating is, like with other banks, the decline in net profit, although Gazprombank holds the status of an authorized bank for payment in rubles for gas supplies to unfriendly countries. This implies that the bank is not subject to blocking sanctions. As noted by Gazprombank analysts, the decrease in profit is attributed to a "fivefold increase in allocations to reserves for the loan portfolio and correspondent accounts" (Sherunkova 2023). An increase in the loan portfolio by 14% is noted, exceeding 100 billion rubles. Such allocations to reserves for the loan portfolio and correspondent accounts exceed the entire net profit for 2021. These operations are necessary to compensate for potential losses on loans. Considering this factor, Kommersant summarizes: "Gazprombank's assets at the end of 2022 grew by almost 1.5 times, reaching 12.4 trillion rubles" (Sherunkova 2023). Additional factors contributing to the increase in Gazprombank's assets include the following:

- Experience in using the national payment system SPFS since 2018;
- Development of the national payment system MIR: Multilateral preferential programs, cashback, and offers on savings accounts for new clients;
- ESG: Implementation and development of the UnionPay payment system with benefits for clients: free transfers up to 150,000 rubles, free cash withdrawals, and the possibility of receiving cashback. A competitive advantage is the ability to use the card in more than 150 countries worldwide. This option is not available with other banks;
- For businesses, Gazprombank also provides unique services not offered by other banks: the ability to open Visa Business and Mastercard Business cards, as well as corporate cards of Visa, Mastercard, UnionPay, and JCB payment systems in the Gold category;
- The bank provides businesses with the opportunity for convenient and prompt business management (various services);
- Standard annual interest rates apply to savings accounts, and for deposits, the bank has formulated the best (among the analyzed banks) offer at 11% per annum;
- ESG: During the VIII Eastern Economic Forum, the Gazprombank team supported the initiative of cooperation with colleagues from Africa, Asia, and Latin America on reducing and absorbing CO_2 emissions, environmentally friendly waste management, and developing scientific research cooperation.

3 Methodology

The main objective of this research is to analyze the impact of economic sanctions on the banking system of the Russian Federation and lay the foundation for a shift towards ESG collaboration with Eastern partners. The authors reviewed the literature and analyzed previous studies on the impact of sanctions on the Russian banking system, as well as on the turn towards Eastern ESG collaboration. The authors carried out qualitative and quantitative data analyses related to the impact of sanctions on the financial stability of Russian banks and their relations with Eastern countries within the framework of ESG collaboration. Additionally, an investigation of investment and financial indicators of Russian banks with a focus on Eastern collaboration in the context of overall ESG strategy development has been conducted. Authoritative analytical tools have been developed to assess the impact of sanctions on the banking system of the Russian Federation and the prospects for developing ESG collaboration in the East. Upon completion, the authors analyzed the obtained data and formulated conclusions and recommendations regarding the path of the development of the banking system of the Russian Federation under conditions of sanction pressure and a turn towards Eastern partners in the context of ESG collaboration.

4 Results

The introduction of sanctions against Russia represents a unique situation in terms of its scale and duration. The Russian system has successfully countered various types of sanctions across different sectors, including legal, physical, and financial realms. Sanctions against the Russian financial system have been particularly active recently, necessitating detailed analysis and systematization, considering the impact of banking sector stability on the state's ability to pursue its interests. Russian banks continue to seek new partners as part of the implementation of ESG transformation, driven not only by sanction pressures but also to align with international standards, enhance attractiveness to investors and clients, and maintain competitiveness in the market. In turn, Russian banks have strategic intentions to establish unified ESG centers of competence within the BRICS countries. Analyzing sanctions counteraction tools will strengthen the strategy for developing the Russian banking system, including the integration of ESG principles.

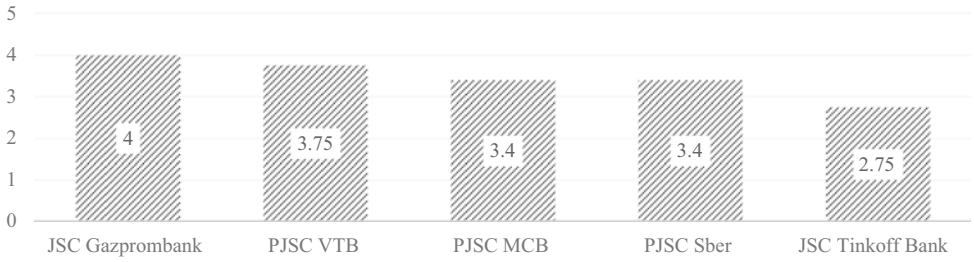

Fig. 1 Rating of banks by efficiency of counteraction to economic sanctions. *Source* Compiled by the authors

5 Conclusion

Thus, the average efficiency indicator of the analyzed banks stood at 3.46 (Fig. 1). This indicates that the resistance to sanctions by the key systemically important banks of Russia can be considered successful, as the requirements of the Central Bank of Russia regarding the maximum and minimum values of key indicators have not been violated. The liquidity of bank assets has been maintained, the banks' credit portfolios have increased, and there has been a growth in the number of clients (individuals and legal entities) despite the decline in net profit in 2022. It is worth noting that new counteraction tools were utilized by banks that fell under sanctions. As a result, banks demonstrated corresponding net profit results in Q1-2023, which are comparable to pre-crisis results (Q1-2021).

From the perspective of ESG transformation, it is worth noting that only two banks (Sber and Gazprombank) have openly declared their readiness to cooperate with Eastern partners in promoting ESG transformation. However, it has been reliably demonstrated that each of the banks under consideration, despite the sanction pressure, continues to implement an adapted ESG strategy within the Russian Federation. They actively attract foreign (including Eastern) investments into domestic high-tech green enterprises. Based on the results obtained, the researchers believe that the agreements launched in 2023 for joint work on implementing ESG principles within the banking systems of the Russian Federation, Asia, Latin America, and Africa represent the first step towards creating significant international projects in the field of ESG. This serves as one of the tools to counteract economic sanctions in the Russian banking sector.

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Business Audit in the Context of ESG Information: Environmental Aspect

Nadezhda N. Makarova, Ivan A. Chusov, Dmitry V. Kalashnikov, and Oksana V. Kravtsova

Abstract

The development of non-financial reporting, particularly the environmental performance of economic entities, is closely linked to improving the quality of information disclosure. Unfortunately, the quality of information lags behind its volume growth. Many companies utilize the ESG (Environmental, Social, and Corporate Governance) management model, which actively promotes the development of the institutional and legal framework for non-financial reporting. One of the paramount methods to enhance the quality of disclosed non-financial information is to conduct independent audits. The environmental criteria adhered to by companies, in line with ESG principles, should not exceed the maximum sustainable capacity of the environment. This research aims to develop a theoretical approach to auditing non-financial reporting, disclosing the stages of its implementation in the transition towards sustainable development of the economic system from an environmental perspective. The research presents a generalized methodology for auditing non-financial information, particularly focusing on the environmental component. The authors employ fundamental methods at the theoretical level, such as formal logic and dialectics, as well as empirical methods, such as observation and description.

Keywords

Audit · Non-financial reporting · Environmental topic · Sustainable development · Verification

JEL Classification

M42 · M49 · O13

1 Introduction

The fundamental challenges of our times, such as global climate change, gender social inequality, and environmental conditions, represent only a part of the systemic crises in the economy and, consequently, the challenges that necessitate a reevaluation of the existing management and control concepts.

Over the past decades, the Concept of Sustainable Development of society has been implemented internationally, encompassing economic, social, and environmental aspects (ESG factors). From the perspective of the implemented Concept of Sustainable Development, goals are defined at corresponding levels: global, national, regional, sectoral, and individual economic entities. Significant transformations occurred in the approaches to the interaction of economic entities with the surrounding world, key stakeholders, and internal personnel during this time.

Since the mid-twentieth century up to the present, the issue of the stability of economic systems and environmental determinants has held exceptionally dominant importance, having reached a global level. This circumstance is explained by the rapidly increasing anthropogenic impact on the biosphere due to substantial growth in the global economy, population increase, expansion of industrial and economic activities, and the inability of the planet's ecosystems to sustain all of this in the near future. Consequently, the environmental determinant impedes the development of an economic system oriented towards sustainable development.

As a staunch evolutionist and the creator of the doctrine of the noosphere (i.e., the sphere of human reason and its colossal creative power), V. I. Vernadsky gave rise to the

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_15

fundamental ideas of sustainable development in the early twentieth century. His ideas formed the basis of the concept of sustainable development of the global community. At the beginning of the twentieth century, V. I. Vernadsky predicted the practical use of atomic energy. Nowadays, the agenda includes the large-scale use of renewable sources.

The philosophy of ESG (Environmental, Social, and Corporate Governance) is gradually becoming an inherent component of business globally and in Russia, demanding a more responsible attitude towards the planet's future.

2 Methodology and Results

During the research, the authors employed scientific methods grounded in general scientific principles such as abstract-logical, dialectics, and generalization. The methodological framework of the work is based on the provisions and regulatory framework of auditing, as well as contemporary institutionalism.

In the context of the Sustainable Development Concept, the emergence of the ESG trend in the business environment is associated with the publication of the UN report "Who Cares Wins. Connecting Financial Markets to a Changing World" (IASGYAN 2022) in 2004, which predetermined the approach to formulating principles of sustainable development. Thus, by combining three parameters (principles), businesses ensure sustainable development management (Fig. 1).

International and Russian trends in sustainable development in recent years led to the implementation of ESG standards and the formation of public non-financial reporting, which is gaining popularity in Russia. For instance,

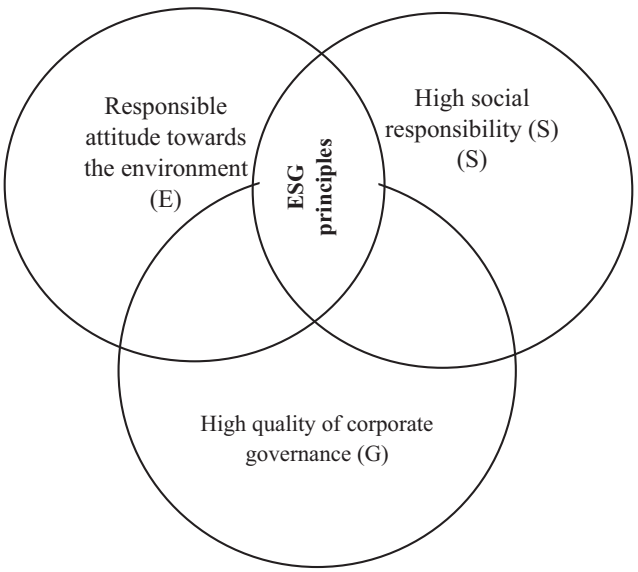

Fig. 1 Basic ESG principles. *Source* Compiled by the authors

large Russian companies voluntarily publish corporate non-financial reports on the National Register website. As of October 1, 2023, 1419 non-financial reports were officially published, disclosing business performance results in terms of sustainable development. The portal presents 548 sustainability reports, 388 social reports, 111 environmental reports, and 372 integrated reports. These reports were compiled by 250 companies operating in Russia (2023). Such reports provided by economic entities inform society about the results of achieving Sustainable Development Goals (SDGs) regarding environmental, social, and economic components.

"However, the informational value of various types of public reporting as a tool for communication between economic entities and stakeholders is neutralized without the procedure confirming its reliability" (Bulyga and Safonova 2022, p. 9). Moreover, there is no unified methodology for non-financial reporting, which poses a series of problems for auditing (lack of standardized forms of non-financial reporting, clear requirements for the nature and scope of audit procedures, difficulties in understanding various directions and areas of economic entity activity, testing procedures in audit checks, etc.). It is also worth noting that in scientific literature, this audit is interpreted as "verification."

The definition of "audit of non-financial reporting" is absent at the legislative level. However, the concept of audit is established in the legal aspect. It is understood as "an independent examination of the accounting (financial) statements of the audited entity to express an opinion on the accuracy of such statements" (Federation 2008). The object of verification can be the entire non-financial reporting, its individual components (e.g., greenhouse gas emissions reporting), and assessing the awareness and satisfaction of stakeholders in the indicators of the verified information. Verification (as tasks ensuring confidence or as accompanying audit services) can be initiated by the organization and at the initiative of a third party with the participation of professional and public associations and internal auditors to obtain the most accurate, objective, and reliable information on compliance with the principles of sustainable development. In accordance with the Concept of Public Non-Financial Reporting Development, "independent external assessment of public non-financial reporting at the initiative of issuing organizations is carried out in the form of confirmation (certification) by a person or group of persons independent of the preparation process of public non-financial reporting" (Government of the Russian Federation 2017). In Russia, more attention should be paid to confirming non-financial information, which is considered relatively underdeveloped and requires serious elaboration.

Ecology and climate (factor E) remain under active scrutiny by companies (environmental safety, resource conservation, waste management, biodiversity preservation,

carbon footprint reduction, etc.). The significance of environmental auditing in ensuring the quality of non-financial reporting by economic entities is also driven by the transition of the global and Russian economies to green standards. However, according to the International Energy Agency (IEA), global energy in 2022 reached a new historic peak of emissions—about 13.2 gigatons (Gt) of CO_2, which is 1.3% more than in 2021, due to the growth in electricity generation from fossil fuels in the Asia–Pacific region and Europe" (International Energy Agency (IEA) 2023).

Environmental auditing (as a kind of business audit component) is dictated by the need to increase the confidence of a wide range of potential stakeholders in the accuracy of information about environmental protection commitments. In this case, the main focus is on verifying the indicators of non-financial reporting on the company's sustainable development, particularly environmental reporting. This report should contain all facts of the company's impact on the environment.

From the perspective of integrated reporting, the focus on environmental information leads to the formation of environmental accounting and reporting of the economic entity's environmental condition in both natural and monetary terms. Therefore, the term "eco-economic audit" is appropriate in this context.

In reality, environmental auditing represents the following (Makarova and Timofeeva 2016, p. 145):

- Environmentally-oriented norms and rules formally established by environmental law;
- Organized practices of auditing the activities of economic entities;
- A form of scientific knowledge with its theoretical foundations;
- A field of practical activity based on a theoretical and legal basis and capable of determining the methodology of auditing.

A generalized audit methodology in the context of disclosing non-financial information about the environmental commitments to environmental protection of an economic entity is presented in Fig. 2.

It is worth noting that environmental commitments to environmental protection include a commitment to sustainable development by the economic entity and its impact on the environment, including carbon emissions and its footprint, energy usage, waste, and environmental responsibility.

During the preparatory stage of the audit examination, the parameters of the economic entity's environmental impact on the environment as an open system are studied. At this stage, the grounds for the emergence of environmental protection obligations of the economic system are specified.

During the planning stage of the audit examination, an informational framework is established to comprehend the

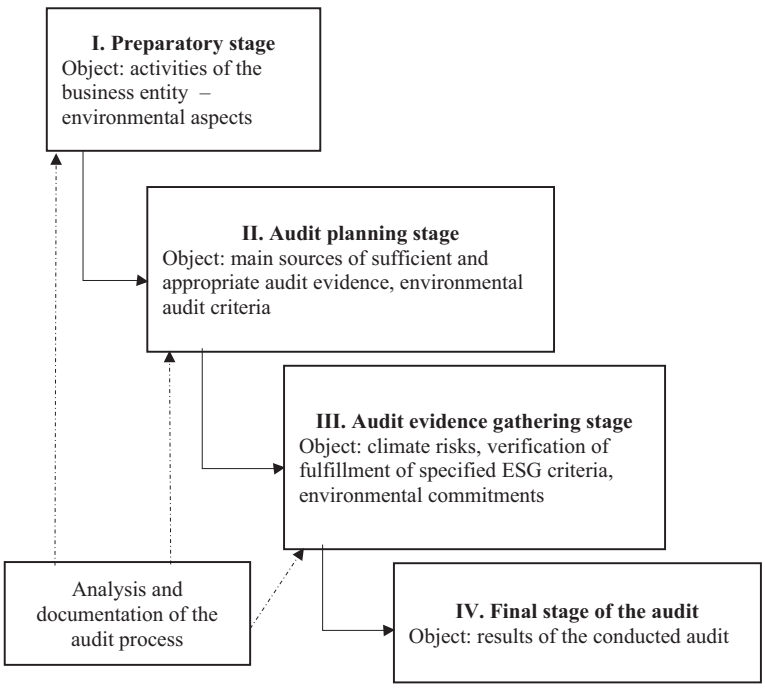

Fig. 2 Generalized audit methodology in the context of non-financial disclosure: the environmental dimension. *Source* Compiled by the authors

environmental activities of the economic entity, and procedures for an ecological audit program are devised to present and disclose information on ecological matters. In this context, parameters of the organization's environmental impact on the environment (including climate) are set, primary sources of sufficient and appropriate audit evidence are identified, and criteria for the indicator system are determined.

During the collection phase of reliable audit evidence, it is proposed to conduct analytical procedures to assess the quality of presentation and disclosure of information, particularly its completeness, on ecological matters in the non-financial reporting of the economic entity. At this stage, quantitative and qualitative indicators may be utilized to assess the ecological component of the evaluated entity's ESG. This information should ensure a proper basis for evaluating the organization's contribution to the state's sustainable development process. Furthermore, a scoring scale for disclosure assessment should be employed to conduct analytical audit procedures related to ecological themes in non-financial reporting. Typically, the rating system regarding the ecological component is expressed using consolidated rating categories. It consists of levels ranging from "A" (High level), followed by "B" (Medium level), to "C" (Low level). The evaluation of component E is conducted from two correlated perspectives: the impact of the economic entity's activities on the environment and vice versa—the impact of the environment on its activities over a certain period. From the perspective of integration into the sustainable development agenda, the following sub-levels are determined within the ecological component:

- Level "A"—maximum, very high, high sub-level;
- Level "B"—adequate, moderate, moderately weak sub-level;
- Level "C"—weak or very weak level.

During the rating assessment of the ecological component, an analysis of necessary documents, business processes, and corporate operations of the company is conducted, evaluating them against national institutions, internationally recognized criteria, standards, and best practices in the sustainable development field. Simultaneously, the quality of the application of specific practices and informational transparency is evaluated.

At the concluding stage of the audit methodology, it is proposed to synthesize the results and conduct procedures to determine key ecological audit issues in the audit report, expressing an opinion on the accuracy. Such procedures serve as a tool to ensure the informativeness of the presentation and disclosure of information on ecological matters in non-financial reporting. This stage concludes with the confirmation (attestation) of reporting in the environmental sphere: regarding systems and processes in the ecological sphere; verification of sustainable financial instruments; information on the company's carbon footprint of greenhouse gas emissions (Scope 1, Scope 2, and Scope 3).

Thus, to prevent greenwashing, enhance the trust of stakeholders, especially major investors, in the activities of the economic entity, and the disclosed non-financial information on climate-related risks and opportunities for the economic system in the context of its business, measures taken in the environmental sphere should undergo independent external assessment reflected in the annual non-financial report or in the form of professional confirmation (attestation). To achieve this, auditing organizations (auditors) sufficiently prepared to perform their duties in this area should be engaged. The necessity of obtaining an independent opinion to confirm the accuracy and legitimacy of data, contributing to enhancing business reputation and the efficiency of internal processes, is recognized by companies engaged in sustainable development.

3 Conclusion

Currently, the fundamentals of audit regulation in Russia are established by Federal law "On auditing" (December 30, 2008 No. 307). This law does not include the concepts of environmental audit and audit of non-financial reportingin the field of sustainable development, nor does it define the subject of auditing non-financial reporting in case of its publication. Auditing the non-financial reporting component E is primarily based on assurance standards for non-financial information. Typically, these are internationally accepted standards (GRI, SASB, ISSB, TCFD, and others). Therefore, the institutionalization of non-financial reporting auditing in Russia is still in its formative stages, as there is no comprehensive set of fundamental institutions, and questions of standardization and legitimization of companies' activities in sustainable development remain unresolved.

At the present stage, the status of the environmental audit institution, establishing general rules for tasks related to the independent assessment of the completeness, accuracy, and accessibility of non-financial reporting information on ESG factors, demonstrates that its adaptation speed to changes observed in the economy, climate, and new technologies is lower than the transformations themselves. Therefore, "if we follow the logic of modernization breakthrough, it is necessary to accelerate the pace and scale of institutional transformation by improving the institutional and legal framework" (Makarova et al. 2020, p. 29) of environmental auditing to ensure compliance of companies' activities with legislative environmental norms, as confirmed by any dynamically developing countries in the global community.

Promoting integrated thinking in corporate practice (achieving the latest management thought) in the accounting and control sphere reasonably enhances, based on professional judgment, the boundaries of forming and confirming the accuracy of non-financial reporting associated with the implementation of ESG principles.

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The Role of Advanced Technologies and Responsible Innovation in the Decarbonization of the Oil and Gas Industry

Alsu R. Akhmetshina, Rosa G. Kaspina, and Zhanna A. Chistopolova

Abstract

The urgency of decarbonizing energy systems has grown since the entry into force of the Paris Climate Agreement in 2015. The impact of global climate change has been linked to the escalation in the atmospheric concentration of carbon dioxide (CO_2). The world community is currently promoting the idea of decarbonization—the restructuring of the economy and energy systems to drastically reduce CO_2 emissions, which will reduce the burden on the environment. The oil and gas industry has a huge impact on the climate. Therefore, oil companies are actively implementing decarbonization projects using advanced technologies and responsible investments. This research examines the primary techniques and technologies employed in decarbonizing the oil and gas sector, specifically within the Oil and Gas Climate Initiative (OGCI), which comprises the largest international corporations in the industry. A correlation analysis is carried out to ascertain the correlation between the volume of greenhouse gas (GHG) emissions and investments in decarbonization technologies.

Keywords

Carbon · Climate change · Global warming · GHG · Energy resources · Fuel · Gas · Hydrocarbons · Oil · Sustainable development · Technological innovation · Environmental R&D

JEL Classification

Q4 · Q010 · Q540 · Q550

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1 Introduction

It can be stated that climate change has come. The average global temperature has risen by 1 °C and is projected to rise by 1.5 °C in the near future while maintaining the current pace. This is already reflected in the environment. Cataclysms, weather and climate disasters, forest fires, and hurricanes occur, leading to the death of people and animals (Jackson et al. 2018).

The nations took a crucial step towards mitigating adverse environmental effects caused by the climatic variations by endorsing the Paris Agreement during the 21st session of the Conference of the Parties (COP21) in Paris on December 12, 2015. This agreement aims to significantly decrease the worldwide emissions of greenhouse gases (GHG) and restrict the rise in global temperatures to two degrees Celsius within this century. Additionally, the agreement seeks to discover methods by which to further restrict the increase to 1.5 degrees Celsius (UNFCCC 2015).

Dioxide (CO_2) emissions worldwide show that all countries must significantly increase their efforts to decarbonize the energy sector in the future (Papadis and Tsatsaronis 2020).

Climate risk is considered one of the most critical for our world. To achieve this goal, a growing number of companies worldwide have launched ambitious programs to reduce GHG emissions, primarily carbon dioxide (CO_2), into the atmosphere. The goal is to achieve zero emissions by 2050.

In terms of decarbonization, the oil and gas sector is a key sector where efforts should be concentrated. The oil and gas sector needs to reduce CO_2 emissions associated with production, preparation, transportation, processing, and consumption. Oil and gas companies urgently need to limit emissions associated with their direct activities and those that are outside their influence area.

The main priorities and goals of oil and gas companies are consistent with global trends and sustainable

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_16

development goals, namely caring for the environment and reducing the burden on it, ensuring personnel development and safe production, providing regional development, and considering the interests of stakeholders (Akhmetshina et al. 2022).

Currently, the structure of the business model of oil and gas companies reflects the transition to a low-carbon level of development and alternative energy. The largest companies are increasingly investing in innovation and research and development (R&D) in this area (Chistopolova and Kaspina 2022).

The process of decarbonization within the oil and gas industry may entail a comprehensive and multifaceted approach, encompassing various elements such as regulatory, commercial, analytical, methodological, technological, organizational, administrative, and financial considerations. The methodology employed elicits a reduction in the carbon intensity of the industrial sector and the energy division. This is accomplished through decreasing greenhouse gas emissions, reducing fossil fuel utilization in the energy balance, adopting energy-efficient technologies, and utilizing renewable energy sources (Ilyinsky et al. 2022).

The authors identified the main directions of decarbonization of oil and gas companies: efficiency of operations and minimization of emissions, alternative energy sources, innovation, and technology.

European countries are most interested in decarbonization and actively support it because they depend on importing energy resources. The USA and China are leading in CO_2 emissions into the atmosphere. Therefore, they are actively developing decarbonization technologies. Work is underway towards the development of renewable energy sources and the use of hydrogen as fuel (Filimonova et al. 2023).

Since European and American decarbonization policies differ, global decarbonization can be divided into two models (Fig. 1). European oil and gas companies are becoming large energy companies that rely on renewable energy sources (wind, solar, etc.) and gas projects and reduce oil production and exploration projects. Simultaneously, American companies do not want to reduce oil production; they choose technologies that reduce greenhouse gas emissions and allow for carbon capture and storage (Pusenkova 2021).

Figure 1 indicates that there exists an increased emphasis in the European policy towards the transition to sustainable energy practices.

The current state of affairs can be attributed to the greater degree of autonomy enjoyed by European firms vis-à-vis their respective states, coupled with the considerably higher scrutiny exerted by their investor pool. The aforementioned outcome can be attributed to the formidable energy policy of the EU, which necessitates and incentivizes major European entities to establish more stringent objectives. There is a need for organizations to expand and vary their portfolio of initiatives.

National governments offer numerous incentives, namely tax reductions and subsidies, to commercial entities. The aforementioned advantages have been planned to stimulate the progress and advancement of the economy through alleviating fiscal encumbrances for commercial enterprises.

The encouragement and advancement of alternative energy technologies are advocated.

This piece of writing pertains to factors that impact the demand for products offered by major corporations.

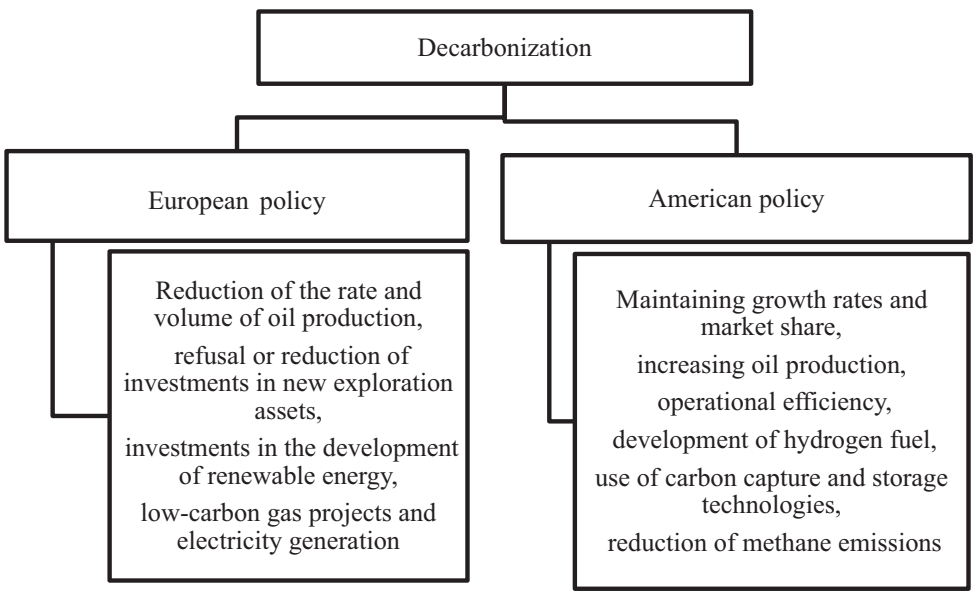

Fig. 1 Decarbonization policy. *Source* Compiled by the authors based on Oil and Gas Climate Initiative (OGCI) (2023)

Revising it into an academic methodology would involve a more formal tone and structured language. A potential academic version of this passage could be: "The focus of this discourse pertains to a range of factors which bear influence upon the level of demand exhibited for goods and services supplied by prominent conglomerates." This revised description entails a more polished and scholarly approach, aligning with standard conventions of academic writing.

The USA has a significant abundance of cost-effective natural gas reserves. There exists a well-established network of pipelines for its transportation.

Supporting facilities are needed for carbon storage, transportation, and distribution. The aforementioned circumstance presents diverse prospects for sizeable US oil and gas enterprises, elucidating the rationale as to why these enterprises place greater emphasis on implementing carbon capture, utilization, and storage (CCUS) technologies (Magasheva 2022).

2 Materials and Methods

In this research, the authors analyzed the advanced decarbonization technologies of the largest OGCI oil companies and used correlation analysis to identify the relationship between GHG emissions and investment in technology.

In this research, the authors analyzed the reporting of the 12 largest oil and gas companies included in the OGCI and identified the main technologies and innovations for decarbonization that these companies are implementing. The authors also conducted a correlation analysis and revealed the relationship between GHG emissions and investments in technologies and innovations for decarbonization.

3 Results and Discussion

Stakeholders are putting increasing pressure on oil and gas companies to reduce the carbon footprint of their products. The COVID-19 pandemic and the economic downturn have shown that decarbonization must be a top priority for the oil and gas industry.

The oil and gas industry has three scopes of emissions. Scope 1 and Scope 2 include direct GHG emissions from the operations of companies and indirect emissions associated with the energy supply of companies. They account for 12% of the world's total anthropogenic GHG emissions. Scope 3 pertains to the utilization of merchandise offered by oil and gas entities and entails the most substantial share of greenhouse gas (GHG) emanations among the oil and gas industry, being accountable for an additional 33% of worldwide GHG discharges. The aforementioned emissions have become a paramount concern for the global community. The oil and gas sector is also responsible for a significant proportion of methane emissions within the overall greenhouse gas (GHG) emissions (Grushevenko et al. 2021).

Decarbonization represents a primary focal point within the global energy agenda, as posited by the International Energy Agency (IEA). Decarbonization policy aims at energy transition to reduce the carbon intensity of global GDP (reducing GHG emissions, gradually reducing the share of hydrocarbon fuel in the energy balance, and introducing renewable energy sources) (Kholodionova and Kulik 2022).

For the fastest and most effective solution to the problems associated with decarbonization, the largest oil and gas companies have united in OGCI to use powerful scientific, engineering, financial, and managerial competencies to jointly participate in solving the climate problem.

OGCI brings together 12 major international companies, such as Aramco, BP, Chevron, CNPC, Eni, Equinor, ExxonMobil, Occidental, Petrobras, Repsol, Shell, and Total Energies. These companies provide about 30% of the world's oil and gas production (Khorasani et al. 2022).

OGCI members have established the OGCI Fund, which invests in companies, technologies, and projects that accelerate decarbonization.

The main areas of investment activity of OGCI are reducing methane emissions, reducing carbon dioxide, and recycling and storing carbon dioxide (CCUS) (Table 1).

Eni is implementing projects to reduce flaring and methane emissions, increase efficiency, and capture and store carbon. The company also invests in renewable energy sources and uses solar energy in oil and gas operations.

Total Energies plans to present a project to remove 98% of methane and carbon dioxide from steam crackers.

CNPC uses special integrated installations to extract natural gas from remote wells. The company monitors methane emissions from all its activities.

Saudi Aramco uses specialized drones to detect and then fix methane leaks.

ExxonMobil is also working on methane leak detection and has developed a comprehensive program that includes investment in research and technology.

To reduce emissions, Repsol has invented a new generation of membrane technology. The technology makes it possible to increase the extraction of methane and clean natural gas from carbon dioxide.

BP uses Kairos Aerospace aircraft with infrared imaging installed to detect methane leaks. The automated control system makes it possible to identify and eliminate emission sources.

Equinor relies on electrification for decarbonization.

Petrobras is working to improve carbon efficiency by using innovative technology to re-inject carbon dioxide into

Table 1 OGCI Climate Investments

Areas of investment activity	Why is it important	Initiative actions
Reducing methane emissions	Methane is a far more potent GHG than carbon dioxide. It stays in the atmosphere for a shorter time. Thus, reducing methane emissions can result in an important near-term reduction in the pace of global warming	Expand leak detection and repair campaigns, replace or upgrade high-emitting devices, reduce flaring, and reduce venting in new and existing assets
Reducing carbon dioxide	More than half the energy produced is wasted due to inefficiency. Therefore, increasing efficiency is a great way to reduce emissions	Improve energy efficiency, co-generate electricity and useful heat, ensure zero routine flaring by 2030, ensure electrify operations with renewables where possible, and provide near zero methane emissions
Recycling and storing carbon dioxide (CCUS)	Recycling and storing carbon dioxide (CCUS) is the most economically available solution to recycle carbon. It is focused on accelerating its global deployment	OGCI companies are now developing over 20 CCUS hubs around the world. These CCUS hubs take carbon dioxide from several emitting sources, such as heavy industries and power, and then transport and store it using common infrastructure

Source Compiled by the authors based on (Khorasani et al. 2022)

Table 2 OGCI Climate indicators

OGCI indicators	Unit	2017	2018	2019	2020	2021
Investment in low-carbon technologies	$ billion	4.70	5.50	5.60	6.60	13
GHG emissions—all sectors (Scope 1 + 2)	MtCO2e	750.40	730.50	727.70	670.40	656.20
Operated methane emissions—all sectors	MtCH4	2.1	1.90	1.70	1.50	1.30

Source Compiled by the authors based on Oil and Gas Climate Initiative (OGCI) (2021)

an ultra-deep-water tank so that it is not vented to the outside. The company also uses special floating installations for separating and injecting carbon dioxide.

Chevron is investing in renewable energy sources for decarbonization and use in oil operations. California has a large solar energy system.

Shell is investing in projects to reduce the cost of carbon capture. The company has developed an innovative carbon capture technology. Plant capacity is 1 ton per day.

Occidental is working on technology to capture carbon dioxide underground and remove it from the atmosphere (Oil and Gas Climate Initiative (OGCI) 2023).

Oil and gas companies invest heavily in technology and innovation. Using the correlation coefficient, the authors determined the degree of dependence between investments in low-carbon technologies and innovations, GHG emissions, and methane emissions (Table 2).

The correlation coefficient between GHG emissions and investment in low-carbon technologies is − 1. The correlation coefficient between methane emissions and Investment in low-carbon technologies is − 1. A correlation of − 1.0 shows a perfect negative correlation. Increased investment in low-carbon technologies reduces GHG emissions and methane emissions.

Accelerating the transition to zero emissions will depend on investment in innovation and technology. The scenario of sustainable development is associated with technologies that are not commercially available today. Achievement of decarbonization targets will be expedited when early adoption of technologies and innovative practices is pursued (Gaisina et al. 2022).

4 Conclusion

The oil and gas industry is one of the biggest environmental polluters, accounting for 10% of all human-produced GHG emissions, and its products, including oil and gas, account for a further 33% of GHG emissions. Therefore, it is high time for the oil and gas sector to invest in decarbonization to meet the global climate goal of zero emissions by 2050 (Khorasani et al. 2022).

Decarbonization is currently on the agenda, especially for the oil and gas sector.

No one doubts that decarbonization is necessary for a prosperous and sustainable future. We have considered two decarbonization models—European and American. Not to be left out in the near future, global oil and gas companies need to choose for themselves which way to pursue: a decarbonization policy or combining both models and make the transition to a carbon-free future smoother.

Oil and gas giants are teaming up to achieve ambitious goals to reduce GHG emissions. Companies are implementing various technologies and innovations to reduce methane emissions, reducing carbon dioxide, and carbon dioxide processing and storage (CCUS).

The authors have identified a direct link between investment in low-carbon technologies and reductions in GHG emissions. Joint efforts, exchange of experience, and major investments in low-carbon technologies and innovations will lead to accelerated action to achieve zero emissions in the future in accordance with the Paris Agreement.

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Green Transformation of Oil and Gas Companies and Their Impact on the Sustainability of the Regional Economy

Natalya Yu. Sopilko, Nadezhda N. Zhilina, Marina R. Shamsutdinova, Vladimir G. Ignatiev, and Marina V. Dubrova

Abstract

In recent years, the energy market has undergone significant changes. The most notable changes are observed in the increasing share of renewable energy and the decrease in the share of oil and gas. However, due to technological progress and the growth of the Chinese economy, the demand for energy sources continues to rise, creating a deficit and instability in the global market. International rating agencies provide conflicting forecasts regarding the structure of the global energy market, highlighting the need for research on the challenges of energy transition and sustainable development in regions that export hydrocarbon resources. The high volatility of energy prices on global exchanges results from the impact of various factors, including geopolitical, environmental, economic, and others. Creating conditions for sustainable development requires a comprehensive approach from key companies in the energy sector and the government, acting as a regulator of transformational processes. The research aims to identify global trends and challenges in the oil and gas industry, systematize the trends of its transformation, and seek solutions to ensure sustainable development of the regional economy. Currently, we observe a strengthening of oil and gas prices due to global economic processes. Additionally, geopolitical and environmental factors (e.g., the freezing of pipelines in Texas, the Suez Canal blockage, and the Nord Stream gas pipeline disruption) significantly impact the energy market. The oil and gas complex continues to undergo substantial changes and remains unstable. Furthermore, the market is expected to face deficit and instability challenges in the coming years, posing a significant challenge for all market participants. Developing strategies and investments to address these challenges and enhance stability in the industry is imperative. Challenges for the oil and gas complex in the Republic of Tatarstan include a reduction in export volumes and a shift away from Russian oil and gas by European consumers. The research aims to identify solutions for the transformation of the industry, considering emerging challenges and ensuring sustainable economic development in the regional economy.

Keywords

Technological transformation · Energy transition · Regional economic development · Green economy · Innovation projects · Regional economy

JEL Classification

R01

1 Introduction

The globally announced transition to the sixth technological paradigm is impacting the development of Russia's energy complex and its regions, setting new development trajectories and requiring the formulation of long-term strategies in the context of global structural shifts in energy markets.

The oil and gas complex is a system-forming industry for the Republic of Tatarstan, significantly contributing to

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the budget revenues. This necessitates active government involvement in regulating the activities of oil and gas companies to ensure the stability of the national economy.

The concept of state management of the oil and gas complex, based on a systemic-functional approach, implies the use of administrative (direct) and economic (indirect) methods, serving as measures of centralized influence. The institutional concept of state management of the oil and gas complex integrates the toolkit of administrative and corporate levels, making it possible to align the internal interests of companies with the strategic goals of the national economy (Vinogradova et al. 2022).

The Russian oil and gas sector is extremely vulnerable (especially during periods of high sanctions pressure) and requires the development of tools to monitor compliance with formalized industry regulations in the global energy market.

The effectiveness of the mechanism of state regulation of the oil and gas complex is influenced by numerous factors. The high resource potential of the oil and gas complex in certain countries gives them certain advantages in the global market. Simultaneously, countries without their own hydrocarbon reserves are highly dependent on hydrocarbon-exporting countries. The fiscal policies of certain countries and the policies of international organizations of hydrocarbon-exporting countries impact the global energy market (Shumsky 2002).

The multiplicity of institutional methods, forms, and instruments of state management of the oil and gas complex underscores the need to structure them to enhance their effectiveness.

2 Materials and Method

The current state of the global oil and gas complex can be characterized by global structural shifts, increasing competition, and the formation of new alliances. An energy crisis, driven by numerous macroeconomic and geopolitical factors, leads to changes in global state strategies. Disruption of the global fuel and energy balance, the innovative nature of industry transformation, a focus on decarbonization, and increased competition from alternative energy sources require qualitatively new regulators and organizational-economic mechanisms.

Empirical analysis of the economic development of hydrocarbon-exporting countries indicates a failure to adhere to the principles of rational management. Despite high oil revenues, the industrial sector is underdeveloped, the share of investment in human capital is extremely low (Faminsky 2009, pp. 14–19), and social problems intensify. There is a growing imbalance between the rich and poor, rising unemployment, and capital concentration in narrow circles. The methodological basis of the research relies on the conceptual foundations of sustainable development, the green economy, and the circular economy. The research employs methods such as theoretical generalization, comparison, analysis, synthesis, generalization, and abstract-logical, system-structural, and empirical analysis.

3 Results

Transformational processes in the oil and gas complex of Russia are accompanied by a series of institutional challenges, the impact of which significantly influences the national economy and requires the development of adequate strategic solutions to minimize risks.

The Strategy of economic security of the Russian Federation until 2030, approved by the Presidential Decree (Presidential Executive Office 2017), regulates challenges to economic security as phenomena capable of destabilizing the country's economic security under certain conditions.

Energy transition and decarbonization can rightfully be considered institutional challenges for the oil and gas complex of the Republic of Tatarstan because these trends imply the need for a qualitative transformation of the industry. In a narrow sense, energy transition involves replacing traditional energy sources with renewable sources and the widespread use of electric vehicles as a more environmentally friendly mode of transportation. Conceptually, energy transition has a deeper meaning, with the most significant being the introduction of clean energy, promoting careful resource management, reducing anthropogenic impact on the environment, and ensuring sustainable development of national economies. The term energy transition is complemented by the concept of decarbonization, which involves the use of renewable energy sources (wind, solar, water, etc.).

Energy transition involves a set of measures aimed at reducing the environmental impact of an industrial economy based on the use of hydrocarbon fuels. The outcome of the energy transition should be a green economy where renewable resources predominate and the level of negative environmental impact is minimal.

The need for an energy transition stems from the next challenge – climate change. Climate change is a multifactorial phenomenon that cannot be ignored by the oil and gas sector in the current stage of development. Each year, environmental requirements and regulations for conducting activities become more stringent, imposing demands on the processes of hydrocarbon extraction and the quality of processed products. The responsible approach of businesses to the employed technologies forms a trend toward reducing harmful effects and diversifying activities to ensure sustainable development during the transition to a new energy format.

In terms of environmental impact, natural gas occupies a borderline position between renewable sources and traditional coal and oil. On this basis, we can conclude that using this type of resource will help achieve balanced industry development during the energy transition period without strong pressure from environmental advocates.

The international agreement on climate change, adopted by 196 parties at the 21st session of the Conference of the Parties to the UN Framework Convention on Climate Change on December 12, 2015, in Paris, imposes a series of restrictions on developing the oil and gas sector. The key objective of the document is to curb the increase in global temperature on the planet. Analytics demonstrates that the average global temperature exceeds the regulated norm, necessitating the development of new comprehensive solutions in addition to existing measures.

Climate change and the energy transition in the oil and gas sector intersect and have a predominantly anthropogenic origin. Both challenges are driven by political factors, active competition among hydrocarbon-exporting countries for markets, and leadership in the global market through lobbying for strategies advantageous to them. Evolutionary processes change the structure of the global economy. The transition to a new technological paradigm requires new approaches to energy supply for the prudent and efficient use of resources. Simultaneously, political influence intensifies the urgency of challenges, creating additional constraints for certain countries in the form of protocols, regulations, technical conditions, etc.

The group of companies PJSC "Tatneft" forms the oil and gas complex of the Republic of Tatarstan, the successful development of which influences the sustainable development of the region's economy. In the context of the energy transition, of particular interest are the company's approaches to managing sustainability aspects (ESG aspects) based on the full integration of the relevant goals into the development strategy.

Sustainable development principles based on the concept of the green economy have become fundamental conditions for the activities of the "Tatneft" PJSC. Business decisions require an environmentally friendly approach focused on reducing the harmful impact of production on the environment, fostering innovation and compliance with environmental protocols, improving the quality of life for the population, and ensuring the favorable development of territories.

The sustainable development strategy of the "Tatneft" PJSC is illustrated by a series of operational indicators (Fig. 1) and sustainable development indicators (Table 1).

The effectiveness of managing ESG aspects in the strategic development policy of "Tatneft" PJSC depends on a systemic and comprehensive approach from the company's top management and direct government regulators. The company's sustainable development is a priority internal task and one of the key tasks for the regional economy.

Issues related to climate preservation, the implementation of environmental innovations, and the development of business directions that consider trends in the global

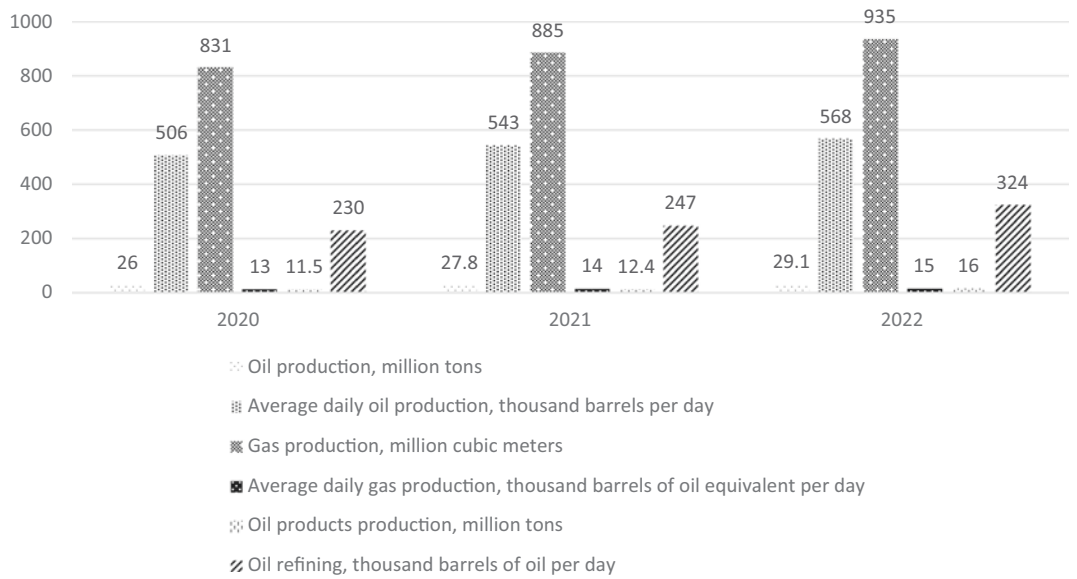

Fig. 1 Operating results (hydrocarbon production) of "Tatneft" PJSC for 2020–2022. *Source* Compiled by the authors based on PJSC "Tatneft" (2022)

Table 1 Sustainable development indicators (social criteria) of "TATNEFT" PJSC for 2020–2022

Indicators	2020	2021	2022
Social investments, million rubles	20,195	23,403	26,891
Listed number of employees, persons	62,900	64,999	66,098
Contribution to labor protection, million rubles	1370.5	1667.2	1930
Lost Time Injury Frequency Rate (LTIER)	0.2	0.2	0.2
Contribution to environmental protection, billion rubles	11.3	11	10.8
Water consumption, million square meters	75.2	71.5	61.9
Volume of recycled and reused water, million square meters	1014.2	1144	1111.4
Associated petroleum gas utilization rate, %	95.9	96.13	98.09

Source Compiled by the authors based on (PJSC "Tatneft" 2022)

energy market require constant monitoring and effective implementation.

The assessment of sustainable development achievements is integrated into the motivation system based on evaluating the performance of key performance indicators (KPIs). Metrics for sustainable development goals have been incorporated into the KPI system for all goal leaders and business unit managers. The indicators of the goal map for ESG aspects are integrated into the monitoring and control tools for implementing strategies, business planning, process, and project management.

Monitoring factors influencing the performance of "Tatneft" PJSC enables prompt managerial decision-making, ensuring the target indicators of the development strategy.

The analysis identified the following factors that determine the further prospects of the global liquid hydrocarbon market and significantly impact the supply and demand balance in the short term:

- An energy crisis, tightening monetary policy, and increased inflationary pressure will lead to a recession in many countries in the first half of 2023, followed by gradual recovery;
- Increased demand due to the possible relaxation of China's "zero tolerance" policy for the coronavirus (according to the IEA, oil demand in China fell by 3% in 2022);
- Production constraints within the OPEC + agreement to stabilize the oil market and in response to the emergence of a buyers' cartel linked to the introduction of a price ceiling on Russian oil;
- Possible supply deficit due to the reduction in Russian exports, depending on the ability to redirect oil products to alternative markets;
- Rising energy prices due to the global energy crisis in 2022 intensified inflationary pressure on the world economy. Reduced economic activity and decreased demand will exert downward pressure on the prices of raw materials;
- Replenishment of US oil reserves to restock significantly depleted strategic oil reserves in 2022.
- Additional demand for oil products from the power sector, driven solely by high gas prices in Europe and Asia;
- Continued focus on decarbonizing the energy sector (in 2022, investments in decarbonization of the global economy amounted to $1.1 trillion, a 31% increase from 2021), comparable to investments in the fossil fuel sector (Shkvarya 2011).

Climate change does not always have anthropogenic causes. There is a wealth of scientific evidence regarding the cyclical nature of processes and the reversibility of negative impacts. However, there is also evidence of significant anthropogenic factors capable of disrupting ecosystems and negatively influencing the global climate. This fact underscores the need to develop strategic solutions to minimize the industry's negative impact on the climate.

Geopolitical processes pose institutional challenges to the oil and gas market. The intensified struggle for influence on the global oil and gas markets since 2022 has become a key problem, increasing the uncertainty of scenarios for the industry's further development. Science extends geopolitics beyond the framework of an external environmental factor affecting individual countries. Geopolitics has become an independent area of scientific knowledge that requires study to develop comprehensive measures to minimize the negative impact of geopolitical factors on national and global policies (Kovaleva 2000). Going beyond the regulation of international relations, geopolitics encompasses the resolution of national, interfaith, international, and other global-level problems (Savchenko and Sidorova 2013).

In the context of a geopolitical approach, the energy transition question takes on a different hue, becoming more of a political trend than an evolutionary regularity. Consequently, the strategies of individual countries acquire a different meaning.

The geopolitical underpinnings of the energy transition are currently receiving much attention in research circles (Bazilian and Howells 2019; Bushuev et al. 2016, pp.

59–63). Achieving a balance between economic and political goals becomes a key concern for scholars in various countries. Green energy policies, in the form of a transition to renewable energy sources, are popular. However, questions about the economic feasibility of the transition and achieving high competitiveness remain open (Shumsky 2002; Zubenko et al. 2012).

Geopolitics in energy transition touches upon issues of economics, ecology, and global division of labor. The use of hydrogen raw materials holds promise but requires justification for the feasibility of large-scale transformation of the energy sector in the context of reducing the negative impact of hydrocarbon emissions on the climate. The formation of new value chains creates a global-scale competition in energy markets for leadership in the world economy.

4 Conclusion

The role of oil and gas resources in the global energy balance and world trade is significant and increasing, with a high potential for developing the gas industry. The development of the global oil and gas complex and the directions and volumes of natural gas and oil trade are influenced not only by classical supply and demand factors but also by other external (including global) factors. Factors influencing the global oil and gas complex, along with high uncertainty in development, should encourage the use of mechanisms of direct government management aimed at reducing the impact of negative geopolitical factors.

Increasing the environmental sustainability of production activities and enhancing the competitiveness of a company require alignment with the standards of the green economy.

The improvement of the efficiency of Russian innovative projects is facilitated by the transformation of business processes and the creation of tools that ensure a clear order of implementing operational processes while minimizing costs and maximizing financial results.

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Social and Legal Aspects of Corporate Responsibility of Business in Support of Sustainable Development and Green Growth

Medical Personnel's Job Satisfaction in Public Polyclinics of the Remote Kyzylorda Region in Kazakhstan: Insider Perspective

Zhanar S. Rakhimbekova, Zhannat Sh. Kozharipova, Tatyana B. Klimova, Raushan E. Tarakbayeva, and Zhuldyz M. Yelubayeva

Abstract

The research aims to study the job satisfaction of doctors and paramedical personnel in public institutions of the Kyzylorda Region of Kazakhstan in the post-COVID period and identify factors affecting their increase, which can generally positively impact sustainable development. The considered region is characterized by complexity, recognized as an ecological disaster zone, enhanced by remote population areas that are difficult to access for medical care. These issues put forward a policy of caring for the region's medical professionals, their status, and their level of satisfaction because medical workers are more vulnerable due to high workloads. The data were analyzed with the help of a survey among respondents, interviews with heads of public institutions, and statistical analysis. Out of 150 selected survey participants, 138 respondents represent public clinics in the region (92% of the research sample). The satisfaction of physicians was 59.1%, and the satisfaction of the paramedical personnel was 56%. Based on the research data, the authors conclude that the essential criteria for forming satisfaction and commitment to the work of public institutions' medical workers in the Kyzylorda Region include remuneration (bonuses), professional development, and the possibility of combining jobs. This research, conducted in the post-pandemic period, identified factors that affect the job satisfaction of physicians and paramedical personnel working in public institutions in the Kyzylorda Region that have a negative ecological status.

Keywords

Satisfaction · Human resources for health · Services · Central Asia · Kyzylorda Region

JEL Classification

I18 · I21 · I23 · M1

1 Introduction

The recovery of the healthcare system after the occurrence of a risk on a global scale, such as COVID-19 and the post-COVID period, requires many efforts in the field of personnel management in public institutions of all countries. Undoubtedly, timely response measures were taken at all levels: national and subnational. However, the public sector system employees carried the enormous burden of countering COVID-19. Physicians and medical workers demonstrated high commitment, determination, and readiness to provide medical care to the population.

The healthcare system of Kazakhstan demonstrated the effectiveness of decision-making to combat SARS-CoV-2 infection. The combination of these consequences exerted the greatest burden on the medical staff of public clinics, especially in regions with a shortage of medical workers at all levels.

This research aims to study the job satisfaction of doctors and paramedical personnel in public institutions of the Kyzylorda Region of Kazakhstan in the post-COVID period

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_18

and identify factors affecting their increase, which can generally positively impact sustainable development. The global need for a health workforce is widely recognized, especially during the impact of the COVID-19 pandemic starting in 2020.

The Kyzylorda Region belongs to a region with an unfavorable ecological status in Central Asia. Geographically, the Aral Sea is located in the region, which is a source of salt extraction and is also an environmental disaster (Andrulionis et al. 2022; Issanova et al. 2023) in Central Asia and the world. It is the cause of climate deterioration (Kostianoy et al. 2010), due to which the number of dusty, sand, or salt storms has increased (White 2014), which has significantly increased the risk of chronic diseases in the local population. The scale of dust transfer from the drained bottom of the Aral Sea is estimated by various authors at 15 to 75 million tons/year (Aladin et al. 2017). Experts affirm that the toxic mixture settles in the territories from the Tien Shan to Scandinavia. Poisonous salt was found in Antarctica, affecting almost 35 million people (Saktapova 2017). The Kyzylorda Region is known worldwide for industrial space exploration (Baikonur), the consequences of which add to the unfavorable environmental component (Kiselev et al. 2003; Neronov et al. 2012). The Kyzylorda Region has an area of 226 thousand sq. km, with four cities, seven districts, and 142 rural districts on this territory. The region's total population is 836,533 people as of April 1, 2023 (Table 1).

The region accounts for only 4.2% of the country's population, of which the rural population predominates over the urban population, although Kazakhstan is urbanizing. Thus, the city-to-village ratio in the country is 1.62. In the region, this ratio is 0.88. There is an equal ratio of men and women.

Healthcare professionals play a key role in improving health. They also play an important role in the economy. A deeper understanding of medical and social personnel, including the necessary investments, has become a prerequisite for the creation of effective, strong, and sustainable healthcare systems (Government of the Republic of Kazakhstan 2022).

Table 1 Population of the Republic of Kazakhstan and the Kyzylorda Region as of April 1, 2023

People			
	Total population	Including:	
		Urban population	Rural population
Republic of Kazakhstan	19,832,737	12,260,185	7,572,552
Kyzylorda region	836,533	392,724	443,809

Source Compiled by the authors based on Taldau Information-analytical system of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (2022)

2 Policy and Practice of Personnel Management in Healthcare of Kazakhstan

Kazakhstan's healthcare reform has gone through several phases and currently applies the model of compulsory medical insurance, which is focused on optimizing and using effectively all its resources. The Concept for Healthcare Development until 2026 has been adopted (Government of the Republic of Kazakhstan 2022), which views "a competitive healthcare system … that provides equal access to quality medical services based on a personalized approach to diagnosis and treatment with competent, motivated, legally protected medical personnel." The National Development Plan of the Country until 2025 has been adopted (Pharmreviews 2021), where Task 3 is aimed at "developing human resources and scientific medicine." The need for medical personnel increases annually, especially in unfavorable ecological regions, which is accompanied by an increased risk of chronic diseases and systemic disorders (Pharma 2020; World Health Organization n.d.). The special relevance of human resources development was noted with the beginning of the COVID-19 epidemiological situation that caused high morbidity and mortality of medical workers, as well as the emergence of fear and unwillingness to work in clinics, which aggravated an outflow of specialists from the healthcare system.

According to WHO, we will consider the indicator of "healthcare and infrastructure workforce" through the dynamics of the number of physicians and paramedical personnel, including linear dependence on changes in the population size of the country and region (Table 2).

The indicators for the Kyzylorda Region are below the republican level and much inferior to the average indicator for the country—0.56. The dynamics before COVID-19 among the paramedical personnel in the region have a leading position. The number per 1000 people is 3.18 higher than the national level, demonstrating the paramedical staff's sufficiency. The dynamics of growth in the number of physicians and paramedical personnel (Tiwari et al. 2021) are shown in Fig. 1.

Following the data from Fig. 1, we can see that the number of doctors and paramedical personnel has tended to increase over the past nine years and amounted to 34.3% and 34.4%, respectively. Over the post-COVID period, the dynamics are insignificant. Growth in the number of physicians (Nardin and Moger 2022) was only 1.7%, the paramedical staff—2.4%. Comparing 2020 with 2019,

Table 2 Indicators of the availability of medical workers for residents in general and in a remote region

Indicator	2019		2020	
	Absolute numbers	per 1000 people of the population	Absolute numbers	Per 1000 people of the population
Physicians				
Republic of Kazakhstan	74,046	3.97	76,443	4.05
Kyzylorda Region	2740	3.41	2842	3.49
Paramedical Personnel				
Republic of Kazakhstan	179,837	9.65	185,757	9.84
Kyzylorda Region	10,402	12.95	10,601	13.02

Source Compiled by the authors based on Ministry of Healthcare of the Republic of Kazakhstan (2021)

the growth dynamics were evident. In absolute numbers, it amounted to 102 doctors and 199 paramedical workers. Similarly, in the post-COVID period (2021–2020), there were 18 doctors and 120 paramedical personnel, which shows a low interest on the part of medical personnel. In 2023, the implementation of the national project on the modernization of rural health care began in the Kyzylorda Region.

3 Literature Review

Satisfied staff usually perform more productive work, take the initiative, and are loyal and committed to their work and the (Horton et al. 2016) employer. A significant role is played by state support and the amount of spending allocated to the healthcare system. After A. A. Legostaeva and B. K. Jazykbaeva (Legostaeva and Jazykbaeva 2021) had conducted research, they concluded that the healthcare system is experiencing serious difficulties due to the aging of medical personnel. However, the share of Kazakhstan's total expenditures on health care is 3.3% of the country's GDP, which is half as much as recommended by WHO (6% of GDP). Kazakhstan ranks 174th out of 189 countries in the ranking of countries in the world in terms of spending on medicine (Mamyrkhanova 2023).

Scientists consider job satisfaction as a sort of emotional component of a medical worker. It is a fair remuneration for work, including internal professional satisfaction (Mrduljas-Dujić et al. 2010), ergonomic working conditions, lack of stress, well-being at the workplace, and employee motivation (Aoun et al. 2021; Xuan Tran et al. 2013) that has an impact on the organizational commitment of medical workers (Blaauw et al. 2013), and the quality of medical services provided and access to these services (Mere et al. 2023).

The working day of a medical worker has its own specific features—this includes long working hours (Kisa and Kisa 2006), high returns focused on striving for effectiveness and adherence to therapy (Domagała et al. 2018), and providing professional medical care to the population, on which the quality of life of patients, their safety, and life depend. Considering the human factor, the speed of decision-making, the possibility of stress risk, and the influence of working conditions, the important elements in the concept of job satisfaction are the environment, atmosphere, relationships in the clinic team, the management style, and opportunities for career and personal growth.

Although there are scientific papers available, job satisfaction of physicians and paramedical staff, given the high level of stress and workload during and after the pandemic, requires more in-depth research among medical workers of public clinics, considering the growth of negative environmental problems of the studied region.

Institutional assistance to medical staff in Kazakhstan is fragmented and limited; it was an additional financial motivation during the COVID-19 pandemic.

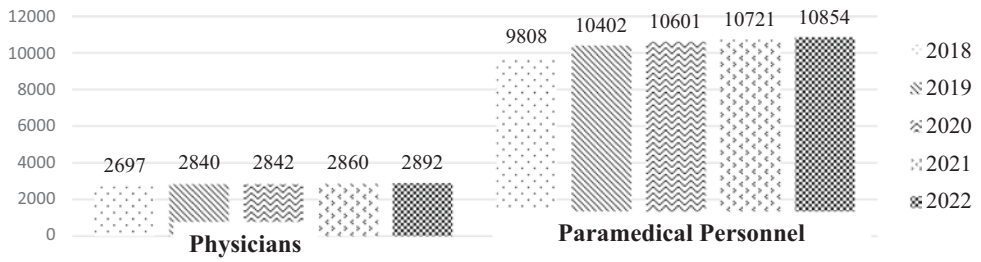

Fig. 1 Dynamics of the number of physicians and paramedical personnel in the Kyzylorda Region for 2014–2022. *Source* Compiled by the authors based on Taldau Information-analytical system of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (2022)

4 Method

The approach is based on a descriptive study, a mixed research method implemented in the form of interviews among the heads of public polyclinics, and an individual formalized e-questionnaire where questions were asked in a predetermined order with closed most appropriate answers (fixed-alternative questions) from several proposed options on the Likert scale. The questions were based on the results of interviews with the top management of institutions (Sutriyawan et al. 2021) to adapt to local working conditions and identify problems and preferences among respondents. Effective changes for personnel management in public institutions were identified that would help ensure sustainability and helpful solutions for implementing sustainability.

5 Results

The target respondents were physicians and medium-level and junior medical personnel of public polyclinics, such as municipal state enterprises on the right of economic management "Municipal Polyclinic." The interview involved 138 respondents of various levels, of which 91% were women and only 9% were men. As for the types of respondents, physicians accounted for 6.5%, top management—1.5%, medium-level medical personnel—86.9%, and junior medical personnel—5.1%. Of the respondents, 3.6% finished medical residency or internship, 13% had higher education (bachelor's degree), 5.1%—incomplete higher education, and 78.3%—secondary professional medical education (college).

It was found that more than half of the physicians interviewed in public polyclinics are aged 18–34 years and account for 63.7%; the more mature age from 35 to 62 years accounts for 27.2% of physicians. Notably, 9.1% are doctors who practice while already retired. For paramedical personnel, the ranking by age looks more uniform. The exception is that 11.2% of respondents are at the pre-retirement age of 55–62. Almost 32% of doctors have been working in polyclinics for more than seven years, 36.4% of respondents—for three to seven years, 22.7% of respondents have been working for one to three years, and the smallest category—9.1% have been working for less than one year. The situation with the paramedical staff is more obvious and immediately shows the high loyalty of employees, as almost 70% have been working for more than seven years. Only 3.5% started working in clinics less than a year ago. The rest were evenly distributed from 8–9% in each category. In general, the paramedical staff in public polyclinics is almost permanent and loyal; staff turnover is lower.

6 Findings

The studied period is a post-COVID period, and the impact was still great. As we have found, measures were taken on the part of the state policy to support and motivate medical workers (Cucchiarini et al. 2021), and the value of personnel was increased. In Kazakhstan, by a measure of the Government and the Ministry of Health of the Republic of Kazakhstan, starting from January 1, 2022, wages for healthcare system workers have been increased. We have taken the opportunity to assess the impact of this fact on employee satisfaction during this period.

The survey findings show that the level of satisfaction with payment and invested efforts of physicians is much higher than that of the paramedical staff. The measurement made it possible to discover aspects of ambiguity among the satisfied and dissatisfied because the share has not actually changed over the measured years. The weight of satisfied employees has become 9.1% higher in order of importance. Professionals showed a higher level of dissatisfaction in 2021 due to a lower pay level. Simultaneously, in 2021, 13.6% of physicians were dissatisfied with payment. The level of satisfaction of the paramedical staff who rated "excellent" increased by 12% compared to the previous period. There was also a growth in those who assessed such satisfaction as "good" (1.7%). Only 7% of nurses gave a "satisfactory" assessment in 2022 (18.1% a year before). Comparing the assessment of the degree of satisfaction with the results of their work, it can be stated that doctors evaluate their contribution more highly. Doctors who are fully satisfied with the results of their work account for 62.1%. The paramedical personnel's satisfaction is lower by 7.6%. Approximately the same number of respondents assessed it as "good." Almost 1% of doctors put up "satisfactory" versus 13.6% of the paramedical staff. It can be seen that physicians rate feedback from the top management as "excellent" (59.1%). The same rating made by the nursing staff is 7% lower. The analysis shows that 18.2% of doctors assessed it as "good" versus 32.2% of the paramedical staff. A neutral assessment was made by 18.2% of doctors; this indicator shown by nurses is 7.8% lower. The assessment results according to the criteria "very dissatisfied" and "unsatisfactory" are similar and vary within 5%. Figure 2 shows the results of the most important criteria that can increase job satisfaction among medical personnel.

According to Fig. 2, respondents selected important criteria that can increase their satisfaction. Thus, physicians and the paramedical staff highlighted "Bonuses" as the most important criterion, as well as the possibility of receiving an additional daily operational rate within an organization—financial motivation.

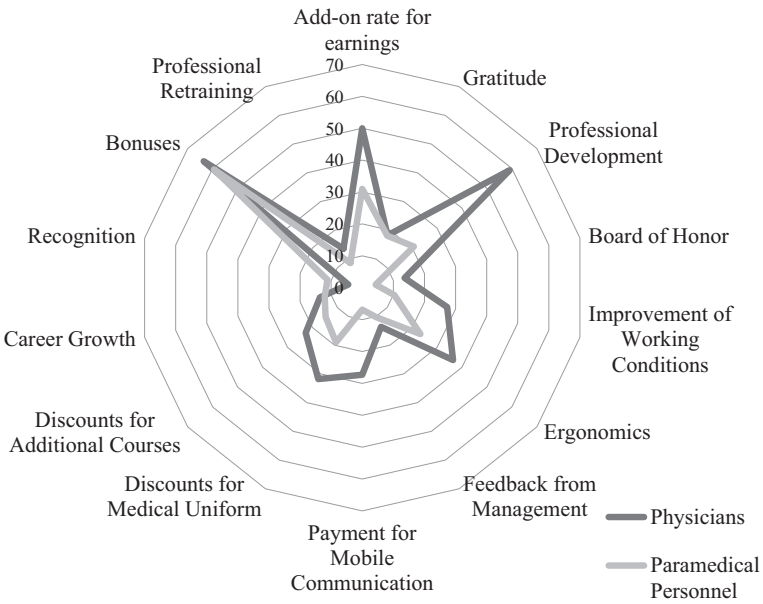

Fig. 2 Specify the most important criteria that can increase your job satisfaction. *Source* Compiled by the authors

Among the non-financial components for doctors and nursing staff, of great importance are such criteria as ergonomics (air conditioning system, considering the climate in summer + 46 ℃ and in winter − 37 ℃) and the improvement of on-the-job working conditions that will prevent fatigue and the development of occupational diseases and will contribute to preserving the health of specialists.

7 Discussion and Conclusion

Empirical studies have shown that the surveyed doctors and paramedical staff of public polyclinics in the region are generally satisfied with the payment and the result of their efforts: 81.8% and 88.8%, respectively. This is confirmed by research (Kisa and Kisa 2006); salary and income were found to be an important source of dissatisfaction. This is partly due to the fact that in Kazakhstan, by a measure of the Government and the Ministry of Health of the Republic of Kazakhstan, starting from January 1, 2022, wages for healthcare system workers have been increased. Additionally, with a status of an unfavorable region, the population living in an ecological disaster zone receives compensation (Electronic Government of the Republic of Kazakhstan 2021), the region's population receives a 30% allowance, and residents of the Aral and Kazalinsk Regions—a 50% allowance. However, the survey findings showed that, despite the high level of satisfaction with pay, employees distinguish two important factors: bonuses and the possibility of part-time work. The level of medical personnel's satisfaction with the results of their work is satisfactory, as, on average, this indicator is about 47.5% for doctors and 43.2% for paramedical staff, which is confirmed by the results obtained. When highlighting the level of importance of the criteria, the most significant criterion was noted—professional development. Research findings show that the level of feedback from the management is positive but insufficient. It requires efforts to increase and improve communication between them. According to the research results, 22.7% of physicians and 15.6% of paramedical personnel are unsatisfied. At the level of organizations' top management, a set of measures should be developed that will make it possible to increase staff satisfaction based on improving feedback and interaction. The research recommendations are as follows:

- To monitor the level of employee satisfaction to find a solution to improve the work efficiency twice a year;
- To conclude contracts with private suppliers (medical uniforms and telecommunications (mobile communications)), provide employees of public polyclinics with discounts for purchase or payment on a mutually beneficial basis, and provide an employee insurance opportunity for medical workers and render services with priority service (maybe in cooperation with other public institutions for the benefit of scale) on the part of a supplier;
- To improve the ergonomic conditions of stay of medical personnel and patients.

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Trends in the Development of Judicial Reform in the Kyrgyz Republic and Prerequisites for Its Improvement in the Context of Sustainable Development

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Abstract

The relevance of the scientific research is the need to analyze the essence of the judicial system currently operating in Kyrgyzstan, which is an independent and autonomous branch of government, the main focus of which is the provision and protection of human and civil rights enshrined in the Basic Law in the context of sustainable development. With the entry into force of the Constitution of the Kyrgyz Republic, adopted in 2021, significant changes have taken place in legislation in the field of functioning of the judicial bodies. In this regard, the analysis of trends in the development and implementation of judicial reform is of some relevance. The problems of improving the activities of courts throughout the history of their formation and development in Kyrgyzstan, perhaps, remain one of the most important and priority ones in the context of sustainable development today, since the main function of the State should be the development and creation of such a mechanism that would ensure proper protection by the State of the violated rights of its citizens. It is the state that has special powers, which makes it able to provide legal guarantees in case of violation of their rights. The purpose of the study is to describe the main directions of development of domestic legislation in the field of judicial power, which were a certain stage and prerequisite for the next constitutional reform that has taken place in Kyrgyzstan.

Keywords

Judicial power · Judicial system · Legal status of judges · Judicial reform · Court · Innovations · Independence and autonomy of the court · Sustainable development

JEL Classification

K4 · K41

1 Introduction

In modern society, we realize that only the court is able to implement an important function of the state related to the creation of an effective mechanism for all forms of legal protection of human rights in the entire system of state authorities, since it has a priority role in the formation of such legal guarantees and ensuring real protection, and in case of violation, effective defense of rights and freedoms of subjects. Today it is very important that the judicial authorities, and in general the judicial power, show their openness and accessibility to society in order to gain their trust. All this is possible only under the condition of adherence to the principle of the rule of law and the priority of human rights in the administration of justice. These are all the requirements that are a priority in each initiated judicial reform, but move on to the next stage of its development as those that have not been fully implemented.

As rightly noted by the Russian scientist V.B. Vershinin, who studied the issues of the place and role of judicial protection in the legal system, the most important indicator of the legal character of the state and the democracy of society

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_19

is the level of judicial protection (Vershinin 2011). According to M.F. Vyatkin, one of the main signs of legal state is an independent and autonomous judicial power with sufficient force and authority (Vyatkin 2004). The author especially emphasizes its leading role in ensuring constitutional legality and observance of the principle of the rule of law.

At the same time, A.A. Atakulova believes that despite the scale of the ongoing judicial and legal reform, there may be certain miscalculations and mistakes, which, in her opinion, are still manifested due to the gradual transition from the old Soviet judicial system to the formation of new national, democratic judicial institutions in Kyrgyzstan (Atakulova 2008). In fact, as practice has shown, the next reform in relation to the activities of the courts contained all the work aimed at updating the current administrative, criminal, criminal procedure, civil procedure legislation, as well as legislation regulating the organization and activities of courts, law enforcement agencies and other legislation directly or indirectly related to the administration of justice (Presidential Decree of the Kyrgyz Republic of August 2012).

We are increasingly convinced that in our country the court should not only carry out the mission assigned by the Basic Law, that is, to administer justice, but also do everything in order to become truly independent and autonomous. At the same time, the court should be a body whose activities neither state bodies nor political forces have the right to influence.

2 Methodology

One of the significant documents in the field of judicial power, which has become the basis for further reforms, is the National Program approved by the act of the head of state (National Development Program of Kyrgyz Republic of October 2021), where the main emphasis is on the special role of the judicial branch in the system of public authorities as one of the main components of the foundations of the state, ensuring legal stability in the country, allowing the protection of rights and the freedoms of citizens and legal entities that create the necessary conditions for political and economic activity. This marked the beginning of the development and adoption of the third state target program "Development of the justice system of the Kyrgyz Republic for 2023–2026" (2023), and hence the development of the next judicial reform in Kyrgyzstan.

3 Results

Analyzing the trends and preliminary results of the implementation of the third stage of judicial and legal reform, it is important, in our opinion, to focus on the positive results that have been achieved.

First of all, it is necessary to identify those areas that are related to the improvement of legislation. One of the significant areas of judicial and legal reform is the development and adoption of new regulatory legal acts. Summarizing the achievements of the reform, one of the experts participating in the implementation of the main provisions of the noted reform, G.R. Mamatkerimova, notes that the legislation of our country, taking into account the updating and adoption of new codes and laws, the legislation has been adapted to a common standard, the logic has been straightened. She believes that the legislation has become more holistic, convenient for both citizens and law enforcers (Mamatkerimova 2019).

Undoubtedly, the adoption of new legislation is a kind of preliminary report on the State's activities in the field of judicial reform since it has acquired independence and sovereignty. To begin with, it should be noted the important role of the process of understanding and overcoming old principles and ideas that laid the foundation for the formation and development of the judicial system in our country during its existence as part of the USSR. Under these conditions, legislation developed and adopted already in the post-Soviet period is designed to meet the real needs of modern society, where the interests of subjects of legal relations, primarily citizens, are taken into account, and a clear system of court administration and law enforcement agencies has been established. Moreover, for the first time since the years of independence, Kyrgyzstan has managed to bring the judicial and legal reform that has been initiated to its logical end on some points, as evidenced by the fact that today national legislation largely meets international standards.

One of such significant innovations was the reform of the criminal law system in the Kyrgyz Republic, since the problem of combating crime, and therefore the need to develop a specific criminal policy of the state due to the fact that new crime trends have appeared, has always been and remains relevant. This state of affairs prompted a rethinking of the essence of the existing criminal policy in order to develop more enhanced and targeted measures to combat crime. Thus, Thus, L.Ch. Sydykova, the head of the expert working group, believes that those mechanisms that worked well enough in the conditions of the Soviet formation began to falter in the new conditions (Sydykova 2019). The key innovations and the result of such a large-scale work by the drafters of the Penal Code during the implementation of judicial and legal reform are the results that have been achieved. For example, the term "criminal offense" has been introduced, which assumed the differentiation of crimes and their definition as minor, less serious, serious and especially serious. At the same time, the punishment for minor crimes does not necessarily include imprisonment. The concept of "depenalization of acts" has

also been introduced, providing for a reduction of the term of imprisonment.

In order to avoid any corruption loopholes in the administration of justice and, in particular, to facilitate the task of the judge when adjudicating offences, a categorization of punishments has been developed in the form of a table. Concepts such as "medical crimes" have appeared, and the institution of probation has been introduced, which today is making every effort to successfully perform its functions.

One of the features of the judicial and legal reform carried out in the Kyrgyz Republic is the identification of priority areas for the development of the country's criminal policy, including the introduction of such institutions that will facilitate the use of alternatives to imprisonment in order to humanize criminal policy. As noted above, perhaps the main focus of this entire reform is the improvement of legislation, which will be aimed at humanizing the application of liability, without depriving the most important thing—freedom. Moreover, a significant innovation of this reform is the introduction for the first time of such an institution as probation, which is quite widespread in many countries. The essence of this institution lies in the adoption of such measures against persons who have committed a crime, which represent a huge work on the part of the state in the form of social rehabilitating assistance to them. Ultimately, such work will contribute to the re-education of the above-mentioned persons and their rethinking to some extent of their socially dangerous, illegal behavior, and most importantly, will assist in choosing their future life orientation, the principles of coexistence in society.

To implement the ideas of judicial and legal reform in this area, a corresponding law regulating the activities of the probation institution has been adopted (Law of the Kyrgyz Republic of February 2017). The functions of the bodies of probation were initially assigned to the body that was part of the structure of the State Penal Correction Service under the Government of the Kyrgyz Republic (2023), subsequently, on the basis of an act of executive power from September 1, 2019, its functions were transferred to the jurisdiction of the executive authority represented by the Ministry of Justice, the structural body of which became the Probation Department under the Ministry of Justice.

During the years of independence, certain steps have been taken in Kyrgyzstan towards changing some criminal procedural norms aimed at their effective application in practice, in the field of reforming the modern criminal justice system. At each stage of the reform of the current criminal legislation, issues arose that required appropriate decisions. To a greater extent, they concerned the provision of legal guarantees ensuring the realization of human and civil rights and freedoms. K.M. Smanaliev, analyzing criminal legislation, notes that the Criminal Procedure Code of the Kyrgyz Republic of 1999 contained the rudiments of the old Soviet criminal procedure. At the same time, he is convinced that it contained an obvious accusatory bias, low efficiency of pre-trial and trial proceedings, excessive bureaucracy, lack of necessary procedural guarantees for subjects involved in the criminal prosecution (Smanaliev 2019). Such a point of view, characterizing and defining the role of criminal procedure, has the right to exist, since the priority principle of the ongoing reform in the field of judicial activity, its most important feature remains the implementation and provision of constitutional principles aimed at protecting human rights and freedoms.

The effective result of the judicial reform undertaken, perhaps, has become the consolidation in the criminal procedure legislation of the norm regulating the legal status of the so-called investigative judge. The appearance of this institution in the criminal procedure is dictated by the need for a function that consists in exercising appropriate control within the framework of the powers granted by law regarding the observance of legality in the actions of law enforcement agencies during pre-trial proceedings. In other words, this subject has the authority to monitor on behalf of the court whether human and civil rights and freedoms have been violated in pre-trial proceedings The point is that this representative of the judiciary can make decisions regarding the legality and validity of the procedural actions carried out during detention, the application of preventive measures, the extension of detention and other types of actions in the pre-trial process (Code of Penal Procedure of the Kyrgyz Republic of October 2021). All this has served to improve legislation in the field of increasing the effectiveness of criminal justice by introducing the institution of special investigative actions.

The introduction of this institution related to the implementation of investigative activities, operational investigative activities should contribute to the implementation of the most important tasks of criminal proceedings such as the rapid and complete investigation of crimes, identification and prosecution of persons who have committed them, in accordance with the legislation (Code of Penal Procedure of the Kyrgyz Republic of October 2021). In fact, according to A.K. Kulbayev, with the adoption of such innovations, problems coming from the Soviet criminal procedure related to ensuring constitutional human rights in the operative-search activity and the implementation of the results of the operative-search activity in proving criminal cases will be resolved (Kulbayev 2019).

All this has led to the emergence of new institutions and the granting of powers to subjects stipulated by the norms in the field of criminal procedure, the need for which is explained by the trend of the times.

Along with such innovations, video conferencing systems have also been introduced, as well as audio–video

recording of trials, which, according to the developers and initiators of this legislation, would facilitate the procedure for interrogating the accused, witness and victim, and would eliminate those violations that occur during written recording. Such changes have an impact and a role in further improving the activities of the courts and recognizing them as truly independent and autonomous institutions in the administration of justice, which would strengthen the public confidence in the court. However, in practice, participants in court proceedings still face the problem of implementing and ensuring the right to audio–video recording of court proceedings.

Another important step in judicial and legal reform is the fact that the new criminal legislation, which came into force in January 2019, provided for the introduction of new information and communication technologies (ICT) into criminal proceedings and the digitalization of this process as a whole. One of such innovative information systems is the Unified Register of Crimes and Misdemeanors (ERPP), the purpose of which is to form criminal law statistics in the country, to ensure the reliability and objectivity of statistical data on crime in the country. T.M. Ashuralieva emphasizes the special role of the unified register of crimes and misconduct as a unique system introduced in Kyrgyzstan, which is becoming a new reality (Ashuralieva 2019), p. 64].

Such a system is supposed to contribute to the formation of an effective criminal policy of the state, the development of necessary state response measures and new effective approaches to prevent and reduce crime.

An equally important event in the implementation of judicial and legal reform is the adoption of such a code, which is aimed at establishing the procedure for the consideration of cases arising in the field of administrative and legal relations. The procedure for considering and resolving the above-mentioned disputes in court, as well as procedural principles, are widely and in detail covered by this Code (Article1) (Administrative Procedure Code of the Kyrgyz Republic of January 2017).

In Kyrgyzstan, the consolidation of administrative procedure at the constitutional level, among other forms of judicial proceedings, is also very relevant, since in any modern state governed by the rule of law in the context of economic development, entrepreneurship, the existence of such a form of legal proceedings, and in general, the functioning of the so-called administrative justice is the implementation by the legal state of its important function - to guarantee the legal form of protection not only for citizens, entities carrying out their activities as a legal entity by the court. In turn, the development of this institution acts as a kind of guarantee on the part of the state in realizing the legal possibilities of investors, and will also contribute to preventing violation of their rights and freedoms. In such situations, the role of administrative justice is very significant, since it is characterized as one of the institutions of judicial protection represented by the activities of administrative courts (Presidential Decree of the Kyrgyz Republic of May 2020).

Examining the issues of the third stage of the judicial and legal reform, it is necessary to identify another feature and significance of its direction, such as the digitalization of the judicial and legal system in the Kyrgyz Republic, which began on August 5, 2002.

From 2002 to 2004, special attention was paid to improving the transparency of judicial processes through the introduction of an automatic case distribution system, publication of court decisions, improved statistical reporting, as well as a more efficient workflow in five pilot courts (Kaliev 2019).

The next stage of digitalization of the judicial system was implemented in accordance with the adopted next Program (Resolution of the Jogorku Kenesh of the Kyrgyz Republic of June 2014). One of the important tasks of the implementation of this Program was the introduction of information and communication technologies that would allow the use of various information technologies in the implementation of legal proceedings in the form of equipping courtrooms with a video surveillance camera in order to ensure the safety of participants at the court hearing. Today, this important mission is carried out by “Adilet Sot”, a special body under the Judicial Department of the Supreme Court (2023).

It is important to note the role of another document in the implementation of the main directions of digitalization of the judicial system. This is the Decree of the President of the Kyrgyz Republic, which notes the need to introduce digital infrastructure into the activities of judicial and law enforcement agencies as a matter of priority (Presidential Decree of the Kyrgyz Republic of January 2019). Another such act (Presidential Decree of the Kyrgyz Republic of January 2020) continued the implementation of digitalization in the field of courts, prosecutor's offices, as well as the activities of bodies performing the law enforcement function of the state. In addition, the following presidential decree (2020) also raised the issue of identifying the needs of the judicial system for innovative digital solutions in the field of judicial proceedings.

Thus, according to the authors who have studied the issues of digitalization of the judicial and legal system in Kyrgyzstan, “digitalization has covered not only the economy, business, and wide circles of the population, but also such a conservative sphere as the judicial system that is traditionally considered as buttoned-up one” (Mamatkerimova and Kulbaev 2019).

Another important aspect of the ongoing judicial and legal reform in the country is the draft of the next Program (Resolution of the Government of the Kyrgyz Republic

dated March 2019), which, however, has not been considered by Parliament due to the loss of force of the abovementioned decree of the Head of State.

4 Conclusion

Thus, certain steps have been taken to implement the main tasks of the judicial and legal reform. However, the sociopolitical situation after the regular elections to the Jogorku Kenesh on October 4, 2020, did not make it possible to bring to a logical conclusion the next stage of judicial and legal reform, which began 10 years ago. In 2021, laws regulating the activities of judicial authorities were developed and adopted in accordance with the Constitution of the Kyrgyz Republic (2021). But it should be noted that various conditions are being created in the country for the implementation of the next stage of judicial reform, including the improvement of the current legislation at each stage. Nevertheless, there are various reasons and conditions for which judicial reform is not being brought to its logical conclusion. We believe that in order to achieve these goals, it is important to further develop the reform process aimed primarily at ensuring effective protection of violated human and civil rights and freedoms, which, in turn, will contribute to increasing people's confidence in the judiciary. In this regard, it is necessary to continue efforts undertaken to solve the tasks set by the state, one of which is the use of modern methods of information technology in the activities of judicial authorities. Therefore, all this should contribute to the implementation of justice as an exceptionally honest, transparent and open process based on the law, without allowing delays in the consideration of cases by judges, which is one of the common grounds for bringing judges to disciplinary liability. In this regard, it is important to note that despite the fact that some work is underway, further effective measures in this direction are required. It is necessary to continue the work on improving the qualifications of judges, as well as the development and implementation of methods to assess the quality of their professional activities in order to strengthen human resources in the field of justice.

The results of the study show that today the goal of judicial reform should primarily be the creation of optimal conditions for unloading in the activities of courts, ensuring access to justice, and most importantly, for the implementation of high-quality activities of judges by guaranteeing the provision and observance of the principles of independence and autonomy of courts, as well as improving current legislation in the field of judicial power.

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Mechanisms of Change and Preservation of Kyrgyz Folk Traditions as the Core of Ethnic Culture

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Abstract

Purpose: The purpose of the article is to identify psychological mechanisms for the realization and transfer of traditional knowledge, to identify mechanisms for changing and preserving folk traditions as the core of ethnic culture. *Research methods*: The methodological basis of the research is an integrated approach that includes complementary methods, the main of which are comparative analysis of scientific sources, interview, questionnaire. *Results*: The article presents the results of the analysis of public opinion in relation to the traditions of Kyrgyz nomads and modern folk traditions, as well as an analysis of the mechanisms of changes in folk traditions and the attitude of the people to the revival of lost traditions. There are elements of universal and national values in the social experience of every nation. Every people, every nation is guided by the values accepted by this community in matters of educating the younger generation. *Originality*: The research revealed that the main factors of changes in Kyrgyz traditions are the transformation of socio-economic circumstances in the country and the transition to a settled way of life (the end of the XIX century) and collective labor in collective farms (the beginning of the XX century). The transformation of folk traditions, which occurred as a result of changes in socio-economic conditions, led to the transformation of the mentality and value orientations of the people.

Keywords

Traditional knowledge · Nomadic traditions · Mechanisms of change · Traditions · Value orientations · Mentality · Consciousness · Ethnos

JEL Classification

A31 · A32 · C93 · H52 · I21 · I26 · Q51 · Q52 · Z13

1 Introduction

There has clearly been a tendency in the last two decades to awaken the ethnosocial consciousness of the people, which in turn has been expressed in an active desire to revive and preserve traditional knowledge that affects the development of socio-economic relations of the ethnic group. The ethno-evolutionary processes of globalization have led to significant changes in folk traditions, which are the chronicle of the life experience of generations (Konurbaev 2018; Teltayeva 2014).

Traditions are revealed in customs, ceremonies in the form of specific ritual actions or ways of behavior (Konurbaev 2003). The key to the moral purity of the Kyrgyz nomads were traditions, according to which human actions were evaluated for seven generations.

The traditions of the times of nomadism were socio-psychological regulators of the relationships of Kyrgyz nomads and reflected the results of social impact on the activity of the individual in society (Musaeva 2017). The ways of transmitting the experience of generations form the central core of any ethnoculture. At the same time, psychological

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_20

studies of the process of education, as a rule, did not affect the ethnic characteristics of peoples, and works on ethnopedagogy did not reveal psychological mechanisms and factors of consolidation or change of ethnic consciousness (Kozina 2021).

The recreation of the traditional national values of the people, the formation of a national mentality, has always been the main task of any nation. This task becomes especially urgent during the transition period with the change of socio-economic conditions.

The study of the traditions of the people involves the identification of psychological mechanisms for the implementation and transfer of traditional knowledge. A single and generally accepted definition of the essence of "psychological mechanisms" has not been formed today. Understanding the essence of the category "psychological mechanism" contains natural-scientific and socio-psychological components. The effect of psychological mechanisms results in a stable psychological approach that reflects human interaction with the environment. Psychological mechanisms by A.N. Leontiev are considered from the standpoint of motivations. The psychological mechanism according to A.N. Leontiev is a system of socio-psychological impacts that determine the activity of the individual in society.

The main approaches to the description of psychological mechanisms are social and psychophysiological ones. E.V. Falunina, V.F. Falunin and A.A. Ulyanova consider the psychological mechanism from the position of explaining human behavior as "a reflection of objective processes and phenomena that ensure human interaction with the environment" (Falunina et al. 2015).

Psychological mechanisms for the implementation and maintenance of traditions are essentially socio-psychological regulators of the behavior of members of society. The implementation and transmission of traditions involves the use of such psychological mechanisms as persuasion, imitation, infection, suggestion, which are mechanisms for regulating mass behavior.

The relevance of our research is due to the social tasks of forming the mentality of the nation and creating innovative methods of educating fundamental moral values and principles in building a sovereign state of the Kyrgyz people.

The purpose of our research is to identify the mechanisms of changing and preserving folk traditions as the core of ethnic culture. At the same time, it is not our aim to reconstruct the nomadic way of life of the Kyrgyz people. The task of further integration with the world economy and world culture has been and remains urgent for Kyrgyzstan. The analysis of the ethnic cultural intangible heritage of the people has shown the presence of a huge ethnopedagogical reserve of traditional knowledge of Kyrgyz nomads. An important task is to identify, analyze and adapt this ethnopedagogical reserve to modern conditions and integrate it into the modern educational process.

The study of the role of Kyrgyz folk traditions in the issues of socialization and personal education has been carried out for the second century, and nevertheless, a convincing concept in this direction has not yet been developed.

M. Mead, E. Bronfenbrenner and E. Erikson in their experimental studies denote tradition as the basis of national identity, formed under the influence of socio-economic conditions (Bronfenbrenner 1976; Mead 1988). The identification of the influence of socio-economic conditions and customs of society on the change in the behavioral characteristics of the younger generation was significant in the research of Margaret Mead. The changing society in the concept of Margaret Mead creates a configurative type of culture when values change and socially important guidelines and traditions can be destroyed, and society, in order to preserve itself, must consciously support and protect ethnically significant values (Basilov 2019; Filimonova and Filimonov 2022).

The value of the analysis of folk traditions in the formation of educational technologies is confirmed by the research of N.N. Palagina, who revealed the relationship between traditional actions and the formation of imagination in students (Palagina 1997). Valuable are the works of Academician Izmailov (1991) and Professor Rakhimova (1992) in terms of the study of the educational forces of folk traditions.

2 Methodology

The methodological basis of the research is an integrated approach, which is based on scientific ideas of L.S. Vygotsky about the cultural and historical nature of the human psyche, E. Erikson's theory of the role of traditions in the formation of personality, and K. Jung's theory of the collective unconscious in ethnic representations of the people. The methodological basis is also the peculiarities of the ethnic values of the Kyrgyz people, formed under the influence of folklore and folk akyns of A.E. Izmailov, M.R. Rakhimova, A.T. Kaldybayeva, as well as the ideas of American psychologists that traditions are the basis of national identity, formed under the influence of socio-economic conditions.

The main research methods were: comparative analysis of scientific sources, surveys and interviews with wide groups of the population.

In order to identify public opinion on the expediency of reviving and preserving Kyrgyz traditions, studies were conducted to identify the assessment of the significance of Kyrgyz traditions from the position of reference groups, for which respondents were asked to express their attitude to

modern traditions and to the traditions of Kyrgyz nomads. Respondents were also asked to note the traditions that had undergone changes.

When we studied the attitude to modern traditions, the sample consisted of 647 people, of which: rural residents under the age of 35–355 people, over 35–133 people; urban residents under the age of 35–144 people, over 35–15 people.

The study of the attitude to the traditions of Kyrgyz nomads was conducted on the basis of a sample of 661 people, including: rural residents under 35 years of age—354 people, over 35 years of age—132 people; urban residents under 35 years of age—151 people, over 35 years of age—24 people.

Citizens of Kyrgyzstan from the following territories took part in the experimental studies: Kadamzhai district, Aksy district, Chatkal district, Bazar-Korgon district, Nooken district, Suzak district, Tash-Kumyr, Jal-Abad, Alai district, Aravan district, Kara-Suu district, Uzgen district, Chon-Alai district, Ak-Talinsky district, At-Bashinsky district, Zhumgalsky district, Kochkorsky district, Naryn district, Naryn, Bishkek.

Expeditions to the above-mentioned regions of Kyrgyzstan have formed the basis of the authors' field materials.

3 Results

Kyrgyz traditions were formed in accordance with the existing socio-economic conditions, the way of life and climatic conditions of the living environment. The preservation and transmission of folk traditions is supported by the public collective opinion of the ethnos. In order to recover and apply traditional knowledge and adapt it to modern conditions, it is necessary to find out the attitude of the people towards them. In order to identify the mechanisms of transformation of Kyrgyz traditions, as well as to analyze public opinion on the feasibility of reviving and preserving Kyrgyz traditions, the following studies were conducted.

Kyrgyz respondents were asked to express their attitude to modern traditions and to the traditions of Kyrgyz nomads listed in Tables 1 and 2. Respondents were also asked to note the traditions that had undergone changes.

As the results of the survey of the population of Kyrgyzstan show, the modern traditions and traditions of Kyrgyz nomads are well known to the generation of rural respondents over 35 years old. The opinions of different age groups who consider modern traditions valuable mostly coincide. However, respondents' opinions on some traditions differ. For example, 53.3% of the older urban population do not remember the rite called "жыгач той"—a wooden wedding, and of those who do, only 6.7% consider this tradition valuable.

Respondents of all age and social groups consider the traditions associated with the birth and upbringing of children to be the most valuable modern traditions. For example, the tradition of choosing a name ("ат коюу") is regarded as a valuable by 66–100% of rural and urban respondents. The tradition associated with a plea for the happiness of a child ("азан") was considered valuable by 61.8–87.6% of rural and urban respondents.

Respondents of all ages and social groups consider the most valuable traditions of Kyrgyz nomads to be those related to hospitality and the birth of children. For example, the tradition related to the ransom for the right to see a newborn ("балага көрундук") is considered valuable by 35.1–67.4% of rural and urban respondents. The value of the tradition, which the Kyrgyz call "конок үйдун куту"—guest is happiness of the house—is confirmed by 30.4–45.8% of rural and urban respondents.

In general, the analysis of the survey has shown that the vast majority of the population of Kyrgyzstan, more than 50% of respondents of all groups consider valuable modern traditions from the first to the seventeenth from the above list and only the first tradition from the list of Kyrgyz nomads. From 0.8% to 4.7% of respondents have noticed changes in the modern traditions and from 1.2% to 4.7% of interviewed people have noted changes in the traditions of Kyrgyz nomads.

Customs, ceremonies and rituals are one of the main components contributing to the preservation of traditions. The transition to a settled lifestyle, the change of forms of social education significantly influenced the real implementation of traditions Kyrgyz traditions were formed in accordance with the existing socio-economic conditions, the way of life and climatic conditions of the living environment. The condition for the preservation and transfer of traditional knowledge is their regular application in the daily life of the people.

It is necessary to consider changes in traditions during the transformation of socio-economic conditions and lifestyle of Kyrgyz people by the example of compliance with environmental standards.

The arrival of nomads to a new place began with the rite "greeting of the nomad camp" ("журт менен учурашуу"), according to which the newcomers addressed the spirits of the new place of residence and promised to be careful of Mother Earth and Mother Water, asked the spirit of the spring or river ("суу перисене") permission to take water from the source and promised that their children will not pollute the spring. When installing a yurt for the newlyweds, the nomads invited a respected and wise aksakal, who raised a tundyuk (a lattice circle in the center of the dome

Table 1 Modern Kyrgyz traditions and traditions of Kyrgyz nomads

№	Name of the tradition
1	Ат коюу—choosing names
2	Кыз узатуу—the bride's farewell at her parents' home
3	Азан—a plea for happiness for a child
4	Суйунчу—good news message
5	Бешик той—lullaby feast
6	Сөйкө салуу—the custom of giving earrings
7	Сүннөт той—the rite of circumcision
8	Тушоо кесуу—cutting the fetters on the child's legs
9	Тушоо той—giving a blessing to a child for the long path of life
10	Корундук—the bride show
11	Каалоо жана бата—wishes and blessings
12	Жентек той—coming to the bride show of wife's relatives
13	Кудатүшүү—matchmaking
14	Кыркын чыгаруу—bathing in 40 tablespoons of water or the first shirt
15	Калым—the bride price
16	Жүгүнүү—daughter-in-law's bow
17	Отко кирүү—the bride's visit to her parents accompanied by her new family
18	Колго суу куюу—the ritual washing of the hands
19	Карын чачын алуу—the first haircut of a child's hair
20	Карын тырмагын алуу—cutting the first child's nails
21	Мүчөл жаш—the child's 12th birthday
22	Аркан тосуу—the wedding custom
23	Чач өрүү—braiding braids
24	Уй-булодогу сырдуу буюм—family heirlooms
25	Ата кесибин улоо—following the father's profession
26	Күйөөнүн жан баштыгы—the groom's bag—the groom's return gifts
27	Бешик куда—lullabies matchmaking
28	Жыгач той—wooden wedding, while the bride price is not paid, the groom goes to visit the bride's relatives

Source Developed by the authors based on the authors' field materials

of the yurt). At the same time, the arrivals assured the spirits of the area that the young family would also take care of Mother Earth and Mother Water as well as the respected wise aksakal.

When the nomads changed their place of residence, they performed a farewell ceremony with the spirit of the place of residence and with the spirit of the water source. So, the nomads followed the traditional principle of "конгон журтуңан көчкөн журтуң таза болсун" (let the place where you migrated from be cleaner than the one where you migrated).

All these centuries-old ecological norms of traditional interaction with the environment began to be forgotten during the transition from a nomadic to a sedentary lifestyle. The period of transition to a settled lifestyle of the Kyrgyz began at the end of the XIX century and ended at the beginning of the XX century.

Changes in socio-economic conditions due to the transition to a settled way of life and the destruction of the patriarchal family have significantly affected the implementation of traditions and the transfer of traditional knowledge to the next generations. Since there was no need for regular travel, the performance of rituals had no practical value. Elements of environmental knowledge, of course, are still preserved in the ethnic memory of the people, but the lack of vital necessity for the practical application of traditional knowledge has led to the fact that environmental standards today have moved from the category of strictly mandatory to the category of recommended and non-mandatory. If earlier traditions were the basis of the upbringing of the younger

Table 2 Traditions of Kyrgyz nomads

№	Name of the tradition
1	Балага көрүндук—a ransom for the right to see a newborn
2	Конок үйдун куту—the guest is the happiness of the house—when cooking dinner in the nomads' kazan there was always an additional piece of meat for the traveler-guest
3	Боз үй көтөрмөй—yurt for newlyweds, respected aksakal raised tundyuk
4	Журт менен учурашуу—greeting of the nomad camp—an appeal to the spirits of the new area with a request for permission for a new settlement
5	Тартуу—a gift from the master of a rare thing
6	Талгак кесе—food for a pregnant woman from neighbors
7	Журт жайлоо—to butter up the nomad camp—7 days after moving to a new place, each family thanked the host of the settlement for the warm welcome
8	Бертик суроо—the request of bertik (bertik from Kyrgyz means—"to damage the lower back")—when someone got sick, one of the family members took a bucket and went around all the yurts collecting food for the sick person
9	Кочкө салым кошуу—donations to the nomad—jigits (horse riders) met people from the temporary nomad camp and asked if they needed help, if there was anyone who was suffering from pain
10	журт менен коштошуу—Farewell to the owner of the nomads settlement and the spring that flowed before the temporary nomad camp
11	Суу кечирүү—assistance in crossing the river
12	Айып чапан—чапан вины—when the girl was secretly married, the groom's family sent a sign of recognition of their guilt that the marriage was committed in violation of traditions, and readiness to be punished
13	Ак көнүлдүн сандыгы—so called the trunk of a good-natured person—the request to give a rare thing
14	Каркыралуу көч—nomads-cranes—beautiful girls on horses rode in front of the nomads

Source Developed by the authors based on the authors' field materials

generation, now they have become a kind of recommendation supplement to standard school curricula.

Next, it seems important to consider the changes in the traditions of the transmission of traditional knowledge through the "бата" (blessing). Initially, the transfer of knowledge through a blessing was used not only as part of some kind of celebration, but also for the transfer of special energy and information abilities, which the Kyrgyz called "касиет" (to influence the weather, healing gift, foresight). But, as a result of the development of trade, socio-economic relations, as well as the impact of the cultures of neighboring peoples and Islamic traditions, the transfer of knowledge through "бата" has undergone multiple changes. Earlier, the wisest elders were necessarily invited to bless. At the same time, the invitees also expressed their blessings. At the meeting, they talked about epic and folk heroes, about their great achievements. It was believed that only in such an atmosphere "бата" would give a positive result. Today, people hold this event, as a rule, not at home, but in a restaurant or cafe. And, of course, the blessings pronounced for the perpetrators of the celebration do not "affect" their home, but the public place of the event.

It is important to analyze the impact of socio-economic conditions on changes in the traditions of the transfer of traditional knowledge through the choice of a name to a child. Initially, when choosing a name, the Kyrgyz preferred the names of heroes and batyrs (heroes of the Kyrgyz people), but each change of socio-economic formations led to the appearance of new names, characteristic of the nature of new formations. For example, the arrival of Soviet power in Kyrgyzstan and the transition to a collective form of labor led to the appearance of such names as October, Deputatbek, Ilim (science), Shiloobek, Soyuzbek, Sovetbek, Okmotbek (Okmot-government), Zavodbek, Melis and modern names Askar, Kurmanbek, George, Indira, Ernest, etc.

An important factor in preserving the traditions of the people is played by mass solemn ritual actions, in which the oldest and respected members of society play the main role. By tradition, children actively participate in such solemn events. Modern conditions of urban life have significantly changed the essence of traditions. Currently, family holidays related to the upbringing and development of children are held in some families. However, at the same time, ritual actions are partially performed, and children are invited only from among close relatives.

4 Conclusion

The most important factors in the transformation of Kyrgyz traditions are the changing socio-economic conditions in the country.

An equally important factor that influenced the real implementation of traditions is the transition to a settled lifestyle (the end of the XIX century) and collective labor in collective farms (the beginning of the XX century).

Changes in socio-economic conditions have caused a change in values and folk traditions. Psychological mechanisms of consolidation and change of traditions are the most important components, forming factors of the mentality of the people.

Changes in folk traditions, under the influence of historical and socio-economic conditions, transform the mentality and value orientations of the people. With the transformation in the way of life of an ethnic group, ethnic ideas and value orientations are also being re-evaluated, as a result of which the traditions themselves are undergoing changes.

The factors influencing the change of traditions are not only the socio-economic conditions in the country, the nature of activities and interethnic communication, but also the content and forms of education.

After Kyrgyzstan gained independence, the focus of society's attention was paid to the aspirations of the people to develop a new market economy. At the same time, the tasks of education of young people in new socio-economic conditions, as well as the tasks of preserving and revitalizing traditional knowledge, were left without due attention.

Traditions and customs today are a forgotten pedagogical resource of the people, which has yet to be explored, analyzed and adapted to the modern conditions of the formation of national consciousness of society.

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Ethnopedagogical Heritage of Kyrgyz Nomads' Traditions

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Abstract

Purpose: The purpose of the article is to analyze the ethnopedagogic features of Kyrgyz traditions, rituals and ceremonies and to identify elements of ecological and spiritual-moral education of young people that may be in demand in modern conditions. *Research methods*: The methodological basis of the research is an integrated approach that includes complementary methods, the main of which are comparative analysis of scientific sources, interviewing, questioning, the method of historical analysis and oral history. *Results*: The article presents the results of research on the intangible cultural heritage of Kyrgyz nomads in terms of the analysis of traditional knowledge, rituals and ceremonies aimed at the formation of ecological consciousness. The article examines the mechanisms of individual and collective spiritual growth embedded in the psychology of the Kyrgyz people. The mentality of Kyrgyz nomads is characterized by ancestral responsibility, as well as moral and ethical responsibility for the actions performed, which, according to the Tengrian tradition, will be evaluated for seven generations, which guided the representatives of the genus to perform worthy deeds and live in moral purity. The formation of the Kyrgyz mentality, which includes norms of behavior, thinking and the sphere of feelings, contributed to the creation of collective stable spiritual values, which at all times were interconnected with religious beliefs. The tribal consciousness of the nomads was built on the basis of a nomadic lifestyle and geographical high-altitude living conditions, in which a person was aware of his unity with the genus and with the surrounding nature. The appeal of consciousness to ecological values has been formed for centuries, which contributed to the unification of moral, spiritual and ecological values formed by the Tengrian worldview based on humanistic harmony of man with nature and on the observance of the principles of non-interference in the order of the universe. *Originality*: As a result of the research, it has been revealed that the traditions, rituals, ceremonials, healing and spiritual-magical practices of the Kyrgyz nomads contain not only pagan rituals, but also quite effective didactic tools for the tasks of teaching and educating modern youth.

Keywords

Kyrgyz nomads · Turko-mongols · Nomads · Tengrianism · Ecological consciousness · Traditional consciousness · Tradition

JEL Classification

A31 · A32 · C93 · H52 · I21 · I26 · Q51 · Q52 · Z13

1 Introduction

The spiritual culture of the Kyrgyz nomads has always been interconnected with a syncretic range of religious components of Islamic and pre-Islamic traditions (Kozina 2021). The category of traditional knowledge is largely associated with such pre-Islamic beliefs of the Kyrgyz people. These

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_21

are, firstly, ancestral cults, such as Zher-Suu (Kyrgyz—"Жер-Суу"—an earth-water deity of the ancient Kyrgyz), Tenir-Ata (Kyrgyz—"Тенир-Ата"—a heavenly father, a deity of ancient Tengrianism), Umai-Ene (Kyrgyz—"Умай-Эне"—a deity of ancient Tengrianism, a sacred mother ancestor, a patroness of women and children), and secondly, these are cults, as animal worship, holy places (mazars), shamanism. The most significant influence on the Kyrgyz had one of the pre-Islamic ethnic early forms of religious belief of the nomads—Tengrianism. Researchers analyze Tengrianism from various (ontological, cosmological, mythological, demonological) positions, which leads to the fact that an unambiguous attitude to the essence of Tengrianism has not been formed today (Alieva 2019; Azyrkhanova 2018).

The present period of development of Kyrgyz society is characterized by the fact that a significant part of the mechanisms of individual and collective spiritual growth embedded in the psychology of the Kyrgyz people has been lost. The rupture of value-cultural ties between generations in Kyrgyzstan is one of the reasons for the current problems and contradictions in the process of personal growth of modern youth in Kyrgyzstan. Therefore, at the present stage, it is relevant to analyze and identify the ethnopedagogical resource of ancient Kyrgyz traditional knowledge.

2 Methodology

The methodological basis of the research is an integrated approach, which included complementary methods, the main of which are comparative analysis of scientific sources, interviewing, questioning, the method of historical analysis and oral history. The identification of traditional knowledge was carried out in all regions of Kyrgyzstan.

The research used the authors' field materials with interviews and observations across the regions of Kyrgyzstan in 2015–2022, as well as materials of the ethnographic expedition of the Rural Development Fund 2013–2015 (RDF).

The authors' field materials include observations and interviews with the following informants from the different regions of Kyrgyzstan: K.K. Akmatova, born in 1958; K. Dzhumalieva and B. Kozhaliev, both born in 1960; D.I. Isakova, born in 1960; R. Mambetalieva, born in 1957; A.B. Asangulova, born in 1974; M. Melisova, born in 1989; S.N. Pak, born in 1955; M. Jyldyz Monoldorova, born in 1963; G. Umarova, born in 1955; M. Uzakbayev, born in 1957).

3 Results

The religious beliefs of the Kyrgyz deified the cult of Tengri-Creator as the cult of the Blue Sky and the Spirit of the master ruling the universe (Vasiliev 2017). According to the informant K.K. Akmatova (the authors' field materials), in connection with the cult of the Blue Sky, the Kyrgyz have a legend that in ancient times people with perfect personal qualities and great knowledge descended from the Blue Skies and taught those living on Earth the fundamental rules of harmonious coexistence with each other and nature. The harmonious coexistence of nature and man among the Kyrgyz is interconnected with Koko-Tenir (Kyrgyz—"Коко-Тенир", which was considered a transcendental creator and ensured the harmony of man in the conditions of the surrounding world (Abdyrakhmanov and Syuyrbekov 2018; Usenova 2019). According to the informant K.K. Akmatova, the Kyrgyz still have a saying: "Have you come down from *the Blue Skies* that you have the right to teach me?" (the authors' field materials).

Complementing K. K. Akhmetov, informants bakshi (Kyrgyz—"бакшы"—a folk healer, a witch doctor, one of the definitions of Kyrgyz shamans) Bakyt Kozhaliev and byubyu (Kyrgyz—"бюбю (бүбү)"—folk healer) Dilbar Isakova tell that according to legend, the ancient nomads were originally pure in soul, focused only on good deeds and did not even have bad thoughts (the authors' field materials).

Kyrgyz believe that the high ecological and moral culture of the ancient Kyrgyz, preserved in Kyrgyz traditions, rites and rituals, originates from the knowledge transmitted by representatives of the Blue Skies (author's field materials). The Kyrgyz have a legend that they belong to the peoples living on Earth since the end of the ice age, which ended about 12 thousand years ago. This hypothesis is confirmed by the Kyrgyz proverb: "It has been known since cold times" (Kyrgyz—"бул алмуздактан бери белгилүү") (the authors' field materials).

The tribal consciousness of nomads according to Tengrianism did not allow man to come into conflict with nature. The existence of nomads as compared with the existence of migratory birds living in harmony with the animal and plant world (Akmatova 2017). The nomads knew about the concept of measure. Nomads strictly adhered to the optimality of the size of pastures, the number of tribesmen in the "ayil" (Kyrgyz—a place of settlement, a village), as well as routes of movement to other pastures in accordance with the ecosystem of the area of residence. The Kyrgyz nomads, like migratory birds, roamed without disturbing the natural balance of the fundamental forces of nature, preserving the great dream of Mother Earth (Zhumagulov and Sydykbekov 2017).

The wisdom accumulated over the centuries, ecological consciousness, moral principles, culture of the ancient Kyrgyz and methods of educating young people were preserved in their traditions, customs, rituals and rites reflecting environmental norms and spiritual-moral principles of behavior. The folk pedagogy of the Kyrgyz nomads, based on family education, was organically integrated into the everyday life of the tribal community. The fundamental component of family education of the younger generation was labor education. The child was introduced to elementary work from the age of five, and from the age of nine a certain range of permanent duties was assigned to the child.

According to the definition of Jan Komensky, didactics is a universal art of teaching everything to everyone. In accordance with the essence of this definition, the customs and rituals of the ancient Kyrgyz were also a universal art of teaching everything to everyone and performed the functions of practical instrumental didactics containing ethnopedagogic forms and methods of educational influence on nomads of all ages in accordance with the set didactic goals. The rites and rituals of Kyrgyz nomads were embedded in all significant stages of nomadic life. The main traditions and rituals of the nomads were focused primarily on creating conditions for the well-being of the family, strengthening kinship ties, educating children of personal qualities approved in the community, instilling respect for elders and all members of the clan, which contributed to the unity and mutual assistance (Asangazieva 2018; Kasymalieva 2018; Teltayeva 2014).

In matters of upbringing of the younger generation, the nomads strictly followed the traditions, according to which the methods of education were necessarily supported by the example of elders, their habits, the manner of tolerant behavior and a harmonious lifestyle. The transfer of traditional knowledge among the ancient Kyrgyz took place from the elders to the younger. Each nomad clan had its own set of special abilities (kasiyet—Kyrgyz—"касиет"—sacred gift, spiritual ability), which were usually transmitted through the blessing (Kyrgyz—"бата"). The carriers of the qualities of kasiyet of the older generation chose worthy followers of ancestral knowledge from their children or grandchildren and passed their abilities of kasiyet through some valuable thing, maybe made with their own hands (the authors' field materials).

The traditions and customs of the Kyrgyz nomads were rigidly interconnected with the cycle of spring and autumn migrations. Knowledge related to centuries-old traditions, rituals and customs were passed down from generation to generation and accumulated in the ethnic memory of the Kyrgyz people. The pedagogical and didactic experience of traditional knowledge was transmitted through epics, rites, rituals, sayings and games.

The traditional knowledge of the Kyrgyz was essentially an oral chronicle, a scientific and academic library containing didactic rules and recommendations on all types of activities and all significant life cases of Kyrgyz nomads. The customs and rituals of the nomads contributed to the formation of intra- and intergeneric friendly and mutually beneficial relationship.

Each coming year for Kyrgyz nomads began in early spring with preparation for the resettlement. In spring, as a rule, they roamed up along the rivers to summer pastures (jailoo—Kyrgyz—"джайлоо"). Tribesmen of the nomadic clan and other clans shared information with each other about the upcoming resettlement. They discussed the peculiarities of the new area, hunting, the location of springs, holy places (mazars) and the rules of visiting and behavior on mazars. In the process of preparing for the resettlement, special attention was paid to restoring the ecology of the area where they lived. The reverend attitude of the Kyrgyz people as a sacred object to the ecological purity of Mother Earth and Mother Father had been formed from generation to generation. Nomads strictly followed the traditional rule of their ancestors, according to which "let the place where you migrated from be cleaner than the place where you migrated" (Kyrgyz—"конгон журтуңан, көчкөн журтуң таза болсун") (the authors' field materials).

The psycho-emotional and physiological state of a person is influenced not only by the phases of the moon, increased solar activity and magnetic storms, but also by numerous negative and positive phenomena of a natural, anthropogenic and technogenic nature, manifested in the form of natural electromagnetic and energy-informational radiations of the landscape. The impact of energy-informational fields on humans when interacting with the ecosystem occurs as a result of the transfer of physical radiation energies between natural objects and humans. Any terrain, any landscape corresponds to the electromagnetic and energy-informational environment of interaction with the surrounding world, which is peculiar only to it.

The rites associated with the arrival to a new nomads' camp were centuries-old technologies of attunement of the energy and information environment of a new ecosystem with an energy and information egregore (a term meaning a non-physical entity, a group biofield of the arrived nomads and each family). Observance of customs and rituals depended on the ability of nomads to enter an altered state of consciousness (ASC) during the ceremony and maintain the utmost attention, concentration and proper respect for the spirits of their ancestors and the spirits of the area of residence.

In order to adjust the energy-information environment of the new ecosystem with the energy-informational egregor of the arrived nomads to a new nomads' camp, they

conducted the rituals recommended by tradition, containing didactic components.

According to the rite of "greeting the camp" (Kyrgyz—"журт менен учурашуу"), each family that arrived at a new nomads' camp turned to the spirits of the new area with a request for permission for their new settlement. Each nomadic family assured the spirits that they had arrived with good intentions. Having received permission from the spirits, the nomads built yurts (a Kyrgyz portable frame dwelling with felt covering) and prayed to Mother Earth and Mother Water. During the installation of a yurt for a young family, in accordance with the ceremony "yurt for newlyweds" (Kyrgyz—"үй көтөрүү"), who raised the tundyuk (Kyrgyz—"тундюк"—a lattice circle in the center of the dome of the yurt). The purpose of this ceremony was the intention to assure the spirits that the young family would live with dignity and respect Mother Earth and Mother Water as well as the honored aksakal (based on the materials of the RDF). After the installation of the yurt, according to tradition, the women performed the ceremony of "showering with sweets" (Kyrgyz—"чачыла чачуу"). Neighbors and relatives of the newly arrived nomads congratulated those who arrived at the new place from the doorstep, expressed good wishes and showered the newcomers with sweets and dried fruits.

Upon arrival at the new camp, the women, under the guidance of the eldest, conducted a rite of acquaintance with a spring or river. The spirit of the spring, which was called the "Fairy of the spring" (Kyrgyz—"суу пери"), was appeased with salt and beads, which were dropped into the spring Singing, the women asked the Fairy of the spring for permission to drink water from the spring and promised that their children would not pollute the spring.

After the ceremony, the men went to the spring and cut the sacrificial animal. Seven days after the arrival of the nomads at the new camp, a ceremony was held, which was called "butter up the camp" (Kyrgyz—"журт майлоо"). During this ceremony, each aiyl family thanked the place where the yurt is located and participated in the festive event in order to strengthen good neighborly relations in aiyl.

During the preparation for the new resettlement, a farewell ceremony to the "owner of the zhurt" (Kyrgyz—"журт"—the place where the yurt is located) and the spring was conducted by the women of nomadic settlement. To do this, the women baked seven cakes and made seven candles from tea and cotton, which were installed around the spring. The women sat around the spring, recited a prayer and asked permission for a new migration from the Spirit of the spring, from the Spirit of the mountains, from the Spirit of the stones. The rituals related to the ecosystem of the area of residence, as a rule, were held in the presence of children, who absorbed the accumulated ecological wisdom of the Kyrgyz people with great interest, attention and reverence.

Describing the rite of farewell to the "owner of the zhurt" and the spring, the informant Kerim Kyzy Umut, who was interviewed by the RDF (The Rural Development Fund) researchers, said that when she was a little girl, she waited with excitement for the moment when her grandmother would allow her firstly to take part in the candle making process and then to participate in the ritual. During the ritual, the girl could not avert her rapturous glance from the burning candles in the hands of women in white scarves. The grandmother, together with the other women, prayed and kissed the stones of the spring. After the ritual, the girl was in awe of the stones that her grandmother had kissed and tried not to step on them (based on the materials of the RDF).

Generosity, friendliness, tolerance and rejection of domination have always been the priority qualities of Kyrgyz nomads. This is evidenced by the proverbs of the Kyrgyz people that have survived to this day:

- "If you want to be good, have an complaisant character";
- "If a stone is thrown at you, answer it with food";
- "Give your mother to your father's murderer as a wife" (Karabalaeva and Bayalieva 2018).

The traditional rite of nomads "donation to the nomad" (Kyrgyz—"көчкө кошумча") contributed to fostering tolerance, friendliness and willingness to help each other. This rite was performed at a time when a nomad migration was passing by ayil (settlement). All the residents came out to meet the nomads, stand along the road, and without stopping the nomads, asked if they needed help and shelter, if there were sick people among them. If there were such, then they could stay in the village until the nomads came back or, at the request of the recovered, accompanied them to the place of a new nomads' camp (based on the materials of the RDF).

The nomads faithfully observed the law of hospitality and considered the guest to be "happiness of the house" (Kyrgyz—"конок үйдун куту") and were sure that "the more guests come, the more grace will arrive" (Kyrgyz—"үйгө канча бут кирсе-ошончо кут кирет"). When cooking dinner in the nomads' kazan, there was always an additional piece of meat for the "traveler-guest" (Kyrgyz—"жолоочунун ырыскысы"). Any passing traveler, even a stranger, was invited to the yurt and offered food and lodging for the night and took care of his animals if they were with him.

The nomads had a special and respectful attitude towards pregnant women. A pregnant woman was given a separate bowl for eating (Kyrgyz—"талгак кесе") and everyone in the family tried to fulfill her food preferences. If the family did not have what the pregnant woman wanted, them her neighbors and other tribesmen were told about her desire and another family filled her bowl ("талгак кесе") with the desired food. After childbirth, the mother's relatives gave gifts to the family who helped fill her bowl ("талгак кесе") during the pregnancy (based on the materials of the RDF).

4 Conclusion

Ancient traditions, rituals and rites are at the point of extinction and urgently need protection as elements of the cultural and spiritual heritage of Kyrgyzstan.

The Tengrian and shamanic traditions, rituals and rites of the Kyrgyz nomads are not only a subject of historical value, but also a didactic resource for the education of ecological consciousness of a harmonious tolerant personality.

The existing methods of education and the formation of a harmonious personality cannot be effective without taking into account the ethnic characteristics of a person. The influence of ethnicity on the upbringing of young people is especially characteristic of the peoples of the Turkic-Mongolian nomads, which include the people of Kyrgyzstan.

The formation of pedagogical methods for the education of humanistic values and respect for nature should be carried out taking into account the epistemological, ontological-axiological and anthropological analysis of the ethnic characteristics of a person. At the same time, ethnic didactic tools of education should be based on knowledge about the patterns and features of the emergence of motivating causes that explain noble or ignoble actions of the personality.

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Legal Regulation of Telemedical Activity in Russia: Barriers and Opportunities

Mikhail D. Dzhikiya

Abstract

The modern development of information technologies influences all spheres of human activity. The processes of digital transformation have affected, among other things, such a vital area as medicine. Medical care based on information technologies—telemedicine—is becoming increasingly common. The complex nature of the research object inevitably entails difficulties in its practical implementation, including in terms of legal regulation of the introduction of distance and information technologies in the process of providing medical care to patients. The Russian Federation is not the flagship of the practical application of telemedicine services; foreign countries have much more experience in this field. In this respect, the domestic legislation regulating healthcare issues is not without gaps and problems associated with the use of telemedicine technologies, and needs constant improvement, therefore, the purpose of this study is to identify these gaps in legislation and develop possible solutions to the problems of law enforcement in this area. This article discusses the barriers and opportunities for legal regulation of the use of information and distance technologies in the field of medical services. It also analyzes the current legislation in the field of telemedicine, including the prospects for the introduction of an experimental legal regime. The author has studied the experience of regulation of health service provision using information technologies in foreign countries. Within the framework of the study, an assessment of the effectiveness of the application of existing regulatory legal acts has been carried out and problems of their application have been identified. The study uses general scientific methods of logical cognition. In particular, the experience of a number of countries in the application of information technologies in the field of medical services is analyzed using methods of analysis and synthesis. The system method has made it possible to assess the key areas of improvement of Russian legislation in the field of telemedicine, as well as to develop recommendations for overcoming the main barriers of law enforcement. The formal legal method and the method of juridical hermeneutics have been used in the analysis of normative legal acts regulating the provision of telemedicine services in the Russian Federation and abroad.

Keywords

Legal regulation · Telemedical activity · Barriers · Legislation · Medical care · Patient · Personal data · Ethics · Medical error · Experimental legal regime

JEL Classification

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1 Introduction

In the 1970s, Thomas Byrd was one of the first who coined the term "telemedicine", which literally means "healing at a distance" (from Latin "medicus"—medicine, and Greek "tele"—distance (Murphy and Bird 1974). This concept today includes the use of information and communication technologies (ICT) both to the process of providing medical care, and to the methods of obtaining, storing and processing medical information.

Analyzing the scientific elaboration of the problem, we can note that the issues of legal regulation were considered by N.M. Akulin, E.A. Chesnokova, K.M. Smirnov,

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Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_22

and R.A. Presnyakov in their work "Transformation of medical privacy in the era of digital health" (Akulin et al. 2019); Varyushin (2018) presented in his works the specifics of the legal regime of telemedicine services in Russia; Blagodareva et al. (2022) studied certain aspects of the legal regulation of telemedicine services. The view of O.Z. Khairetdinov, M.A. Bebchuk, A.V. Vladzymyrskyy and S.P. Morozov on the normative provision of distance medical services from the point of view of medical care to certain categories of patients is also interesting (Khairetdinov et al. 2021).

Noting the works of authors who have previously addressed the problems of using e-health and telemedicine, it is necessary to mention the team of authors of the book "E-Health: Legal, Ethical and Governance Challenges: an overview" (George et al. 2013). This study is aimed at identifying various problematic aspects of telemedical activity. In this context, M.S. Zhuravlev, in his review of this book, quite rightly refers to its positive aspects a system approach to the analysis of the problems of distance medical services (Zhuravlev 2016).

The specifics of the legal aspects of electronic medicine is that this activity is regulated by a variety of industry standards. In this regard, the European Commission has identified a number of areas that are most difficult to adapt to the needs of the development of distance medicine: personal data, consumer protection and antimonopoly legislation (Zhuravlev 2016).

The beginnings of telemedicine go back to the early twentieth century; they are inextricably linked with the measurement and transmission of physiological indicators of the human body over a distance. Thus, the Dutch physiologist Willem Einthoven developed in 1901 an electrocardiograph and a method for transmitting electrical signals of the heart over a distance, for which he was awarded the Nobel Prize in 1924.

In the 1920s, Norwegian doctors provided remote consultations to sick crewmembers of ships via radio communication. The most significant impetus for the development of telehealth services was given by the exploration of near-Earth space by humankind. Many developments of Soviet and American doctors and scientists have made it possible, since the 1960s, to monitor the state of the body of cosmonauts and astronauts in near-Earth orbit, spacecraft and the ISS.

Telemedicine technologies are well suited for large countries, because they make it possible to cover hard-to-reach and sparsely populated areas of Russia, Canada, Norway and other geographically similar places with medical consultations. In 2019, the World Health Organization (WHO) published recommendations on methods and ways of using digital technologies in medicine, thereby confirming that the impact of information technologies on healthcare is unquestionable, especially in terms of healthcare coverage for a larger number of the population (WHO 2019).

Another reason for the active use of remote medical consultations was given by the COVID-19 pandemic; then, in conditions of self-isolation of people, quarantines of hospitals and the closeness of countries, telemedicine technologies showed their importance in terms of the exchange of experience within the medical community, which in turn saved thousands of patients around the world. In addition, the advantage of telemedicine is the remote management of medical care for patients undergoing treatment or follow-up at home, which helps to relieve in-patient medical facilities.

Analyzing the European experience in the development of telemedicine, it is impossible not to draw attention to the fact that the legal regulation of the sphere in consideration has some dualism, i.e. distance medical services and e-health in general are regulated by two large blocks of norms—standards for the provision of medical services (for example, Directive of the European Parliament and the Council of the European Union 2011/24/EC of March 9, 2011 on the application of patients' rights in cross-border healthcare (Directive 2011)) and laws on the safety of personal data (such as the General Data Protection Regulation (Regulation (EU) 2016)).

It is important to note that the approach to the possibility for making a telemedicine diagnosis abroad is not unambiguous, sometimes even within the same country, not every region can treat patients without face-to-face appointment (a vivid example of the USA, where it is allowed to diagnose remotely in Arizona, but not in Alabama).

The issues of identification and authentication in telemedicine interaction are solved in different ways in foreign countries. Thus, in India, patients are assigned a unique code by which they can be identified by a doctor; in Sweden, data from banks stored in the memory of a mobile application is used for this purpose; in the UK, identification and authentication of patients is carried out by a nationwide identifier, which at birth is assigned to each person by the local health service.

Special attention should be paid to the consideration of the experience of the introduction and development of telemedicine services on the Korean peninsula, since, as can be seen from the work of scientists, there is a certain similarity in the starting conditions and the general range of problematic issues with our country. In their works, Kang and Choi (2015) consider controversial aspects of the Korean medicine law, which hinder the activation of state pilot projects aimed at the development of telemedicine. According to the results of his research, Park (2015) comes to the conclusion that the development of telemedicine directly depends on the offline conditions in each specific territory, and they differ significantly in the country. Kim (2014) suggests using

the USA's experience in security and privacy issues for the development of telemedicine in South Korea. However, the works of Jeun (2014) lead to the conclusion that the current state of the country's healthcare industry does not allow organizing the process of providing telemedicine services based on foreign experience. Research by Lee (2021) is devoted to the issues of the ratio of "remote" and "medical" in the process of providing telemedicine services. Joung and Park (2012) offer ways to activate telemedicine by establishing detailed legal relations.

Considering the existing normative and legal framework for the regulation of telemedicine technologies, it should be noted that the foundations for the regulation of telemedicine in the Russian Federation are laid down in the Law "On the Basics of Protecting the Health of Citizens in the Russian Federation" (hereinafter the Law), Article 36.2 of which establishes the possibility of consulting a patient or his representative with a healthcare professional through the use of telemedicine technologies. Among the main purposes of telemedicine, the law calls anamnesis analysis, analysis of therapeutic measures, assessment of the patient's current state of health and assessment of the relevance of the organization of his personal examinations.

A mandatory condition for the use of telemedicine technologies, Part 3 of Article 36.2 of the Law establishes the preliminary diagnosis of the patient and the appointment of treatment at the face-to-face attendance, with the exception of medical organizations participating in the experimental legal regime under the 258-FZ of July 31, 2020 "On Experimental Legal Regimes in the Sphere of Digital Innovations in the Russian Federation", (the special legal regime and its exceptions will be discussed later in our article).

It is also important that, according to the Law, remote monitoring of patients is prescribed by the attending physician in accordance with the data entered into the unified state information system in the field of healthcare or its regional analogues. In order to identify and authenticate participants in remote interaction, the Law obliges to use a single identification and authentication system (using authorization through accounts in a Single portal of Public Services, as well as using an electronic signature of a medical professional).

The second federal document that mentions and clarifies the use of telemedicine in Russia was the Order of the Ministry of Health dated November 30, 2017 No. 965n "On approval of the procedure for organizing and providing medical care using telemedicine technologies" (hereinafter referred to as the Order of the Ministry of Health). This by-law also designated telemedicine technologies as remote interaction of medical workers between themselves and patients. Among the aspects not regulated by Law, the Order of the Ministry of Health indicated that telemedicine technologies can be used in the provision of any type of medical care: primary health care, specialized, including high-tech, emergency (including specialized) and palliative care. In the Order of the Ministry of Health, the prerequisite for the use of telemedicine is the establishment of a diagnosis for a patient at a face-to-face medical appointment, the use of a unified information system and ensuring the safety of personal data.

Interestingly, telemedicine care is not recognized by the Ministry of Health as a separate type of medical activity, but is used only as a technological component in the provision of medical services. The procedure for providing telemedicine care is determined, among other things, by the organization's license for medical activities, while the medical institution independently provides communication between medical workers and patients through the allocation of premises, communication facilities and necessary equipment for these purposes. There are no exceptions to the use of a unified identification and authentication system for organizations that do not work within the framework of state guarantees of compulsory health insurance (Letter of the Ministry of Health of the Russian Federation dated April 9, 2018 No. 18–2/0579 "On explaining the procedure for organizing and providing medical care using telemedicine technologies" (2018)).

July 18, 2023 The Russian Government decided to establish an experimental legal regime in the field of digital innovations in the medical activities, including the use of telemedicine technologies, which was reflected in Government Resolution No. 1164 (Resolution of the Government of the Russian Federation 2023) (hereinafter Resolution No. 1664). The experimental legal regime will be in effect for 3 years, i.e. until September 1, 2026.

In this regulatory act, the direction of development, testing and implementation of digital innovations is medical activities, including the use of telemedicine technologies and technologies for collecting and processing information about the state of health and diagnoses of citizens.

The specified experimental legal regime (hereinafter referred to as the ELR) aims to expand the opportunities for consulting patients in a planned format, regarding diagnoses established at a full-time admission, with the possibility to adjust previously prescribed treatment and remotely monitor their health status during the course of treatment.

As "contraindications", i.e. conditions, the presence of which predetermines the prohibition on the use of telemedicine technologies, Resolution No. 1664 fixed the age of the patient under 18 years, medical examinations, as well as the treatment of patients with infections and those in need of emergency urgent, including specialized health care.

The main condition for the correction of treatment using telemedicine technologies in this act is the presence of an official medical document (paper or electronic one)

reflecting information about physical examinations and face-to-face appointments of the patient. In order to minimize the risk of poor–quality provision of medical services, the ELR provides that cases when a patient needs to correct a previously prescribed treatment, in the absence of information about a face-to-face medical appointment (physical examination) in relation to him should be considered by special commissions within 3 calendar days from the date of establishing the fact of telemedicine correction of treatment of such a patient. At the same time, paragraph 17 provides that the medical organization, based on the results of the examination of the revealed facts, takes measures to prevent (eliminate) the consequences and causes of the identified violations, including compensating for the damage caused to the patient in accordance with the legislation of the Russian Federation.

The establishment of ELR is a significant step towards improving the legislative regulation of the establishment and correction of diagnoses using telemedicine technologies (including in terms of personal data protection), but at the same time, many problematic aspects of e-health and telemedicine In Russia today remain unregulated.

2 Methodology

The author has used general scientific methods of logical cognition. In particular, the experience of a number of countries in the application of information technologies in the field of medical services has been analyzed using the methods of analysis and synthesis.

The formal legal method and the method of juridical hermeneutics have been used in the analysis of normative legal acts regulating the provision of telemedicine services in the Russian Federation and abroad. The comparative legal method has made it possible to identify barriers to the introduction of information technologies in the processes of providing medical care to patients.

The system method has made it possible to assess the key areas of improvement of Russian legislation in the field of telemedicine, as well as to develop recommendations for overcoming key barriers to law enforcement.

3 Results

Thus, in the most general form, the following types of activities fall under the term “telemedicine”:

1. Synchronous and asynchronous remote personal consultations on the principles of doctor-doctor and doctor-patient.
2. Recording, systematization and analysis of information about the patient’s health status.
3. The use of hardware and software complexes (including those with elements of artificial intelligence) that help doctors in making specific decisions on treatment tactics of patients.
4. Using the Internet of Medical Things.
5. Introduction of robotic systems into medical activity.

With the increasing interest of the medical community in the use of remote technologies, the problems of confidentiality of medical information, preservation of privacy, data protection, reduction of the risk of abuse, avoidance of medical errors, organization of voluntary and compulsory insurance and a number of other ethical, social and legal aspects of the use of telemedicine technologies began to rise in front of doctors and patients. Separately, it is worth noting that the adoption of e-health is associated with the need to develop standards and rules for the compatibility of tools and technologies that make it possible to implement telemedicine, into ordinary medical practice as safely as possible (From Innovation To Implementation 2016).

In the course of the research, the author comes to the following conclusions:

1. The current normative regulation in Russia contains a direct prohibition on remote diagnosis of patients, which partially restricts the possibility of realizing the rights of the population to receive medical care in conditions of universal digitalization.
2. The existing legal regulation of telemedicine in Russia proceeds from the principle of “do no harm” and aims to avoid medical errors in the absence of personal (face-to-face) admission of patients in the process of providing telemedicine services.
3. The legislation on telemedicine is still conflicting in nature and has many gaps, which in turn does not allow the full use of remote technologies, as well as machine learning and artificial intelligence technologies in the work of doctors.

4 Discussion

According to the author, there is a need for a comprehensive analytical generalization of the application of telemedicine standards, followed by an assessment of barriers to its development in the Russian Federation.

The beginning of the introduction of telemedicine into widespread practice has been reasonably started with the introduction of a three-year experimental legal regime, however, the program for the introduction of this regime

does not provide for the description and gradual weakening of administrative barriers to the use of telemedicine services.

Apparently, the optimal model of legal regulation of telemedicine activities should be built through the balance of private and public interests of all participants in the process of providing medical services, as well as taking into account technical and legislative requirements to ensure medical secrecy, authentication and identification of patients (doctors), and the safety of the entire array of personal data.

5 Conclusion

Overcoming barriers to the development of telemedicine services in the aspect of their legal regulation lies in the plane of ensuring two types of security: patient safety and data security.

It is also worth thinking about finalizing codified normative acts (Administrative Code of the Russian Federation, Criminal Code of the Russian Federation) in terms of implementing separate articles in them that tighten responsibility for unauthorized access to medical data and medical secrecy.

A number of researchers rightly believe that it would not be superfluous to finalize the Labor Code of Russia in order to regulate the work of medical workers within the framework of telemedicine technologies. The new articles will allow an adequate assessment of the "remote" work of doctors, as well as establish working hours and rest regimes, assessment of working conditions and other important aspects of employees' activities.

Certainly, the competent authorities and organizations participating in the experimental legal regime will have a large amount of work to do in terms of creating and finalizing protocols for providing telemedicine care, identifying risks and limitations for the treatment of patients in the conditions of digital transformation of society.

Acknowledgements This work has been supported by the grants the Russian Science Foundation, RSF (project No. 23-78-10175, https://rscf.ru/project/23-78-10175/).

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The Phenomenon of Legal Culture of Contemporary Russian Society

Fail Sh. Yambushev, Sergey B. Kotlyarov, and Larisa N. Sveshnikova

Abstract

The subject of this research is the legal culture of contemporary Russian society, with its specific features, and the prospects for its development, considering the cultural and civilizational transformations occurring within it. The research aims to comprehensively analyze theoretical and practical issues related to the legal culture of contemporary Russian society. Everything that determines human existence in a state-organized society, social relations within which are regulated by law, is mediated by its legal culture and the legal culture of society. The functioning of society within the legal framework reflects the legal culture of society and its level. The concept of legal culture is separately distinguished in legal science, representing the overall level of legal knowledge in society, the development of law, and the objective attitude of society towards legal reality. Legal culture is the spiritual core of law in society, one of the key elements of the system ensuring legal regulation of social relations. The development and life of humanity in today's conditions undergo significant changes. There is a process of mediatization and informatization in all sectors of public life, with significant influence and multifaceted impact from events occurring on the global political and geopolitical stage. Such rapid developments will undoubtedly affect and lead to a corresponding deformation of legal culture.

Keywords

Legal culture · Legal consciousness · Russian society · Legal policy · Moderate conservatism

JEL Classification

K19

1 Introduction

Culture is the primal phenomenon encompassing the myriad forms and processes of human life in society. It gradually evolves through the evolutionary processes of societal development, the accumulation of specific skills and knowledge, and the formation of the spiritual and material experience of society. Culture unfolds in all sectors of social existence.

Simultaneously, it is crucial to understand that the processes of human development and life are far from static and are currently undergoing significant changes. This primarily concerns the mediatization and informatization of all sectors of public life, the differentiation of economic relations, and events occurring on the geopolitical stage. This inevitably influences society's internal values and attitudes, leading to a corresponding deformation of the aforementioned legal institution.

The mass media demonstrate new achievements of humanity, affecting its spiritual and material aspects every day. However, the question of the development of legal culture under these conditions is highly debatable. Some see a platform for realizing the socio-legal potential of society, increasing the accessibility of the legal environment, and, consequently, qualitatively improving the legal culture of the population. Others perceive regression, a worldview crisis exacerbating the problems of societal legal nihilism and, consequently, disrespect for state institutions and the law.

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_23

Moreover, considering that any state-organized society has its legal culture endowed with distinctive features due to the influence of social, cultural, political, and economic factors, a specific research interest lies in studying the legal culture of the society of a particular country, identifying its distinctive features and characteristics. In this context, the authors focus on the legal culture of Russian society.

2 Methodology

The research is based on the general scientific dialectical method of cognition, employing formal-legal, systemic, comparative legal, and historical-legal methods within the field of legal science. The formulated propositions and conclusions shape a certain theoretical framework for the legal culture of contemporary Russian society.

3 Results

Legal culture serves as one of the most crucial indicators of the level of development and maturity of contemporary society. It operates as a symbiosis of spiritual and legal components: integrating well-established legal views, ideas, and values with specific legal institutions and norms. These components find their immediate expression in the consciousness of each individual and exert a direct influence on the creation of the real legal behavioral model for each of them.

Acting as a mandatory element, legal culture constitutes a significant part of the overall human culture. Its content encompasses an immense body of knowledge accumulated in the field of law since ancient times. These include issues ranging from the formation and development of society to problems related to the level of legality in a specific country.

The indicator of the level of legal culture is undoubtedly not only an integral element of the institutions of civil society and the rule of law but also a catalyst for assessing the legal development of society.

The first serious attempts to study this legal category began in the 1960s, interpreted through the concept of socialist legal culture. The main goal of introducing this term was to strengthen the authority of the socialist country and law. Thus, legal culture was considered merely as a tool to influence the behavior of the masses. Doctrinal studies began to show trends focusing on the subjective nature of this category only by the 1990s. Particularly, the development of this phenomenon was attributed to the level of legal consciousness and legal awareness within society.

Nowadays, the concept of legal culture is increasingly encountered in legal science, philosophy, sociology, pedagogy, and even in everyday communication among people. Diminishing the importance of this legal institution is irrational and extremely detrimental to the organization of any country's activities.

Studying the specifics of society's legal culture at a particular historical stage of its development, it is important to remember that the primary sign of legal culture deformation is a change in the legal consciousness of society. In today's world, the development of legal consciousness is an integral factor in the social adaptation and progress of each individual. During social adaptation, the legal consciousness of the subject undergoes development, acquiring specific features and individual traits. Since the 1980s, the study of legal consciousness has emerged as a dynamic field within legal research, becoming the focal point of discussions in numerous academic circles. However, up to the present, a unified understanding of the essence of this category in legal theory has not been fully achieved.

It is crucial to understand that legal consciousness reflects the content and essence of the law, developed through the intellectual activity of individuals.

Therefore, the level of legal consciousness often serves as a criterion for assessing the level of legal culture within the population. As a result, legal culture is adorned with evaluative characteristics such as low, high, developed, and others. Consequently, within the study of the legal culture institute, examining the current level of legal consciousness among the population holds fundamental significance. Legal consciousness constitutes the core of the balance wheel for the healthy development of legal culture, directly influencing its other components—law, legal relationships, legal institutions, and legal behavior.

Nevertheless, in the context of this issue, it is essential to recognize the reciprocal relationship. Thus, the values formed by society and the country significantly influence the legal consciousness of each individual. As a result of the impact of institutions of social regulation, an individual acquires specific behavioral attitudes that, typically, may contain positive and negative aspects.

Legal consciousness and the legal culture of a society are crucial components of the spiritual life of the entire community, determining the population's attitude toward the law, its authority, and its effectiveness.

In the context of socio-legal reality, they serve as a kind of indicator that instantly reacts to any changes within the legal field—uninterrupted functioning of the state mechanism and its failures, effective legislative regulation, and the inability of state policy to satisfy the interests of all population groups. This leaves a mark on the legal consciousness of society, endowing the law with specific qualitative characteristics demonstrating its effectiveness.

In connection with this, identifying and further studying the varieties of deformations currently takes on an urgent and topical character.

Within discussions on the problems of forming legal consciousness, one often encounters statements that this legal phenomenon is currently in a particularly vulnerable state and, as a result, prone to various deformations.

The legal culture of Russian society is a phenomenon endowed with signs of uniqueness, individuality, and irreducibility. It represents an intertwining of various value orientations, national cultures, and a duumvirate of Western and Eastern thought and mentality.

The formation of the legal culture of Russian society took place in conditions of complex and contradictory historical and civilizational challenges. They directly impacted the formation of Russian legal culture and legal consciousness, which are an integral part of our everyday reality.

Thus, to choose the right vector for improving the legal culture of Russian society, evaluating the prospects of its development, it is particularly important to turn to Russian sources—to engage in the study of the genesis of Russian legal mentality, analyze its distinctive features and characteristics, and determine the factors influencing it.

Defining the peculiarities of Russian legal culture, it is important to understand that Russia is a polyethnic and multi-confessional country. More than 190 nationalities reside within the country. Its borders extend from Europe to Asia. In such conditions, there arises and exists an objective (vital) need to build intra-state multinational relations, which cannot but affect its legal culture. Thus, multivectorality is one of the most important and distinguishing characteristics of the legal culture of contemporary Russian society. For instance, S. A. Snashkov, referring to multivectorality as a characteristic of legal culture, points out two priority directions in the development of Russia's legal culture: on the one hand, identifying itself as an integral part of the European legal tradition and, on the other, a tendency to isolate from the Western legal space (Snashkov 2022).

The relevance and significance of such a perspective deserve attention and thoughtful consideration. Simultaneously, it is necessary to note that the priority of these directions was ambiguous and depended on the goals pursued by political elites in a specific period at various stages of historical development. In this regard, public opinion is similarly divided into two polar camps, with one advocating for preserving the identity of the legal culture and the other for orienting it toward the West.

For instance, in defense of the former perspective, Professor V. V. Sorokin noted, "We… live in a country that is the homeland of the term "PRAVO" [The word "Pravo" is translated from Russian as "Law." Emphasizing the difference between "Pravo" and "Law," V. V. Sorokin tried to highlight the uniqueness of the legal field in Russia] in all the richness and uniqueness of its content. It was here that "PRAVO" was born, not "JUS," not "LEX," or "LAW," for which there were and are no adequate analogs in other countries" (Sorokin 2007, p. 314).

However, regardless of the period, there existed a radically opposing opinion. In support of this, we turn to the statement by A. E. Chernokov, "In comparison with the West, Russia is a non-legal and, unfortunately, even anti-legal society… It (the law) did not find mass support for its principles and basic institutions, which essentially led to its collapse" (Kharitonov et al. 2006, p. 203).

From studying such polarized perspectives, we can emphasize the need for an integrative study of this legal phenomenon, making it possible to conclude about the unique nature of legal culture in Russia. Its development within the consolidation of legal cultures of the nations and ethnicities of Russia, as well as the continuity of European and Eastern foreign experience, endows Russian culture with a special uniqueness, requiring finding certain compromises, including in terms of the convergence of divergent views and interests of the subjects.

Speaking about the uniqueness of legal culture in Russia, it is important to note that Orthodoxy played a special role in its formation. According to some researchers, during tsarist Russia, the overwhelming majority of the population had a nihilistic attitude toward the law. For them, the religious aspect was of paramount importance rather than the legal one.

Discussing the nature of this particular feature, it is important to highlight its positive aspects. This can be explained by the fact that legal culture, as a component of the overall culture, has its traditions—certain rules of behavior and norms passed down from generation to generation. Traditions make it possible to preserve the values of society and create without destroying. Orthodoxy, namely the perception by many Russians of the divine purpose of the ruler and God's providence in Russia, can be considered one such tradition.

An individual's upbringing in a mature socialist society was directly linked to the formation of the public legal culture. However, despite significant qualitative differences between the Soviet legal system and the pre-revolutionary one, the role of law in the specified period remained virtually unchanged in regulating social relations. The only difference was that the primary purpose in coordinating societal interactions was no longer Orthodoxy but rather communist morality and ideology.

In connection with this, when discussing the characteristic features of Russia's legal culture, it can be noted that there has always been a certain dependence of law on the dominant ideology in Russian society. In this context, the ruling authority supported it through the use of political and legal means, while ideology exerted a very active influence on legal formation and enforcement practices.

This specified feature is closely related to another distinctive trait of Russia's legal culture, namely its state (civilizational) missionary character. These missions varied at different historical stages of Russia's formation and development. For instance, in the pre-revolutionary period, the mission was the preservation and protection of world Orthodoxy. During the Soviet era, it was the idea of global proletarian unity. Nowadays, it is the defense of Russia's sovereignty on the world stage and its national identity.

Thus, Russia's legal culture possesses its distinctive features and characteristics. It represents a kind of culturological phenomenon that has encompassed norms and values from different peoples and cultures, overcoming a lengthy stage of development for these purposes. The specified characteristics include the following:

- The Eurasian nature of legal culture;
- Its multiethnic, multi-confessional character;
- The close interconnection between legal culture and the dominant ideology;
- The endowment of Russia's legal culture with a specific state (civilizational) mission.

Due to these particularities, the legal culture of Russia lacks similar counterparts on the geopolitical map and requires adapted mechanisms of state influence that align with these characteristics. In this regard, the question of choosing a course of legal policy becomes especially relevant, capable of adjusting to these features and directing state activities toward the rational and more effective development of legal culture and public legal awareness.

We are currently witnessing global changes affecting all sectors of public life, including the spiritual realm. In this regard, many legal scholars and sociologists note that contemporary society is experiencing a moral and spiritual crisis brought about by various changes in people's lives, both of a social and economic nature. The crisis also manifests in legal consciousness. However, without the proper development of legal culture, there is no objective possibility for the realization of societal values such as the rule of law, democracy, and the protection of the rights, freedoms, and lawful interests of citizens. In these conditions, questions of legal policy and the choice of its development direction become particularly relevant.

The term legal policy is relatively new to Russian jurisprudence in theory and practice. Nevertheless, legal science has several scholarly works that elucidate the content of this category.

The legal policy constitutes state policy, the policy of legal development, and the tactics and strategy of the legal path of society and the country. It involves activities to create an effective mechanism of state regulation, with the state being its primary subject, represented by its governmental bodies and structures.

When carrying out the activities mentioned above, the state, through its organs and structures, encounters various challenges in its implementation daily. Therefore, it becomes especially important to choose a direction for the most effective legal regulation that corresponds to the needs of society and the conditions of current realities.

The primary direction of contemporary legal policy is the goal of protecting and preserving the traditional civilizational values of Russian legal culture, which is impossible without an awareness of national identity, the development of love for the Motherland, and patriotic upbringing at all levels of the education system. The historical commitment of society to traditional civilizational values and institutions is referred to as the doctrine of moderate conservatism—this direction in politics and science has recently become very popular.

The country's commitment to developing a legal culture in the mentioned direction has become quite prominently expressed at the level of public political statements and in the national doctrine.

Developing ideas to strengthen national identity and traditional values has found consolidation at the legislative level. Primarily, it is crucial to emphasize that the formation of this direction of legal culture takes place within the framework of the national system of legal education and upbringing, which involves solving tasks outlined in the "Fundamentals of the state policy of the Russian Federation in the sphere of legal literacy and legal awareness development of citizens" (approved by the President of the Russian Federation on May 4, 2011) (Presidential Executive Office 2011) and the "Principles of state policy on the preservation and strengthening of traditional Russian spiritual and moral values" (approved by the President of the Russian Federation on November 9, 2022) (Presidential Executive Office 2022).

4 Conclusion

Nowadays, the legal culture of Russian society constitutes a culturological and civilizational phenomenon, encompassing the norms, principles, and values of various peoples and cultures. Therefore, to choose the right direction for its development, it is particularly important to identify the peculiarities of domestic legal consciousness and legal culture, as well as the factors influencing them.

Due to these peculiarities, one can conclude that the legal culture of Russia has no analogs in the world and requires the application of adapted mechanisms of state influence tailored to these characteristics. In this regard,

the question of choosing a course of legal policy that can adapt to these features and direct state activities towards the development of legal culture and legal awareness of the population in a rational and more effective manner becomes particularly relevant.

Legal policy is the activity of creating an effective mechanism of state regulation, the main subject of which is the state, in the person of its state bodies and structures.

Based on the analysis of recent changes in Russian legislation, the authors concluded that the primary emphasis in the direction of the country's legal policy is placed on preserving and strengthening the national foundations of legal culture and traditional Russian spiritual and moral values, patriotism, and national identity. It is often associated with the concept of moderate conservatism, which has gained wide popularity in contemporary Russian politics and doctrine. Given the current processes and ongoing global restructuring, this model of legal culture in Russian society is justified and aligns with its interests.

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Ecological Education and Enlightenment Within the Framework of Implementing the Sustainable Development Concept in the Russian Federation

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Abstract

The relevance of eco-education and eco-enlightenment is determined by the global environmental challenges facing humanity, the history of formation and development of which is inextricably linked to the evolution of the natural environment. We have been using the benefits of nature for thousands of years and began to think about restoring its resources only at the end of the twentieth century. The ecological agenda is entering our lives more densely. The pollution of water bodies and the atmosphere, the cutting down of forests that do not correspond in quantitative terms to their planting, and the growth of industrial and household waste are now the subject of lively discussions on the need to preserve the planet's balance. The world is a highly developed technological system. A large number of factories, plants, and manufactories, extensive use of the latest technologies, and the availability of broadband Internet entail technical progress and have a detrimental impact on the environment. This research aims to draw public attention to the problematic issues existing in the environmental sector and propose ways to improve the environmental safety of the country through changes in beliefs, knowledge, values, skills, and daily habits of people to form their sustainable and responsible behavior.

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Keywords

Eco-initiatives · Sustainable development · Eco-enlightenment · Eco-education · Ecological culture · Ecological thinking · Economic development

JEL Classification

M540

1 Introduction

The natural environment is currently degrading under the influence of the artificial environment. In turn, the artificial environment is generated by the transformative (and partly destructive) activities of humanity.

Most individuals and organizations are deeply interested in industrial progress and actively involved in its processes. Despite this, only a few contemplate the ecological component that lies behind this progress—a component that plays a crucial role in maintaining the balance of nature. Despite its invincible power, we must respect and consider nature's limits and constraints. It is important to realize the significance of preserving the environment to ensure long-term and sustainable life on the planet. Even resources that are deemed infinite according to geography textbooks (e.g., fresh water, clean air, and sunlight) are increasingly losing their qualitative characteristics and pristine properties. This occurs due to irrational human activities and, sometimes (more often), the inaction of humans, who are the primary users of these resources and, simultaneously, the main agents capable of helping the planet.

In contemporary society, issues related to the interaction between nature and humans are becoming increasingly global and ecologically significant. If we do not recognize the urgency and learn to care for nature in the future, an ecological catastrophe will become inevitable. For this

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_24

reason, civil society needs to shape a system of views on the "ecological agenda" of the present, foster environmental culture among the population, and instill awareness of personal responsibility for each citizen towards their living environment. According to the authors, eco-education, eco-enlightenment, and awareness must begin from the earliest age, even preschool. The earlier such knowledge and competencies are acquired and the more comprehensive the approach to instilling such ideas, the greater the likelihood that they will later transform into firmly established convictions and vectors of action.

The research attempts to shed light on existing positive trends in the field of environmental protection and the contradictory issues in the eco-enlightenment sector. A thoughtful analysis of these issues will enrich the theoretical foundation for designing an eco-education system. The development of the eco-education system requires a more profound theoretical grounding. It is essential to enrich the theoretical basis for designing this system to effectively address the challenges and problems associated with ecology and the environment. New research and theoretical analysis will help improve the understanding of the principles and methods of enlightenment and develop innovative approaches and solutions. Expanding the theoretical foundation of eco-education will make it possible to shape environmental culture more effectively and increase society's awareness of the importance of environmental conservation. Thus, improving the theoretical basis for designing an eco-education system plays a crucial role in achieving long-term sustainability and ecological development.

The tasks outlined in the research, the solution of which has made it possible to achieve the set goal (to enhance the environmental safety of the country through changes in individuals' beliefs, values, and habits to form sustainable and responsible behavior), include the following:

- To study and analyze theoretical material and practical experience in organizing eco-enlightenment and eco-educational work;
- To identify trends and contradictions characterizing the eco-enlightenment in Russia.

The practical significance of this research lies in the fact that its results have practical applications and contribute to developing a strategy for advancing eco-education in the Russian Federation. Throughout the research, the authors identified socio-cultural trends, regularities, and effective tools that contribute to forming environmental culture in society. These findings can significantly affect forecasting and scientifically justify the further development of eco-enlightenment. The authors also addressed the issue of developing environmental consciousness and corresponding culture in the context of achieving sustainable development.

The 2030 Agenda for Sustainable Development was adopted by the UN on September 25, 2015. This Agenda (universal and applicable to all countries) comprises 17 interconnected and indivisible Sustainable Development Goals (SDGs) to ensure the well-being of all. From the presented goals, it is possible to highlight those that directly or indirectly relate to environmental issues (Fig. 1).

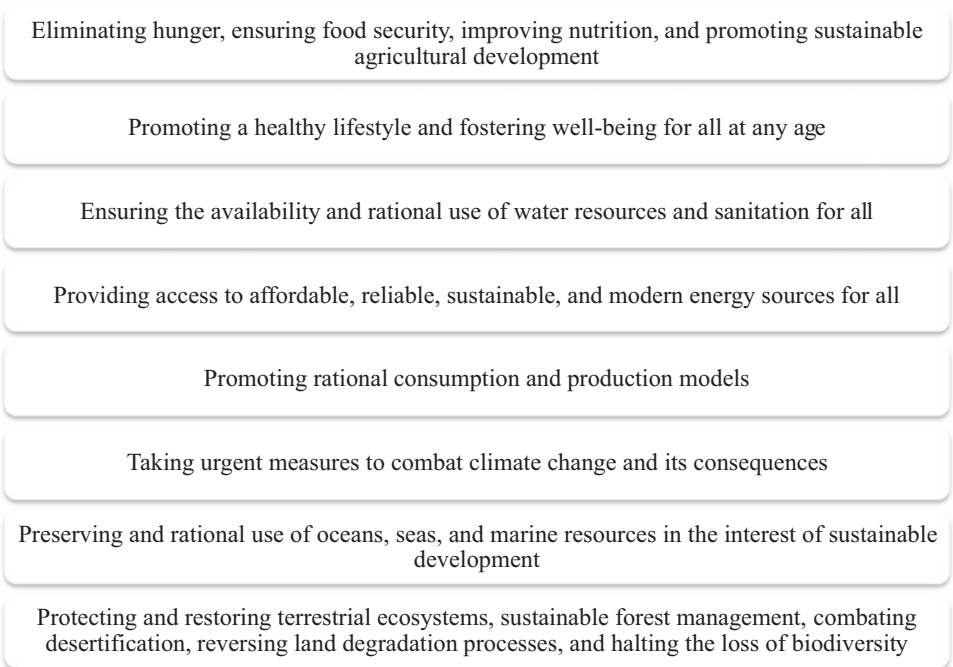

Fig. 1 SDGs that address environmental issues. *Source* Compiled by the authors

Most SDGs outlined in the Agenda are directly or indirectly linked to preserving our planet's resources. Coordinated interaction among governmental bodies, representatives of the private sector, active civil society, and all individuals, regardless of their social status, are required to succeed in sustainable development.

SDGs call on every country (rich, poor, and middle-income) to join forces in the collective effort to improve the well-being of our planet. Countries recognize that effective resistance to the problem of poverty is only possible through implementing targeted measures that contribute to economic development and address fundamental issues in education, healthcare, social protection, employment, environmental sustainability, and the fight against climate change. The complete fulfillment of these goals is necessary to achieve a unified and perfected outcome.

2 Methodology

A systemic approach is the primary method employed in conducting this research. Through its application, the authors described the features of eco-enlightenment and eco-education and conducted a comprehensive analysis of interconnected processes occurring in forming environmental culture. The analysis is grounded in the theoretical works of scholars engaged in investigating the issue of shaping human environmental culture. For instance, T. S. Popova and T. A. Zalisko confirm that environmental safety becomes particularly relevant during the rapid development of all sectors of the national economy. An increasing number of people show interest in preserving the environment, reducing biogenic risks, and minimizing the negative impact on natural resources (Popova and Zalisko 2023).

A. A. Artemieva also focuses on eco-enlightenment for the population, exploring the issues of forming environmental culture among students in secondary and higher education (Artemieva et al. 2022). E. V. Grednovskaya considers eco-memes (motivational posters guiding citizens toward responsible environmental behavior) as auxiliary tools for the practices and strategies of eco-enlightenment (Grednovskaya 2022). V. S. Antonova regards eco-enlightenment as an instrument for shaping sustainable models of environmental behavior among the population (Antonova 2022). N. A. Ronzhina views eco-enlightenment and eco-education as forms of environmental awareness for citizens (Ronzhina et al. 2022). E. R. Baybatyrova studies eco-education on an individual level and in the context of globalization processes (Baybatyrova and Khasbulatova 2022). N. Chakanova describes environmental ethics and environmental culture as the foundation for harmonizing relations between society and nature (Chakanova and Chakanova 2023). O. A. Batmanova explores ways to stimulate public participation in eco-volunteer activities (Batmanova et al. 2023).

A review of the literature on the research topic makes it possible to conclude that many authors identify socio-cultural trends in the field of environmental protection and propose effective tools for shaping environmental culture among the population, capable of influencing the further development of eco-enlightenment.

3 Results

The ecological problems exert a destructive impact on nature and human health. The influence of these problems on the human body leads to serious consequences, including worsening heredity, the spread of genetic diseases, the chronicization of illnesses, increased child mortality, epidemics, and the rise of oncological diseases. Ultimately, these factors contribute to a decrease in human capital and hinder the country's development in all areas.

In the global environmental agenda, Russia should be one of the key countries taking effective measures to address environmental issues. The ecological agenda is an excellent opportunity for collaboration with Eastern partners of Russia. It is necessary to draw increased attention to Russian environmental initiatives. However, we have only recently come to this realization. The development of environmental culture in Russian society at the turn of the twentieth and twenty-first centuries was accompanied by the following significant contradictions:

1. There was a contradiction between active legislative activity to form a systemic environmental culture and the lack of an active state position on this issue. As a result, the environmental measures taken were fragmented and undoubtedly required government support.
2. There arose a contradiction between the declaration of the need to form an environmental culture among Russians and the lack of a unified approach to interpreting its essence and structure. As a result, monitoring the dynamics of the development of environmental culture became impossible.
3. There was a contradiction between the popularity of "environmental fashion," where various environmental organizations conducted many events for enlightenment and the level of professionalism in the expert community. This led to the development of erroneous, scientifically unfounded ecological thinking and distorted perceptions of environmental culture.
4. There was a mismatch between the obvious importance of the family in shaping environmental awareness in

children, solidifying ecological habits in adults, and the lack of effective mechanisms for eco-enlightenment within the family institution from society and the state.

Currently, humanity is facing an imbalance between economic and ecological, rational and irrational, and common and private interests. This imbalance is the result of several factors, ranging from the growth of the Earth's population (which is currently three times higher than the mid-twentieth century) to the impact of advances in science and technology. We can expect serious problems related to the interaction between society and the environment, as well as escalating negative phenomena of natural and human-made origin.

In such conditions, it becomes evident that we need to learn to anticipate imminent threats emanating from the environment, at least in the near future. Each of us must possess basic knowledge and understanding of an environmentally rational way of life and transmit this knowledge, skills, and ways of thinking to the next generations. To achieve this goal, it is necessary to involve eco-education, upbringing, and enlightenment, which will contribute to the transmission of this knowledge, the development of skills, and the formation of positive habits.

The formation of environmental culture in society has long become a necessity and ceased to be a subject of debate. However, academic circles are still actively discussing the creation of a comprehensive and multi-level system for the formation of environmental ethics. This system should offer effective methods for developing this complex quality in individuals, including early childhood, as well as in society at large. In recent decades, Russia has accumulated significant experience in the field of eco-education, which requires detailed systematization and analysis.

Earlier, the impact of humanity on the environment was mitigated by natural processes in the biosphere. Nowadays, humanity stands on the brink of an environmental crisis. Preserving nature for future generations is a global problem of our time, requiring immediate action. This is why annual international scientific and practical conferences, forums, meetings, flash mobs, etc., are held, where issues of rational use of natural resources, water and air pollution, and waste disposal are discussed. These platforms define the main directions and mechanisms for environmental protection and ensuring the population's ecological safety.

The protection of the environment has always been an intriguing subject for humanity. However, it was only in the twentieth century, with the development of industrial production and an increase in the environmental burden, that nature conservation ideas and the resolution of ecological problems became an integral part of economic transformations.

Adherence to all listed principles plays a crucial role in solving environmental problems. To foster an environmental culture, support for an ecocentric approach is necessary, prioritizing the resilience and interdependence of living nature with human society. In contrast to anthropocentrism, ecocentrism is based on the concept of an objective system in which all living organisms, including humans, their resources, economy, technology, and culture, interact with each other and the surrounding natural environment. The principle of integrity plays a fundamental role in understanding contemporary environmental issues and increasingly influences the theoretical comprehension of the relationship between humans and nature, urging us to strive for harmony between natural and human-created resources on the planet.

To overcome contemporary imbalances in nature, it is crucial to increase the level of public awareness and develop its ecological tolerance. Only these efforts will help overcome crises in the relationships between people and nature. Eco-education and eco-enlightenment play a vital role in this process, uniting the natural, social, and technical aspects of scientific knowledge, as well as temporal and spatial connections and interactions in the real world. Such a combination makes it possible to form a comprehensive system upon which we can build the future.

Eco-education is developed based on fundamental principles that serve as the foundation for shaping environmental culture in society. Among the significant principles highlighted in this context, the following deserve special attention:

- Principle of social responsibility;
- Principle of scientificity;
- Principle of balance;
- Principle of feedback;
- Principle of modernization;
- Principle of harmony;
- Principle of systematization;
- Principle of comprehensiveness;
- Principle of humanism;
- Principle of innovativeness.

Adhering to these principles is an integral part of solving environmental problems. To develop eco-culture, it is necessary to apply an ecocentric approach that emphasizes the focus on nature and the interconnectedness of humans with it. Unlike anthropocentrism, ecocentrism unites all life forms in a single system of interaction with the environment. The fundamental principle is a commitment to integrity, which helps understand contemporary environmental issues and consciously utilize the natural and artificial resources of the planet. The new environmental

situation significantly influences ecological culture, opening new facets of society's interaction with the geographic environment. To overcome the crisis in the relationship between humans and nature, it is essential to raise awareness and ecological tolerance in society. Only in this way will it be possible to restore the disrupted balance in natural processes. Eco-education and eco-enlightenment bring together various aspects of scientific knowledge, forming a comprehensive system of connections in space and time that reflects interactions in a real geographic context.

In the Russian Federation, eco-education is actively conducted in educational institutions at all levels, from preschools to universities. The Ministry of Education of the Russian Federation pays significant attention to developing a continuous eco-education system throughout the country. In 2022, a decision was made to develop the concept of eco-education for schools and update the Federal State Educational Standards (FSES). As part of this process, new documents were created that establish formats and approaches to teaching and define key topics included in the curricula. Leading topics in eco-education include nature conservation, awareness of the global nature of environmental problems, and resistance to actions that harm the environment. These new documents represent an important step towards improving students' environmental awareness and contribute to the formation of environmental culture from an early age.

To effectively implement these standards, recommended educational programs have been developed and are being implemented in schools and preschools. The primary school conducts lessons on the environment, fostering a respectful attitude toward nature and developing in children a desire to act in accordance with environmental norms and rules. In middle and high school, eco-education is integrated into biology, physics, geography, social studies, health and safety, other disciplines, and extracurricular activities. According to the authors, it is essential to continue this work in colleges and universities, especially in teacher training institutions, because educators will subsequently serve as guides to the hearts and minds of their students.

Environmental topics are actively promoted and integrated into various supplementary programs. Since 2022, over 20,000 organizations located in all regions of Russia have joined forces to implement this direction. Starting from 2020, within the federal project "Success for every child" under the national project "Education," there has been active establishment of eco-stations and centers for eco-education and eco-enlightenment for children. This includes school forestry, environmental teams, and eco-patrols. The Deputy Minister cited an example: in 2021, 14 eco-stations were operating in Russia, and by the end of 2022, the total number of such organizations reached 60. Thanks to eco-stations, there is career guidance for agricultural specialists, addressing the shortage of agricultural personnel in regions and promoting green professions for the future.

Within the national project "Education," children's biological gardens have been opening since 2021 in Russia. As of the end of 2022, 87 such preschool institutions were operational in 71 regions of Russia. In our view, it is necessary to create all opportunities to involve as many children and youth as possible in the system of eco-education and eco-enlightenment. The Ministry of Education of the Russian Federation continually improves the implementation of environmental work, provides educational organizations with material and technical support, and assists in methodological approaches.

Eco-education is presented in numerous forms, including the following:

- The diffusion of eco-knowledge;
- The promotion and popularization of ideas contributing to the protection of the environment from adverse impacts;
- The organization and support of grand events for its preservation;
- Informing the population about new regulatory acts in the field of ecology;
- Ensuring environmental safety within the country, region, or city;
- Production and dissemination of programs aimed at increasing ecological literacy and citizens' commitment to this issue;
- Creating and disseminating social advertisements, films, videos, and printed publications dedicated to ecology;
- Organizing international, interregional, regional, and local conferences, forums, and other events on environmental issues;
- Establishing environmental centers and museums and developing tourist routes to popularize environmental protection.

Moreover, it is crucial to maximize the use of cutting-edge technological achievements for educational activities in the field of ecology, aiming to spread knowledge about environmental preservation. The synergy of all mentioned measures supports social responsibility and ensures the conservation of the world for future generations.

4 Conclusion

Eco-education and eco-enlightenment are paramount in ensuring the civil right to a favorable environment. They are an integral part of the state's sustainable development strategy, where the ecological sector holds a central position.

The processes of eco-enlightenment influence the formation of the population's eco-culture. This culture constitutes a key factor in preserving a favorable environment for future generations.

The system of eco-education and eco-enlightenment encompasses all categories of citizens and operates at all stages, from preschool to retirement age. It is necessary to include the foundations of ecological knowledge (including global environmental issues, climate change, and sustainable development) in state educational standards.

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The Influence of Ethnic Mentality on the Development of the Green Economy in the Region: Historical and Cultural Aspect (Case Study of the Chuvash Republic)

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Abstract

The research aims to identify the interrelation between the sustainable development of a region based on transitioning to a green economy and the ethnocultural specificity of the region. It also seeks to determine the effectiveness of the state's innovative policies in the regions of Russia, using the implementation of green projects in the Chuvash Republic during different historical periods as an example. Among the issues hindering the transition to a green economy, it is crucial to highlight the misunderstanding or disregard of the mentality of the "titular" people residing in the region. The shift to a green economy should occur without ecological risks for future generations. Equally important is preserving the ecological balance in the spiritual sector of society. The implementation of green projects should not disrupt the mental and moral well-being of citizens or contradict the ethnocultural traditions and worldviews of the people living in the area. The authors rely on the analysis of economic, socio-philosophical, and historico-cultural texts published in Russian over the last decade, addressing the issue of Russia's transition to a green economy. They also draw on data from English- and German-language online platforms related to implementing green economy projects in Europe and other countries worldwide. The research employs content analysis of thematic publications in media and on the Internet, revealing the activities of the authorities of the Chuvash Republic in the field of green technologies. The advantage of the traditional worldview of the Chuvash people lies in its ecological nature. The activities of the Russian energy company "Hevel" (meaning "sun" in Chuvash), located in the city of Novocheboksarsk and engaged in the solar energy industry, align with the Chuvash ethical and spiritual priorities. In the Chuvash traditional understanding, the sun serves as a symbol of moral purity and nobility. Therefore, projects related to solar energy are favorably perceived by the local population. The research results can be considered in the decision-making process for administrative and managerial tasks related to the differentiation of modernization tasks and the implementation of innovative projects in the field of green economy in regions across the country.

Keywords

Green economy · Solar energy · Agriculture · Russian regions · Chuvash Republic · Ethnic mentality

JEL Classification

O13 · O33 · P18 · P28 · Q16 · Q57 · Z13

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1 Introduction

Our world is highly diverse. Each country distinguishes itself through its nature, climate, mentality, and legislation, making it impossible to devise a uniform approach to building a green economy. The transition to a green economy will be unique for each country and even for each of its regions.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_25

In the face of escalating environmental issues, it becomes evident that sustainable economic growth depends on the pace of green technology implementation. The green economy is defined as an economy oriented towards increasing the population's well-being, social justice, and intergenerational equity, promoting economic growth while significantly reducing the risks of degradation and destruction of natural ecosystems and enhancing the resource sustainability of the global economy (Rogatnykh and Serdun 2022, p. 20).

The challenges hindering the incorporation of green technologies into national economies include the lack of funding, absence of innovative technologies, underdeveloped legal frameworks, the reluctance of traditional businesses to adapt to green economy requirements, low skill levels of personnel, the threat of job loss, and the absence of environmentally oriented education for citizens to promote green ideas.

However, besides substantial organizational, financial, and educational investments, green technologies require regional government authorities to consider public opinion. As practice shows, when implementing innovative projects, the approval and acceptance from the local population play a significant role. Citizens' opinions and preferences regarding economic innovations are often linked to ethnocultural traditions and the peculiarities of the ethnic mentality of the people predominantly residing in a particular region.

2 Materials and Method

The research is built on analyzing economic sources published in Russian in the 2010s, addressing the issue of transitioning to a green economy in Russia and its regions. The authors considered the works by Alinov et al. (2016), Belokur and Tsvetkova (2021), Ivanova and Levchenko (2017), Ivanovskaya and Glukhova (2020), Kozhevnikov and Lebedeva (2019), Lipina et al. (2017), Porfiriev (2018), and Rogatnykh and Serdun (2022). Moreover, the authors reviewed English and German texts on implementing green economy projects worldwide (DG AGRI and ENRD 2017; Green Policy Platform n.d.; Sintac Recycling 2022; The European Network for Rural Development (ENRD) n.d.).

Historical-cultural and socio-philosophical sources related to the study of the ethnocultural specificity of the Chuvash Republic and the characteristics of the ethnic mentality of the Chuvash people are drawn from the works of Dmitriev (1959), Evgrafova (2014), Fokin (2009), Ismukov (2001), Madurov (2000), Mikhailova (2010), Mikhailova (1997), Nikitina (2012), Petrukhin (1971), Stanyal (2021), Volkov (1966, 1999), and others. The authors also applied content analysis of thematic materials in the media (Hevel Energy Group n.d.; Kanash District Newspaper 2021; LA TUA ITALIA 2023; Labour Banner of Chuvashia 2021) and publications on official websites (Ministry of Agriculture of the Chuvash Republic 2023; Ministry of Economic Development, Industry and Trade of the Chuvash Republic 2013; Ministry of Industry and Energy of the Chuvash Republic 2022).

For a comparative analysis of the features of green economy development in other countries, the authors utilized data from the Green Policy Platform (n.d.), confirming that each country formulates its own models of green economy. For example, China emphasizes the model of renewable energy sources and allocates significant funds to develop green forests and construct solar and hydroelectric power stations, concentrating attention on green investments and green employment models.

Kenya's model of green tariffs stimulates energy industries adhering to a green model. The Kenyan government offers long-term contracts for electricity supply to renewable energy producers.

India's experience in developing green infrastructure in rural areas contributes to environmental protection. The country's government, focused on social integration and marginalized sections of society, enacted the National Rural Employment Guarantee Act (NREGA), thereby improving the living conditions of temporary workers in rural areas and guaranteeing them the right to work.

Brazil's unique urban planning policy is noteworthy. The world's greenest city, Curitiba, advocates for an environmentally rational way of life and offers programs that encourage residents to recycle waste (Sintac Recycling 2022).

Experts from the European Network for Rural Development (ENRD) (n.d.) believe that the green economy provides economic opportunities and enhances the lives of people in rural areas, maintaining a balance between the use of natural resources and income preservation, considering the risks associated with changes and the opportunities they bring. The EU Rural Review highlights how the transition to a green economy can contribute to the development of rural areas (DG AGRI and ENRD 2017).

The examples of successful green projects are as follows:

- A dairy farm in Dâmbovița, Romania (the 2011–2015 project involved constructing a renewable energy (biogas) production facility on the agricultural enterprise's premises to utilize dairy farm waste and generate energy for the farm and processing facility);
- Energy utilization of landscape wood in Flanders (the 2012–2014 project aimed to enhance the region's landscape by collecting and using wood waste for energy

production; a specialized grinder was purchased for wood processing, enabling rural residents to meet their fuel needs);
- An initiative in the Altmühl region in Bavaria added value to the production of lamb and wool with the quality certificate "Altmühltaler Lamm" (shepherds must strictly adhere to pasture, feed, animal care, etc., requirements to obtain the quality certificate; high-quality meat is sold directly to local restaurants and butcher shops at a fair price for shepherds);
- Collaboration in olive oil research in Italy (a private olive oil production plant allocated funds to test a more environmentally friendly prototype filter in olive oil production).

The success of these projects can be explained by the fact that the green economy stimulated the modernization and development of traditional agricultural sectors in these regions, aligning with the interests of the local population. For example, olives are almost ubiquitous in Italy; Apulia, Calabria, and Sicily produce over 80% of the country's olive oil (olive oil is considered "Apulian gold"). Therefore, green projects in Italy should be associated with olive production (LA TUA ITALIA 2023).

The development of green economy projects in certain parts of Russia can occur based on the utilization of advanced European experiences. The Russian Federation comprises 25 subjects, each with its "titular" ethnic group (Manakov 2022). This includes the Chuvash Republic, where 67.7% of the population consists of Chuvash people. Each of these ethnic regions in Russia has a unique natural landscape, environmental culture, and economic traditions. This specificity significantly determines the initial opportunities for the green economy in the region.

3 Results

The characteristics of the ethnic mentality are determined by the natural-geographic, historical, economic, and sociopolitical conditions of the people's lives. These features also manifest in the models of economic activity of the people. The Chuvash mentality is that of an agricultural people (Dimitriev 1959; Evgrafova 2014; Fokin 2009; Madurov 2000; Mikhailova 1997; Petrukhin 1971). For the Chuvash people, nature (water, land, sun, moon, plants, animals, etc.) is a fundamental element in the national worldview. Love for the land, nature, and the animal world is foundational to the centuries-old Chuvash mentality (Nikitina 2012).

According to the set of life rules for a Chuvash person, enshrined in folklore as the "teaching of the ancestors," gods, humans, and animals are equal creations of nature: "under the sun and the moon, all are equal." The ecological mindset of the Chuvash is expressed in principles like "cut a tree—plant a forest," "do not disturb a bird's nest—you will cause a fire," "do not spit in the well—you will have to drink from it yourself," "strengthen the banks with willow and juniper bushes," "even a frog is useful—nature has nothing superfluous" (Nikitina 2012).

Nowadays, ancient folk beliefs and worldview orientations continue to operate in many Chuvash families in the form of the "teaching of the ancestors," setting a person on a path of harmonious coexistence with nature. The ability to live in harmony with the world and society, the rejection of a consumerist attitude towards people and things, and the ability to be content with little are the worldview foundations of the Chuvash mentality.

In the second half of the twentieth century, an exemplary implementation of ecological thinking by the Chuvash people can be seen in the activities of the talented organizer of agricultural production, Arkadiy Aydak. From 1964 to 2007, he led the "Leninskaya Iskra" collective farm in the village of Verkhnie Achaki in the Yadrin district of the Chuvash Republic (Countrymen of Chuvashia 2022). Under his leadership, the collective farm gained nationwide fame for its environmentally friendly agricultural practices (no pesticides were used, entomological reserves were established, ravines were transformed into forests, and ethnocultural traditions of farming were revived).

It is noteworthy that Arkadiy Aydak, a graduate of the Chuvash State Pedagogical Institute named after I. Ya. Yakovlev was a professional teacher of Russian and Chuvash languages and literature. This implies that he was a person with a strong ethnic mentality, a supporter of ancient folk traditions transmitted from generation to generation among the Chuvash people in the second half of the twentieth century and the beginning of the twenty-first century, mainly through their native language and literature. Aydak conducted traditional holidays, using them as examples of attitudes towards nature and wildlife. He did not separate industrialized humanity from their native land and culture.

In the "Ethnopedagogy of the Chuvash People," G. N. Volkov emphasizes that Arkadiy Aydak fully implemented the postulates of the Chuvash traditional upbringing system in the activities of his collective farm. Chuvash pedagogy is referred to as the pedagogy of the sun, with the sun being the standard of moral purity and nobility (Volkov 1966). The sun's golden color is present in the coat of arms and flag of the Chuvash Republic. Solar warmth is associated with human attractiveness. "Sară khĕr" (literally "yellow girl") is a beautiful girl because the sunny yellow color is a symbol of beauty. The sun is mentioned in Chuvash oaths as something supreme, equal to the Chuvash god Tora: "I swear by the Sun and Tora!".

The idea of reverence for the sun finds its realization in the green projects of the Chuvash Republic related

to alternative energy—the use of solar panels. In 2009, the company "Hevel" (meaning "sun" in Chuvash) was founded in the region. The company is "the only vertically integrated producer of solar modules in Russia" (Hevel Energy Group n.d.).

Hevel LLC's solar power station has been in operation since 2013 (Ministry of Economic Development, Industry and Trade of the Chuvash Republic 2013). Since 2021, the first "smart stop" in rural areas has been operating in the Sugaykasy village of the Kanash municipal district. It operates on solar panels, allowing the rural settlement to save money on electricity (Labour Banner of Chuvashia 2021). The village's residents fully support this solar innovation and actively contribute to implementing experimental initiatives of socially responsible businesses in their settlement. There is confidence that similar projects will spread with no less success in any municipal district of the region.

In 2022, the Head of the Chuvash Republic, Oleg Nikolaev, entrusted the initiation of the construction of a republican solar power station in his Address to the State Council (Ministry of Industry and Energy of the Chuvash Republic 2022). He declared that the Chuvash Republic is ready to embrace ESG technologies actively. This alternative source of electrical energy will align with the new global trends in green energy, contributing to the improvement of the environment and adaptation to climate change.

In 2021, the Association for the Development of Renewable Energy concluded the first comprehensive regional investment rating in the field of renewable energy sources (Kanash District Newspaper 2021). The Chuvash Republic has been recognized as a leader in the industrial development of renewable energy sources, acknowledging the merits of the leadership of the Chuvash Republic in implementing innovative projects for the national economy in accordance with the ethnocultural specificity of the region.

Similarly, the revival of the ancient traditions of Chuvash hop growing using green technologies, with the support of state aid and foreign investments, could become a successful modernization project in the Chuvash Republic (Ministry of Agriculture of the Chuvash Republic 2023). Hops are considered the "green gold" of Chuvashia, with seven enterprises currently engaged in hop cultivation in the region. According to social media comments and responses, the local population strongly supports this promising initiative of the Ministry of Agriculture of the Chuvash Republic.

Moreover, six regional projects are implemented in the Chuvash Republic within the framework of the national project "Ecology": "Rehabilitation of the Volga," "Preservation of unique water objects," "Preservation of forests," "Clean country," "Comprehensive solid municipal waste management system," and "Clean water." These ecological projects can be effectively implemented as part of the transition to a green economy. For example, activities aimed at cleaning the Volga (primarily technological modernization of wastewater treatment facilities) will lead to an increase in the population of rare fish species, growth in fishing volumes, and the number of fish farms. Strengthening the material and technical base of Chuvash forestry (modernization of forest patrol complexes and firefighting equipment, reforestation activities) will contribute to the replenishment of the region's "green lungs," as well as the improvement in the quality and quantity of wood harvested for export. Such an approach will ensure a balance between the economy, ecology, and social policy.

4 Conclusion

If the implementation of innovative policies does not consider the peculiarities of the ethnic mentality of the local population and the ethnocultural features of economic activities, there is a potential threat of social tension in the region, as was the case with Chinese investments in the agriculture of the Chuvash Republic in 2019. Protest actions by the Chuvash population in certain areas of the Chuvash Republic, Ulyanovsk Region, and the Republic of Bashkortostan regarding the transfer of cooperative farmlands to foreign investors for the organization of livestock complexes demonstrated a direct dependence of modernization processes on the ethnocultural factor (Nikitina et al. 2022).

The collaboration between the Chuvash Republic and Chinese investors in the long-term lease of Chuvash land and the development of livestock breeding was discontinued. This resulted from the fact that during the implementation of investment policies in the agricultural sector, the leadership of the Chuvash Republic disregarded the specifics of the ethnic mentality of the Chuvash people, who have historically been an agrarian community and constitute the majority of the population in the region.

Currently, the leading directions of the green economy system include renewable energy sources, waste management systems, water resource management systems, clean transportation, organic farming, energy efficiency in housing and utilities, and the conservation and efficient management of ecosystems (Ivanova and Levchenko 2017, p. 19). It is crucial to select the direction that corresponds to economic and geographical indicators and the public sentiments and ideological orientations of the local population for each region of the Russian Federation. The development of solar energy in the Chuvash Republic can serve as a successful example.

The problems that slow down the penetration of green technologies into the economies of Russian regions include numerous factors (Belokur and Tsvetkova 2021). However, economists often overlook a crucial indicator—the perception and acceptance of green projects by the local population.

Experience shows that if innovative initiatives driven by leaders, entrepreneurs, and scientists contradict public sentiments, these projects typically have an uncertain future.

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Evolution of Methods for the Analysis of Traces of Odorous Substances in Human Sweat and Blood in Law Enforcement Activities

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Abstract

This research focuses on the evolution of techniques in analyzing traces of odorous substances in human blood and sweat within law enforcement activities. The stages of development of methods for human identification through traces of odorous substances in sweat and blood (odor prints) are outlined. The authors describe the early stage (19th—early twentieth century) of employing service dogs in crime detection and investigation. The historical roots of contemporary techniques of olfactory human identification are demonstrated. The authors examined the process of developing methods for establishing the identity of a subject based on traces of odorous substances in their sweat and blood. Differences between the procedures of operational and investigative activities) "person and object selection" and forensic examination of human olfactory traces) are indicated. The shortcomings of the criminalistic odorology developed in the USSR in the 1960s are described. It shows how criticism by scientists—proceduralists of the initial tenets of criminalistic odorology- contributed to the formation of the contemporary methodology of olfactory examination of traces of odorous substances in human sweat and blood. The authors listed the main methodological features of the olfactory examination methodology applied in the Russian Federation. Methodological approaches to ensuring the reliability of results obtained in olfactory examinations are described. Compliance with the provisions of the olfactory examination methodology of traces of odorous substances in human sweat and blood with the requirements of the legislation of the Russian Federation for forensic examinations is demonstrated.

Keywords

Odorprint · Forensic examination · Forensic odorology · Olfactory examination · Service dogs · Detector dogs

JEL Classification

K14 · K41 · K42 · K49

1 Introduction

On the one hand, the choice of the research topic is motivated by the successful integration of data obtained through expert examination of traces of odorous substances in human sweat and blood (expertise of human odorprint) into preliminary and judicial investigations of criminal cases. On the other hand, it stems from the interest of experts in the fields of forensic science and criminal procedure in the methodological and procedural aspects of the mentioned expert examination. The authors believe that exploring the development of the methodology for olfactory examination of traces of odorous substances in human tissues and secretions in a historical retrospective will help vividly demonstrate the internal logic of expert examination and the high reliability of the obtained results.

2 Methodology

During the research, to discern the peculiarities of the development of this type of forensic examination, the authors analyzed scientific publications and educational

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_26

literature spanning different years. This is linked to the fact that scientific publications encapsulate the latest trends in the development of science in general and forensic science in particular. Educational literature incorporates information about universally recognized scientific theories and facts. During the research, the authors analyzed the works by Alishunast-Levina and Shikanov (1970), Averyanova et al. (2008), Bayerman (1987), Bezrukov et al. (1965a, 1965b), Bezrukov and Mayorov (1965), Gross (1908), Larin (1996, pp. 148–164), Leonova et al. (2023), Sergievsky (2001, 2019), Moiseeva (2000), Panfilov (2007), Panfilov et al. (2019), Panfilova et al. (2019), Starovoitov et al. (1990), Sulimov et al. (2012), Strogovich et al. (1974), Shidlovsky (1926), Romanes (1887), Schoon and Haak (2002).

3 Results

In the disclosure and investigation of crimes, the issue of identifying an individual based on traces found on trace objects seized during the inspection of the crime scene and other investigative actions and operational measures always arises prominently. Forensic scientists and judicial experts handle this task quite successfully. Identification methodologies involving fingerprints, DNA, voice, facial images, handwriting, and the like are widely known. Since the 1960s, forensic scientists have shown interest in the possibility of identifying a person based on the traces of odorous substances from their tissues and secretions (odor prints).

The fundamental possibility of distinguishing a specific person from a group based on their scent was empirically established in the distant past. The olfaction of specially trained dogs was used to track individuals in the terrain. In the nineteenth century, service dogs began to be systemically used in government structures (police, border guards, etc.). However, it should be noted that their application generally involves tracking a person on the ground by working on their scent trail. Nevertheless, scientific papers in the 1880s already indicated the fundamental possibility of identifying a person based on traces of odorous substances from their tissues and secretions (odor prints) (Romanes 1887).

A vivid example of this can be found in the recommendation of Hans Gross (1908, pp. 243–244). In his work, the scientist pointed out that when strands of the perpetrator's hair are discovered at the crime scene, they should be preserved and used later for their identification.

At the beginning of the twentieth century, the technique described by Gross began to be employed by operational officers of law enforcement agencies in various countries. For example, in 1903, the use of a lineup helped investigate a crime in Belgium. During the investigation of a child's murder on a farm, a police dog was employed. After sniffing the crime scene, farm workers, numbering twelve individuals, were lined up, and the dog repeatedly pointed at one of them. The indicated person soon confessed to the crime. Unfortunately, the authors could not find information in the available literature about applying this operational technique in Russia. Apparently, this is related to socio-economic upheavals (the Revolution of 1917, World War I, and the Civil War). However, in 1926, Shidlovsky (1926) described the "lineup of a person and an object," employing various methods. Either the dog is familiarized with the object's scent and asked to select one person from several, or the dog is familiarized with the person's scent directly and asked to choose one item from several, or the dog is familiarized with the scent of one item and asked to choose another from several.

However, from the legal perspective, the manipulations with the use of police dogs described above were exclusively operational techniques, making it possible to acquire search information or exert influence on the perpetrator to obtain confessions.

However, in the 1960s, forensic scientists began attempting to use an individual's scent as a source of evidential information in preliminary and judicial investigations. In the Soviet Union, these studies are primarily associated with the work of the group led by A. I. Vinberg at the Higher School of the KGB of the USSR and the development of the "method of forensic odorology" (Bezrukov et al. 1965a, 1965b; Bezrukov and Mayorov 1965). Its main ideas can be briefly described as follows:

1. At the crime scene, a forensic specialist collects a certain volume of air using a POZ (odor sampling device). This air volume is stored in a plastic container with the investigator handling the case.
2. After the suspect's apprehension, a specialist—a canine specialist—familiarizes a police dog with the scent of the air in the plastic container provided by the investigator and prompts the dog to choose the person's scent from a group of statisticians.
3. The police dog will base its actions on the "bouquet of scents"—a specific blend of domestic and professional scents supposedly characterizing each individual.

Despite the validity of the idea of olfactory identification of a person based on the traces of odorous substances from their sweat and blood, the methodology proposed by these forensic scientists had numerous technical and procedural flaws. It faced harsh criticism from the legal academic community (Alishunast-Levina and Shikanov 1970; Larin 1996; Strogovich et al. 1974).

Criticism of the method of forensic odorology was largely justified. Its authors left many questions unanswered, including the following key ones:

1. What is the object of expert examination? What is the "bouquet of scents," and how unique is it for each person?
2. Who is the subject of expert examination? Does the handler of the police dog (canine specialist) possess specialized knowledge in the field of investigating human odor prints?
3. What is the role of the police dog? What is the reliability of the information obtained with its assistance?
4. If this study is considered an examination, who issues the expert opinion? Who should be warned about criminal liability for providing knowingly false expert conclusions?

As a result of a heated debate among legal scholars, the idea of conducting expert examinations using the proposed method was rejected. The term odorology acquired a somewhat vulgar connotation. Thus, this stage in developing methods for forensic examination of traces of odorous substances from human tissues and secretions (human scent traces) came to an end.

In the late 1960s, the head of the Medical-Biological Department of the Research Institute of the Ministry of Health Protection of the RSFSR, Doctor of Medical Sciences M. V. Kisin, became interested in this research direction. To research this topic, a young specialist in hunting, K. T. Sulimov, was invited. Throughout the 1970s, he carried out the planned work on developing a methodology for training dogs to detect substances causing narcotic intoxication, creating odor markers to facilitate the work of police dogs. Simultaneously, in his free time, K. T. Sulimov conducted search studies, established a material base for practical work, and collected experimental data.

The stage of rapid development of olfactory research on traces of human sweat and blood in forensic expertise began in the 1980s with the arrival of the young chemist expert V. I. Starovoitov. Together, the researchers developed a methodology for olfactory research on traces of human sweat and blood in forensic expertise, which includes the following basic postulates:

1. A person's scent is strictly individual and determined by substances present in their blood. This idea found complete confirmation in subsequent studies by Moiseeva (2000) and the group led by Panfilova et al. (2019). This fact is also reflected in the methodology of expert examination (Sulimov et al. 2012). Blood samples from the investigated subject are used as a source of samples of odorous substances from human sweat and blood.
2. Trained service dog-detectors are used in the research according to a special methodology. A dog-detector is an instrument. This thesis can be explained by an allegory. The human eye is too weak to examine small objects (e.g., fingerprints). For such investigations, magnifying instruments are used. Similarly, in studying scent traces, human olfaction is too weak, and a special biodetector is used to enhance it. The use of biodetection in chemical analysis has long been known and widely applied (Beyermann 1987).
3. A specialist in kynology does not participate in the expert examination. The study is conducted by two experts with special knowledge in this type of forensic expertise, knowledgeable in the fields of biochemistry, physiology of higher nervous activity, zoopsychology, and jurisprudence.
4. Objects seized at the scene of the incident and during other investigative actions are not used in the study. According to a special methodology, odor samples are collected using special collectors of odorous substances. These odor samples are then used in a comparative study involving dog-detectors (Starovoitov et al. 1990).
5. The study is conducted commissionally. One of the two experts compiles a comparative series of odor samples in which the dog searches for a sample with the specified scent and determines the sequence in which the detector dog will sniff the odor samples. The second expert manages the dog-detector, ensuring that it sniffs the odor samples in a specific sequence. Moreover, the expert managing the dog is not informed about the order in which the odor samples are arranged in the series until the end of the study to avoid unintentional changes in the behavior of this expert at the locations where samples of odorous substances from human sweat and blood (odor samples) obtained from objects provided to the experts for study are located. Thus, the possibility of unintentionally signaling the dog-detector with changed behavior is eliminated.
6. In the comparative series of odor samples, there is always a sample with the sought-after odor characteristic (i.e., possessing the same odor characteristic as the one specified for search). This achieves two goals. The first goal is to verify the operability of the dog-detector and its motivation to search specifically for the individual scent of the investigated subject. Notably, experts refer to this sample as the "standard." If the dog finds the "standard," it means it is searching for the individual scent of the person whose sample was specified at the start. The second goal is to positively reinforce the dog after sniffing the comparative series. Therefore, the dog sniffs the "standard" odor sample last.

7. A comparative series of odor samples consists of ten objects, with one of them being mandatory as the "standard." One or two other objects (but no more than two) in the comparative series are obtained from the investigated objects provided to the experts by the study's initiator. The remaining odor samples are obtained from model objects with properties (material, signs of use, contamination, etc.) closely resembling the investigated objects (Sergievsky 2001).
8. The results obtained in the study using one dog are confirmed upon its repeated use after rearranging the odor samples in the comparative series.
9. The results obtained in the study with one dog are subsequently verified with other dog-detectors.
10. Before using each dog-detector in each comparative series of odor samples, its operability and the quality of compiling the comparative series are tested. The dog-detector is familiarized, and odor samples obtained from an uninvolved person (a control subject) are placed in the comparative series. If the dog does not exhibit signaling behavior near the sought-after sample or shows false signaling behavior toward other samples, it is not used in the study.

Adherence to the expert methodology makes it possible to avoid systemic errors ("experimenter's errors") and obtain reliable information about the presence or absence of traces of the odorous substances of human sweat and blood in the forensic examination of the odor prints of the examined person on the objects presented for investigation. According to calculations by P. B. Panfilov, "the probability of a random error with a categorical positive resolution of the issue of detecting odor traces of the examined subject on the object using three dogs-detectors, which consistently reproduce signaling behavior towards the investigated and "standard" objects in the comparative series, is no more than$1.02 \times 10-^{8}$" (Strogovich et al. 1974).

The methodology was validated from 1984 to 1988 in various units of the Ministry of Internal Affairs of the USSR. The interest of the investigative authorities in this type of expert research turned out to be unexpectedly high. Moreover, as it turned out, qualitative research of objects—carriers of human odor prints—became possible with specialists who knew criminology and forensic expertise rather than guide dog handling skills (Sergievsky 2019). In 1991, an extended meeting of the Scientific Council of the Scientific Research Institute of the Ministry of Internal Affairs of the USSR was held, during which forensic scientists, proceduralists, and specialists in natural sciences gave a positive assessment of the work of K. T. Sulimov and V. I. Starovoitov. They also recommended continuing research in this direction (Karlin 1992).

Thus, by the beginning of the 1990s, a forensic olfactory examination methodology for human sweat and blood odor prints had been developed in Russia. This methodology complied with all the requirements of the legislation of the Russian Federation, making it possible to obtain reliable results and use them in the disclosure and investigation of crimes. The forensic examinations conducted according to this methodology, in full compliance with the requirements of Russian legislation, are based on the principles of legality, respect for the rights and freedoms of individuals and citizens, the rights of legal entities, the independence of the expert, objectivity, comprehensiveness, and completeness of the investigations conducted using recent scientific and technological advancements (Russian Federation 2001). The expert's conclusion on the results of the examination of human odor prints is based on provisions that make it possible to verify the validity and reliability of the conclusions made based on generally accepted scientific and practical data (Leonova et al. 2023).

The next stage in the development of techniques used in olfactory studies began in 2018–2020 when a group of employees of the Expert Forensic Center of the Ministry of Internal Affairs of Russia, consisting of Z. Yu. Panfilova, P. B. Panfilov, and Yu. S. Fironova, began initiative research to develop a method of chemical extraction of odorous substances of human sweat and blood for further use of the obtained extracts in a comparative study with service dog-detectors (Panfilov et al. 2019).

4 Conclusion

Forensic examination of human odor prints has passed all stages of formation and is a powerful tool for preliminary and judicial investigation. The effectiveness of this type of forensic examination is recognized by leading criminalists in Russia (Averyanova et al. 2008).

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Judicial Practice and Issues of Improving Administrative and Civil Liability in Entrepreneurship

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Abstract

The research explores issues related to improving the legal regulation of various measures of liability in the field of entrepreneurial activities amidst new realities. The main challenge in this sector of public relations is that, in today's conditions, the existing national normative legal framework requires refinement to align with the rapidly changing business environment at home and abroad. This issue is not merely theoretical and legal but also remains practically relevant, given the difficulties encountered in legal enforcement practices. A significant portion of these difficulties is procedural, linked to implementing procedures for holding individuals accountable for violations committed during entrepreneurial activities. Summarizing and analyzing existing legal enforcement practices in this realm of legal relations contribute to further refining the mechanisms of civil and administrative liability in entrepreneurship. In turn, this should enhance the effectiveness of addressing various pressing issues through the adoption of necessary economic and legal measures aimed at supporting entrepreneurs amidst new challenges but also noticeably improve the business climate in the country, fostering better conditions for conducting various forms of small, medium, and large-scale businesses.

Keywords

Legal regulation · Entrepreneurship · Civil code · Administrative liability · Civil code · Judicial practice

JEL Classification

K2 · K23 · K32 · K41 · K42

1 Introduction

The legal regulation of liability in the field of entrepreneurship is inseparable from the process of legitimizing this type of activity within the territory of the Russian Federation. It was closely linked to key political and legal changes occurring in the country in the early 1990s amid the beginning of the dissolution of the USSR and the transition to a new model of the Russian economy based on the establishment of market relations. Over the three decades since then, the Russian economy has traversed a rather tumultuous path in its development, marked by a series of crises. One of the factors contributing to their emergence was the imperfection of the general normative legal framework regulating relations in entrepreneurial activity and the practical application of certain measures of accountability to business participants for the violations committed. The consequences of such imperfect state legal policies in entrepreneurial activity continue to manifest to varying degrees to the present day.

The new challenges facing the Russian economy in the early twenty-first century further emphasized the need for continued improvement in the legal regulation of partnership relations between businesses and the state. This includes the necessity of making certain changes to the established practice of applying measures of administrative and civil liability to individuals who represent the status of registered entrepreneurs. These circumstances must

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_27

be considered in light of the increased attention from the Russian government to various forms of business support: providing preferential loan programs, co-financing key (critically important) infrastructure projects, subsidizing, relaxing a range of regulatory functions, and others. This is particularly important in cases where entrepreneurial activity positively impacts social development, fostering initiative, enhancing citizens' creative potential, reducing the final cost of manufactured goods, introducing new sectors of the economy, etc. (Solovieva 2021).

This research aims to trace the main directions of changes occurring in the legal regulation of liability in entrepreneurial activity, as reflected in the content of a series of regulatory and enforcement acts from 2014 to 2023. Achieving the set goal involves conducting a comprehensive analysis of various measures of administrative and civil legal liability and establishing benchmarks for evaluating the effectiveness of their practical application.

2 Materials and Methods

Based on the literature analysis, the authors note that the study of the topic of legal regulation of liability in entrepreneurial activities within the territory of the Russian Federation has evolved into a separate and distinct research direction over the past decade.

Works of a general nature are primarily presented regarding the stated issues. These works examine conceptual definitions and characteristics of types of legal liability in the field of entrepreneurship, including the disclosure of their features and grounds. Special attention should be given to publications specifically dedicated to studying the legal regulation of administrative and civil liability in entrepreneurship.

Over the more than three decades since the declaration of the course towards establishing free market relations, the normative legal framework and the enforcement practice regarding the regulation of entrepreneurship by the Russian state were repeatedly reviewed. These revisions led to changes and amendments to the norms of Russian constitutional, administrative, and civil legislation.

The process of constant updating of regulatory legal acts, including certain provisions of the Administrative Code of the Russian Federation and the Civil Code of the Russian Federation in the sector of business conduct, including issues related to holding dishonest entrepreneurs accountable for various types of liability, continues to this day. According to Kipiani (2021), legislative instability in this area of legal relations contributes to increased violations in the field of entrepreneurial activity.

Alongside legislative changes, enforcement practice is also being improved. The decision of the Constitutional Court of the Russian Federation (December 17, 2020) approved the "Information on 'Constitutional and Legal Protection of Entrepreneurship: Current Aspects'" (Constitutional Court of Russia 2020), which contains generalized and systematized material on various aspects of legal regulation of entrepreneurship in today's conditions. The fifth section of this document is specifically dedicated to the legal liability of entrepreneurs. In the "Information," legal liability is elaborated upon in three points, including summarizing enforcement practice in administrative and civil disputes.

3 Results

Business entities have a wide range of obligations to implement a whole range of measures to protect atmospheric air and water resources, ensure the safety of industrial waste management and rational use of land, protect forests, and preserve biodiversity ("Surgutneftegas" PJSC 2021). The outcomes of this activity are documented in the respective annual reports of enterprises (Petrova 2023).

In recent years, the pertinent directions for refining judicial practice include the norms of existing land and environmental legislation, including those regulating the procedures for holding individuals engaged in entrepreneurial activities accountable under administrative and civil law.

According to current requirements, ensuring compliance with land and environmental legislation norms is directly entrusted to organizations or entrepreneurs. In turn, they are obliged to ensure that their employees do not violate the relevant legal norms. The established procedure for holding accountable during law enforcement practice often leads to organizations or entrepreneurs being subject to legal liability, including administrative and civil, due to the fact that the actions or inactions of their employees breached the requirements of Russian environmental legislation (Kalyonov 2017).

A number of such cases of holding entrepreneurs accountable for non-compliance with established environmental legal norms attracted the attention of the Constitutional Court of the Russian Federation. According to information provided in the document "Constitutional and Legal Protection of Entrepreneurship: Current Aspects," the decision of the Constitutional Court of the Russian Federation regarding the consideration of administrative and civil legal relations in entrepreneurship emphasized issues related to defining the constitutional foundations of business conduct rules and the application of specific norms by law enforcement agencies.

During the conducted constitutional norm control, it was established that the Russian legislature, at the time of developing environmental norms, committed a series of

violations regarding compliance with the requirements of clarity, coherence, and consistency. For this reason, the Constitutional Court of the Russian Federation was compelled to acknowledge that Part 1 of Article 8.8 of the Code of the Russian Federation on Administrative Offenses, regulating legal responsibility for the violation of general rules for the use of land plots not for their intended purpose, does not meet the requirements of the current Basic Law of the country. As a result, significant amendments were subsequently introduced into Russian administrative legislation.

In its decisions, the Constitutional Court of the Russian Federation also emphasized the necessity to "… consider the public-law nature of relations between regulatory state bodies and subjects of entrepreneurial activity." In this connection, it was pointed out that in addition to documenting the fact of legal norm violation, regulatory bodies must also thoroughly examine all circumstances of the case, paying particular attention to determining the guilt of the individuals involved. The Constitutional Court also did not rule out the possibility of shifting the burden of proving innocence to entrepreneurs. Within the materials of the analytical documents of the Constitutional Court of the Russian Federation, it is emphasized that more attention needs to be paid by the Russian legislature to formulating general principles of legal responsibility. This circumstance significantly affects judicial enforcement practices. The quality of legal regulation gives rise to a whole series of contradictions between existing general constitutional and specific norms, the elimination of which is necessary to halt the process of arbitrary interpretation of legislative acts by law enforcement entities.

The Federal law "On environmental protection" does not clearly state the obligation of a subject to pay for negative impact on the environment. In practice, this often leads to the situation where such payments are collected from specialized organizations directly engaged in the disposal and placement of waste generated as a result of the activities of other organizations.

The Constitutional Court of Russia also drew attention to the fact that the constitutionality of the application of various measures of administrative coercion is influenced by the quality of the development of procedural legal norms. This primarily concerns issues of calculation and determination of specific limitation periods for bringing to administrative responsibility. The current situation is one of the pressing issues of Russian administrative law, which is the subject of special consideration in many recent scientific works (Kipiani 2021).

The practice of the Constitutional Court of the Russian Federation contains a detailed analysis of some specific situations related to the enforcement practice of recovery. For instance, following the consideration of a request from a magistrate judge from the Trans-Baikal Territory, the Constitutional Court made a decision, according to which the recovery was excluded from the cases applied in the implementation of the requirements of Russian legislation regarding establishing a deadline for enforcement proceedings. During the examination of Article 15.33.2 of the Code of the Russian Federation on Administrative Offenses, which was in force at that time, for its compliance with the Constitution, it was established that this norm was too ambiguous in determining the responsibility of entrepreneurs for failure to submit accounting documents to the Pension Fund of Russia (currently—the Social Fund of Russia). After establishing this fact in December 2019, the aforementioned defect was rectified by the Russian legislature, as a result of which the said article of the Code of the Russian Federation on Administrative Offenses was supplemented with a special note clearly stating the exclusion of the category of entrepreneurs without legal entities from the circle of persons subject to such administrative responsibility.

The Constitutional Court examined the legal practice regarding implementing proportionality in sentencing for committed offenses. As a result, the constitutional body issued a corresponding directive to the Russian legislature. Following the directive of the Constitutional Court of the Russian Federation, new amendments were made to Article 4.1 of the Code of the Russian Federation on Administrative Offenses in 2014, granting judicial and other law enforcement bodies the authority to reduce administrative fines below the minimum limit. Subsequently, it became possible to apply the new procedure for holding individuals accountable, especially in cases where the fine for officials was set at no less than fifty thousand rubles, and for legal entities—no less than one hundred thousand rubles.

During the consolidation of the established judicial practice from 2018 to 2020, the Constitutional Court also expressed several fundamental legal positions regarding determining civil liability in entrepreneurial activities. This includes such cases as failure by an entrepreneur to file a bankruptcy petition with the Arbitration Court, payment of a penalty under a contract, determination of liability to the copyright holder for exclusive rights, compensation for property damage, and others.

As a result of reviewing appeals regarding the unconstitutionality of provisions in certain norms of civil legislation received by the Constitutional Court of the Russian Federation, it was established that the prevailing practice in the country, when considering bankruptcy cases in courts, of recovering expenses from entrepreneurs in full, including cases arising directly from the fault of authorized or other bodies. This primarily concerns cases of improper assessment of the possibility of debt repayment from the entrepreneur's

property or funds used in the course of entrepreneurial activities. It was determined that such a practice directly violates the rights of individual entrepreneurs. They are placed in unequal conditions compared to other categories of individuals involved in business processes (founders of legal entities, etc.). As for the process of recovering property damage caused by non-payment of taxes, in these cases, the Constitutional Court of the Russian Federation provided its own detailed explanations, primarily addressing issues related to the fulfillment of tax obligations when writing off hopeless tax arrears. Again, as in the previous case, the court pointed out that these cases may occur not only due to the taxpayer's fault but also due to the fault of regulatory authorities. Therefore, this fact must be considered in judicial practice, especially concerning the activities of tax authorities that have missed the legally established deadlines for presenting their claims.

In cases involving the recovery of compensation for violations in the sphere of intellectual property rights, the Constitutional Court of the Russian Federation has taken the path of increasing such payments. Moreover, the amounts of compensation may significantly exceed the actual damages. The application of this approach is justified by the fact that the existing civil law norms in the sphere of intellectual property rights protection should be used not only as a means of compensation but also as a punitive measure. Simultaneously, it is emphasized that when determining the total amount of compensation payable to the right holder by a single act of an individual entrepreneur for several intellectual property objects, the court must also consider the actual circumstances of the case and, in certain cases, have the authority to set it below the minimum threshold (e.g., in cases of repeated exceeding of the amount of damages caused to the right holder).

Thus, the aforementioned positions and clarifications of the Constitutional Court of the Russian Federation vividly demonstrate that Russian judicial practice in the regulation of business relations continues to evolve towards the development of unified, systematized approaches applicable to the process of considering relevant categories of administrative and civil cases within the framework of existing legal norms. This is entirely understandable and justified from the perspective of establishing the normal functioning of judicial bodies at various levels. Changes occurring in the socio-economic, socio-political, and cultural-ideological life of the country find direct reflection in the field of legal regulation of entrepreneurship. In these conditions, the creation of favorable conditions for conducting business is seen as one of the most important measures to maintain the stability of the development of the Russian state and society.

Ultimately, implementing the main directions of entrepreneurship development should be aimed at building an economically efficient tax system, legitimizing business, and enhancing economic competitiveness, which, in turn, will improve people's living standards (Alexandrova et al. 2022).

Studying the specific content of the amendments and additions made to the existing norms of Russian legislation in the field of regulating legal liability in the conduct of entrepreneurial activities over the past years makes it possible to trace two main trends.

The first is the easing of administrative burdens on businesses. This found expression in adopting a series of legislative novelties as part of special economic measures to support businesses in 2022–2023. According to the Federal law of July 13, 2022, penalties for administrative offenses established for participants in foreign economic activities were reduced.

In accordance with the norms of the Federal law of July 14, 2022, the mitigation of liability for committing administrative offenses was aimed at establishing a minimum fine in case of voluntary compensation for damages caused by participants in entrepreneurial activities. Simultaneously, the possibility of replacing the fine with a warning was established if it was found by state control bodies that such an offense was committed for the first time. Additional support was provided in the form of a 50% discount on the payment of the fine itself if done within 20 days from the date of imposition of administrative punishment. The said regulatory legal act also introduced some changes to the procedure for considering administrative cases. Particularly, a rule was established according to which the consideration of an administrative case initiated as a result of a control measure cannot be conducted by the same official who carried it out. It was particularly emphasized that cases of administrative offenses regarding non-compliance with a number of mandatory requirements could only be initiated with conducting the appropriate control measure or inspection, which should have been accompanied by the preparation of a special act.

The second trend is the tightening of requirements of administrative legislation in the sphere of entrepreneurial activities. First and foremost, this affected those areas of business that suffered the most from crisis phenomena. Thus, in accordance with the Federal law of March 4, 2022, some new penalty sanctions were introduced from September 1, 2022. They were provided for such offenses as failure to apply coercive measures regarding freezing (blocking) of funds and other property in accordance with legislation on special economic and coercive measures; conducting transactions (financial operations) on behalf of a legal entity with property obtained by criminal means, etc.

4 Conclusion

Thus, the analysis of existing legal norms regulating administrative and civil liability in the field of entrepreneurial activity indicates that this sphere of relations is the subject of close attention from the federal legislative bodies and the judiciary. On this basis, "conceptually important is the circumstance that the specific content of the existing legislation and the practice of its application, including its procedural aspect, constantly require further improvement" (Alexandrova and Fedorov 2015).

In substantiating its decisions and legal positions, the Constitutional Court of the Russian Federation strives to consider a range of circumstances aimed at individualizing the legal responsibility of entrepreneurs, including determining the proportionality and seriousness of the offense, the size and nature of the damage, the character of guilt, adherence to the principle of social justice, etc. The main threats affecting the inconsistency of regulatory frameworks in relations between business and government include factors such as the lack of clear differentiation of various measures of administrative and civil liability associated with unjustified increases or decreases in the sizes of penalties for offenses. On the one hand, imposing hefty fines on entrepreneurs may contribute to suppressing economic activity among the population, leading even to the forced liquidation of economic entities, especially representatives of the so-called small and medium businesses. On the other hand, reducing administrative burdens on entrepreneurs should contribute to increasing the attractiveness of such activities to society, stimulating competition among them.

However, one must remember to maintain a certain balance regarding the organization and conduct of control and inspection measures by government authorities and officials. Excessive tightening of business control by government bodies, as well as its weakening or even absence at the proper level, are two sides of the same coin. Respect for property rights and the freedom of entrepreneurship by governing structures is the key to the successful development of the Russian economy in today's geopolitical conditions. The most important tool for this is the timely introduction of changes and additions to the legal regulation of legal liability in the field of entrepreneurial activity. This largely concerns issues related to holding entrepreneurs accountable for administrative and civil liability based on maintaining a balance between private and public interests. To a large extent, the lawful behavior of business participants depends on the quality of existing legislative norms and their correct application in practice. Unfortunately, it must be acknowledged that contradictions in certain existing norms of administrative and civil law still persist. Based on the study and generalization of established legal practices, the process of their improvement undoubtedly continues.

Significant support in terms of protecting the rights and interests of entrepreneurs from arbitrary punishment by various supervisory authorities remains the relevant decisions (clarifications) of the Constitutional Court of the Russian Federation, adopted as a result of considering specific appeals submitted to this judicial body on contentious issues related to holding individuals engaged in entrepreneurial activity accountable for administrative and civil liability.

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Implementation of the Environmental Aspect in the Discipline "Physical Education and Sports": Theory and Practice

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Abstract

The introduction justifies the relevance of the stated topic and presents the author's position regarding the specificity of forming students' environmental culture in the learning process. This becomes possible only with the integration of environmental knowledge into the content of general and professional training courses in the aspect of the studied discipline. In the "Methodology" section, the authors defined the system of tasks for environmental education of student youth and described the role of the academic discipline "Physical Education and Sports" as an integral part of the learning process and the formation of the personality of a student (in perspective, a professional specialist). The direction of the research is clarified. The conduct of an exploratory experiment is described to study the presence or absence of information about ecology in the knowledge of first-year students and determine the level of their environmental culture. Survey results indicate that first-year students, having a generally fragmented and non-systemic understanding of ecology and environmental issues, show little interest in such knowledge, resulting in an average level of environmental culture. Further, the authors described methods and techniques of the work of physical education teachers with first-year students in lectures and practical classes. Following the study of the academic discipline "Physical Education and Sports" in the first year, a final assessment is provided in the form of a survey. The analysis of the results demonstrated an increased interest in environmental issues, a deeper understanding, and an elevated level of individual environmental culture for each student. The "Conclusion" section briefly summarizes the research findings.

Keywords

Education · Ecology · Environmental education · Physical culture · Sports

JEL Classification

A30 · I1 · I12 · I19 · I25

1 Introduction

Environmental education of individuals is gradually becoming a more prioritized focus of pedagogical and psychological research in the educational sector of Russia. The goal of environmental education is typically positioned as the formation of a responsible attitude towards nature and the environment. This is understandable: the protection of nature is necessary not only because it (nature) is "our wealth" but, more importantly, because it is intrinsically valuable, self-sufficient, and does not imply crude external intervention. It is crucial to conduct environmental education for future specialists, including those in the field of economics, from this perspective.

Environmental education and the upbringing of youth as preparation of green professionals with environmental culture and corresponding worldviews are in line with the times and imperative. The consequences of the human community's consumerist approach to the world led to the proximity and actual onset of an environmental catastrophe. Evidence of this includes the Kyshtym tragedy (1957), the

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Chornobyl nuclear power plant explosion (1986), the accident at the Fukushima-1 nuclear power plant (2011), and the discharge of radioactive water (2023). Consumer attitudes toward natural resources and ongoing interstate conflicts and wars gradually destroy everything "alive" on the planet. As the most intelligent form of life on Earth, humanity must ensure the continued existence of the current generation by clearly recognizing the necessity and importance of acquiring ecological knowledge. In accordance with these principles, it is vital to build relationships with the surrounding world.

The last Minister of Education of the USSR, academician G. A. Yagodin, was present at the inception of the theory of ecology as a distinct field of science and the initial stages of the development of environmental education in Russia. As the creator of the concept of the mandatory green component in ecological education, he defined the essence of ecology as follows: "Essentially, it is not just science but a worldview; it should reassemble knowledge into something holistic. Only then can a person see their place in the world…" (Mendeleev University of Chemical Technology of Russia n.d.).

Nowadays, it becomes evident that higher education is one of the leading social institutions promoting ecology as a science and environmental education in society. According to the requirements of the Federal State Educational Standards (FSES) of the third generation, the higher education system shapes not only a specialist with a wide range of competencies but, above all, a personality—a fully-fledged, healthy individual with social activity and orientation towards a healthy lifestyle. Additionally, such a person possesses personal qualities and characteristics such as aesthetic ideals and ethical norms of life. An essential and socially significant component in the process of education is undoubtedly the ecological aspect or the formation of green perception and worldview.

During the speech at the International Environmental Symposium, O. M. Dorozhko outlined the content of two approaches to the introduction of elements of ecological culture and knowledge into the education system: "The first approach aims at forming ecological culture by introducing elements of ecological knowledge and nature conservation activities into the educational space of the university. In this regard, the widespread introduction of new thematic content addressing environmental issues of the region or specific aspects of organizing environmental education in the preparation of future specialists becomes crucial. The second approach emphasizes the need to create a spatial core of ecological culture and, as subjects of the educational process join it, expand the spatial and temporal boundaries of ecological culture" (Dorozhko 2005, p. 34). It is noteworthy that this becomes possible only through the integration of ecological knowledge into the content of general and professional training courses.

Thus, the problem of environmental education and upbringing in higher education institutions becomes the subject of focused attention and discussion within each academic discipline aimed at the development and formation of a professional. The problem presents itself to learners in a new aspect every time—in the aspect of the studied discipline: addressing their course, every teacher inevitably touches upon issues of ecological culture directly related to the research subject. In this research, the authors propose to consider how the environmental aspect is practically implemented in teaching the course "Physical Culture and Sports" at the Saransk Cooperative Institute (Saransk), a branch of the Russian University of Cooperation (Moscow).

2 Methodology

Among the tasks of environmental education for student youth, we emphasize the following as fundamental:

1. The development and refinement of worldview with a focus on the environmental aspect (value attitude to the environment) based on an axiological approach;
2. The development and improvement of a responsible attitude towards the results of one's activities, which, to some extent, influence nature and, overall, the ecology;
3. The formation of ecological culture, including the skills of safe behavior in the natural environment, as well as creating conditions for the development of students' experience in various processes aimed at preserving the environment".

"Physical Culture and Sports" is one of the fundamental disciplines that are mandatory for all specialties in any university in Russia. It represents an integral part of the process of education and the formation of the personality of students (prospective professionals), as well as raising the level of their general and professional culture. Thus, within the framework of this discipline, there are broad opportunities for shaping a harmonious personality by optimizing the physical, mental, and psychophysiological state of students in the process of professional training. It is also noteworthy that the foundation of the educational and upbringing process in the considered discipline consists of comprehensive and systemic approaches to education and upbringing, with components such as the formation of worldview, spiritual and moral improvement, and physical, labor, aesthetic, ecological, and other forms of education.

Given that the formation of an ecological worldview and responsible attitude towards nature and the environment

among students is a complex and lengthy process, let us distinguish the following two aspects within it:

1. Ecological consciousness and thinking;
2. Ecological behavior.

The formation of students' ecological consciousness and thinking occurs during lectures on the theory of physical culture and sports, where attention is invariably given to knowledge in the field of ecology. Ecological behavior is gradually formed during practical classes and practical activities.

It is axiomatic that the main goal of physical education and education at a university is to strengthen and preserve the health of young people, anchoring in a positive attitude towards physical culture, sports, and health. According to contemporary requirements, the main goal is accompanied by the task of forming ecological education and an environmentally oriented worldview. Ecological education refers to pedagogical activities aimed at developing students' ecological culture, considered as a system of methods for structuring and conveying environmentally oriented knowledge to students, viewed in terms of spiritual values, social norms of behavior and human existence. Its essence also lies in forming the individual's ecological worldview and explaining the peculiarities of life and relationships among people, to themselves, and in relation to nature.

The formation of a careful attitude towards the environment is a lengthy and complex process, including many components, such as the following:

1. The development of the emotional-value aspect, fostering aesthetic feelings towards nature, expressed in the ability to admire and marvel at it;
2. The cultivation of axiological (value) attitudes towards all living things, combined with a sense of responsibility for one's actions or inaction;
3. The formation of a rational understanding of the limitations of natural resources on the planet and their careful use.

When teaching the discipline "Physical Culture and Sports," we implement a comprehensive approach to education, where monitoring (in the form of surveys) is used at various stages of education, primarily for collecting data on the level of ecological culture among students at a specific moment of education and their interpretation. To study the presence or absence of information about ecology in the knowledge of first-year students and determine their level of ecological culture, we conduct a survey on the first lecture.

The aim of surveying first-year students is to study the presence or absence of information about ecology in the knowledge of first-year students and the level of their ecological culture. The questionnaire consists of eight questions, six of which presuppose choosing a standard answer, while two are designed for an extended response. Respondents are informed that if the suggested standard answer does not fully reflect their opinion, they can write their variant or complement the proposed statement.

The survey involved 98 out of 134 first-year students from the Faculty of Law and Management of the Saransk branch of the Russian University of Cooperation. Among them, 36 were female students (37% of the total respondents) and 62 male students (63%). The age of the respondents ranged from 17 to 19 years.

Responding to the first question (What associations does the word ecology evoke for you? (Write down several phrases)), students listed the following expressions: "environmental protection," "ecology and health," "poor ecology," "habitat," "fighting for ecology," "ecology and natural resource," etc. The chosen associations indicate that the majority of students perceive ecology as the science of interaction between humans and the environment. Only six students (approximately 6% of respondents) did not provide an answer to this question.

Addressing the leading ecological problems of humanity, first-year students noted air pollution with exhaust gases (93%), water pollution (45%), and pollution of the environment with human activity waste (38%). These were standard options. As other issues, they mentioned the uncontrolled destruction of natural resources (not specifying particular resources) (4%). Respondents identified the main problems of environmental distress in their region and city: destruction of the region's forest resources through the cutting of pine forests (53%), air pollution from factories surrounding the city due to emissions (91%), exhaust gases (78%), pollution of drinking water in taps (62%), and littering of certain streets and yards with household waste (29%).

As seen from the survey results, the youth do not show a particular interest in environmental problems. However, it is dissatisfied with the state of the environment. Moreover, among the answers to the third question of the survey (Are you personally concerned about the future of the ecology of your city and the whole planet?), the advantage remained with the answer "sometimes" (73%), most likely due to its neutrality and some indefiniteness, indicating a relatively low level of sincerity among respondents. No explanations were given to the answers "yes" (21%) or "no" (6%).

The following questions of the survey had a practical nature. For this reason, students provided more elaborate answers. In response to the fifth question (Do you think ecology affects the incidence of respiratory diseases, oncological diseases, and others?), predominant answers were of the type "Yes, undoubtedly"; "Of course, it does"; "Yes,

asthma, pneumonia, etc., can develop due to poor ecology." The answer "no" was not recorded; the answer "I find it difficult to answer" was only marked once. Therefore, young people understand the impact of ecology on health in general and the percentage of the population's morbidity in the Republic of Mordovia.

The sixth question (Do you consider smoking in a public place immoral behavior?) sparked a discussion. Among those surveyed, there were many opponents of smoking, considering demonstrative smoking "in public" as immoral (72%). The following arguments were given: "Yes, smoking harms the environment"; "Yes, smokers endanger their and others' health"; "Yes, smoking pollutes the air"; "Yes, these people litter the surroundings with cigarette butts." The following arguments were also used: "One smokes but many suffer"; "Yes! Smoking is harmful to health." Some responses (9%) raise concern: "No, it is normal"; "I do not see a problem with smoking: you can just do not stand nearby"; "There is nothing wrong with it"; etc. The issue is not only the careless attitude toward one's health but also the demonstration of complete indifference to others.

Answering the next question (Should a person follow the rules when building relationships with nature?), students, for the most part (93%), limited themselves to brief standard answers: "yes" (18%); "no" (3%); "sometimes" (63%); and "I find it difficult to answer" (16%). Only nine students (approximately 9% of respondents) supplemented the answers with statements like: "After resting in nature, people should not leave garbage"; "We should not make bonfires"; "Do not destroy bird nests"; "Rule 1: conserve drinking water, rule 2: do not break trees and bushes, do not pick flowers"; "Install purification facilities at plants and factories before they start working."

In response to the concluding question of the survey (How do you assess your level of ecological culture?), the predominant answer was "average"—(71%). The response "find it difficult to answer" was received from 21% of respondents. The answer "high" came from 8% of respondents. No students indicated their level of ecological culture as "low."

The conclusion drawn from the survey results indicates that first-year students generally have some understanding of ecology and the environmental issues facing humanity. However, this understanding is fragmented and non-systemic. Moreover, a significant portion of young individuals is not interested in this knowledge. Thus, the level of ecological culture among first-year students is average. At the initial stage of education, students also lack the skills to discern specifically ecological information coming from various sources (books, journals, TV, the Internet, etc.) and the ability to record it. Moreover, they show no inclination to learn these skills because such information appears as "superfluous," not deserving attention.

Since the curriculum of the Saransk branch of the Russian University of Cooperation does not include an independent discipline of "Ecology" and has no place for it, an essential component of ecological education for future professionals should be the growth of the level of ecological green awareness among students, their ecological culture of behavior. Therefore, it is necessary to strengthen and emphasize the ecological aspect in teaching general and professional disciplines.

The problem of ecological education for students is quite evident in the context of physical education and sports activities. Therefore, it is crucial to clarify to students the ecological requirements for physical education and sports activities, sports and recreational facilities, stadiums, and parks. Additionally, providing specific information on the medical and biological parameters of humans from the perspective of the ecology of physical culture and sports is essential. Acquiring competencies (knowledge, skills, and abilities) during this education is highly significant because it contributes to effective professional performance in any production field. This is achieved by ensuring that students fully comprehend the disciplines of physical education as one of the components of the curriculum, including those related to ecology.

Within the framework of the lecture course on physical education and sports, future specialists learn that organizations focusing on ecological issues are more likely to attract public attention and consumers. During lectures on the "Physical Culture and Sports" course, instructors in emphasize to students that knowledge of ecology and green thinking is necessary in all aspects of life and holds significance for every individual, regardless of their professional affiliation.

To conclude the classes on the academic discipline "Physical Culture and Sports," department instructors conduct a final test aimed at assessing the level of students' assimilation of the studied theoretical material according to the program. This test also involves comparing the level of ecological culture among students after the initial stage of education. The final questionnaire, including 25 questions, comprises 20 questions related to the content of the academic discipline "Physical Culture and Sports" and 5 questions related to ecological themes from Questionnaire 1 with updated formulations. Next, we will provide a brief analysis of the survey results conducted in May of the 2022–2023 academic year.

3 Results

The analysis of survey results revealed that the theoretical material on the subjects of the academic discipline "Physical Culture and Sports" has been comprehensively

absorbed by the students quite satisfactorily. The majority of students made accurate choices in their answers and justified their opinions, thereby confirming the effectiveness of the instruction.

Concerning the ecological aspect of the survey, the results are as follows: students provided a fairly extensive list of phrases (on average, not less than four phrases per survey sheet) in response to the question, "What associations does the word ecology evoke for you?" In comparison with the results of Questionnaire 1, literally all participants in the survey presented their own associations. The choice of associations indicates that virtually all students gained a sufficient understanding of ecology through the lectures.

Identifying the leading ecological problems of humanity, first-year students highlighted all correct standard answers and supplemented them with their own expressions. Based on the respondents' statements, it can be concluded that interest in environmental issues has increased, and young people are concerned about the environment. Answering test questions related to ecology, students demonstrated increased interest in the issue, a deeper understanding, and an elevated level of their ecological culture.

4 Conclusion

If instructors of the "Physical Culture and Sports" discipline in a commercial university set the complex task of preserving and strengthening the health of students and enhancing their high moral, ethical, and physical qualities while planning the educational process, it is necessary to integrate a complex of ecological knowledge and skills into the teaching process. The challenge of forming a specific green mindset and behavior primarily concerns contemporary youth (and, therefore, students). As a result, environmental education stands as one of the most important directions in the system of educational work with youth in schools, universities, and the workplace.

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Project Approach in the Formation of Environmental Legal Competence of Future Lawyers

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Abstract

The Project Approach is an advanced form of education. It is particularly relevant to explore its potential utilization in teaching certain disciplines that necessitate applying systemic knowledge, skills, and abilities to solve practical cases. These aspects are often overlooked in the preparation of future lawyers, leading to a reduction in the professional qualities of future legal practitioners. The research aims to study the pedagogical and organizational-methodological conditions of the project approach to develop environmental legal competence among future lawyers. Based on the analysis of research results from various scholars, the authors conclude that it is necessary to employ project-based learning when shaping and enhancing the environmental legal competence of students studying "Environmental Law": motivation, teamwork, cognitive processes, flexibility, and critical thinking. The developed prototype encompasses the educational component and the organizational aspects of forming environmental legal competence. The authors analyzed problematic aspects of using project-based learning in teaching the discipline "Environmental Law" and the formation of environmental legal competence. Additionally, the authors studied the effects of the project approach on the development of necessary skills and identified a positive trend in the number of students with formed competencies through the utilization of interactive methods and online forms of interaction. Conclusions are drawn regarding the necessity of integrating project-based learning with digital technologies and interactive methods.

Keywords

Environmental legal competence · Environmental legal education · Project-based learning · Legal training · Sustainable development

JEL Classification

I250 · I280 · Q560 · Q580

1 Introduction

Humanity is currently experiencing an environmental crisis. Climate change leads to severe natural disasters (droughts, fires, depletion of large forested areas, accelerated loss of biodiversity, etc.), which is evidenced by official analytical reports and the findings of studies by various authors from different countries who, despite geographical divisions, encounter similar problems (Jha and Bawa 2006; Vieira et al. 2022).

Approximately 9 million people worldwide died from environmental pollutants in 2015. Since 1950, over 140,000 new toxicants were introduced into the environment, of which only a few were tested for safety or toxicity (Daigle 2017). Moreover, preventive measures may also be challenging to implement as medicine primarily focuses on treating diseases. Regulation and rational decisions regarding the risks posed by pollutants to the environment can only be ensured through science, public pressure, and public involvement in eliminating toxic pollutants and protecting health (Braubach et al. 2017).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_29

The decline in environmental literacy among the population, consumer attitudes toward the environment, and legal nihilism exacerbate negative processes. To enhance the effectiveness of social actions and adopt adequate responsive measures, the United Nations Educational, Scientific and Cultural Organization (UNESCO) proposed making environmental education (EE) the primary educational program in all countries worldwide by 2025 (UNESCO 2021). As noted by Director-General A. Azoulay, education should prepare students to understand the current crisis and shape the future (Daigle 2017).

As many authors pointed out, increasing environmental literacy and culture is associated with active interaction with nature, fostering respect and careful treatment towards it (Moiseev 2010; Semenova et al. 2018).

According to Roth (1968, 1992), in a successful society with a sustainable and functional economy, it is necessary for everyone to learn to protect all ecological systems and use natural resources wisely and efficiently.

Stapp (1969) noted that knowledge of environmental issues and pollution is essential for effective policy-making to address environmental problems. The ultimate outcomes of environmental education (EE) should be preserving the environment and establishing connections with nature through a high-quality system encompassing awareness, knowledge, attitude, skills, and participation, wherein individuals interact with the natural environment to enhance human well-being (Stapp 1969). Other authors added that there is no future for humanity without education, which includes analysis, deciphering, understanding, assimilation, and actions for the common good (Douglas et al. 2019).

Currently, the importance of EE arises due to the pressing need to increase environmental awareness and responsibility for more effective promotion of restoration and regeneration of the natural environment by overcoming the negative consequences of human activity over the past centuries.

The primary objective of EE is to provide theoretical and practical activities to enhance social involvement to minimize the impact of human actions on the environment (Leirarg and Lima 2011) and to increase civic responsibility for nature and environmental policy (Semenova et al. 2018). Both can improve the quality of life and well-being of humans and other biological species, as well as the natural environment.

EE can be viewed as an educational process whereby the subject is exposed to the influence of the sphere of education in its various dimensions, fostering reflection and discussion on the interconnections and challenges of socio-ecological, economic, and cultural issues.

According to Colding et al. (2020), environmentally friendly areas play an important role in creating sustainable societies, where governmental policies can improve urban ecosystems and provide individuals with more opportunities to learn about the natural environment, stimulating effective connections and cognitive factors between individuals and nature.

Many countries (e.g., Finland, India, China, Brazil, Kenya, and Japan) officially incorporated EE into their education systems to address problems and prevent future environmental catastrophes.

In preparing future lawyers, particular attention should be paid to the necessity of implementing EE because the acquired environmental and legal knowledge and competencies will become effective elements in the legislative and enforcement activities of legal professionals. As previously noted, a sustainably formed environmental competence will enable a lawyer to make correct and adequate decisions when addressing legal issues related to violations of environmental and natural resources legislation, considering legal norms and the regularities of natural phenomena and processes (Demidov et al. 2019).

Given that many types of legal activities involve solving complex multidimensional tasks, the Project Approach is the most effective in legal education, including environmental law.

Therefore, the authors attempt to examine project-based learning as the most effective method of studying environmental law and forming environmental legal competence among law students within the framework of the existing concept of sustainable development.

2 Methodology

The methodological framework of the research consisted of the sustainable development concept and the findings of scientific studies on environmental education issues, legal training, and the development of environmental legal competence among students of higher education institutions. The authors employed general scientific and pedagogical methods and techniques for conducting the research. To study the level of formation of environmental legal competence and the influence of various factors, including the project approach in teaching, the authors conducted surveys and tests and utilized the method of investigative interviewing. The obtained data was processed using statistical and correlational analyses.

3 Results

As an in-depth form of practical approach in pedagogy, project-based learning (PBL) is a method oriented towards learners, implying a dynamic approach that allows learners to acquire deeper knowledge through active exploration of

real tasks and problematic situations. By conducting prolonged investigation of a specific existing problem (familiar to them task and situation), students comprehensively and, importantly, consciously from an ecological perspective, and systemically study it, contemplating about the future.

PBL is the antithesis of the traditional approach in pedagogy, where the teacher does not provide clear instructions nor offer ready-made answers to emerging questions, problems, or scenarios for solving the set tasks (Project-based learning 2022).

As noted by the Buck Institute for Education (Institute and for Education n.d.), there are key characteristics that distinguish project completion from participating in educational project activities.

Within the framework of a project based on PBL, the project serves as a means of teaching important knowledge and skills necessary for learners. The project contains and frames the curriculum and guidance. Many authors argued that projects can potentially aid in learning, highlighting factors influencing increased motivation, critical thinking, and explaining which technologies are necessary to maintain the activity and efficiency of students and teachers in project work (Project-based learning 2022).

PBL requires attention to the following aspects:

- The problem posed to students (task, situation) – an open, important question or challenge that truly needs to be addressed at present to avoid more severe consequences;
- Careful consideration of the set of knowledge, skills, and abilities associated with solving the proposed problem (task, situation);
- Study the existing social demand for addressing the proposed problem and justify it;
- Establishment of the requirements for forms of collaboration and communication (individual, group, intergroup work, expert-involved groups, offline or online interactions, etc.):
  - Feedback consideration and revision;
  - Public presentation of the product (task solution result).

The theoretical foundations of project-based learning (PBL), as defined by Kokotsaki et al. (2016) and Krajcik et al. (2014), substantiate the importance of PBL and will serve as the basis for further discussion:

- Active learning. Teachers do not provide students with educational materials; instead, students actively accumulate knowledge as they explore the surrounding world, observe phenomena, interact with them, assimilate new ideas, establish connections between new and old ideas, and engage in discussions and interactions with others;
- Dynamic learning. Students directly participate in various scientific practices, such as research development, explanation composition, modeling, etc.;
- Social interaction. Educators and students, as members of a unified community, work together within the framework of purposeful activities to achieve common understanding and solve set tasks;
- Cognitive tools. They can enhance and expand what students can learn. Various forms of group interaction and the use of digital technologies can be considered cognitive tools because they allow students to perform tasks that cannot be achieved without special tools.

In the authors' view, numerous reasons justify the necessity of utilizing project-based learning (PBL) for teaching environmental law and fostering the development of environmental legal competence among students pursuing legal disciplines:

- Motivation. The role of the teacher in PBL is modified in that lecturing is replaced by encouraging motivation, facilitation, mentoring, provision of resources, consultations, and aiding students in the formation of their own knowledge, skills, and competencies. Additionally, interactive pedagogical technologies can enhance interest in the issues;
- Teamwork. Collaborative work is a central characteristic of PBL. Social constructivism assigns significant value to collaborative learning. Students construct knowledge or understanding through thinking and actions in social contexts. Social constructivism asserts that learners acquire concepts or construct the meaning of their ideas through interaction with others and with their world, as well as through interpretations of this world, taking an active role in meaning construction;
- Cognitive process. To enable students to explore something new independently, monitoring their progress and cognitive process is important. PBL allows students to work at their own pace, providing teachers with excellent opportunities to observe students' cognitive processes at different stages of activity. This is particularly important for studying environmental legal issues, as there are many complex concepts to grasp, and students' intellectual abilities to comprehend these concepts may vary significantly;
- Flexibility. PBL essentially makes it possible to adapt the pace and level of learning to the individual according to their abilities;
- Critical thinking. PBL fosters the development of critical thinking through discussions and analysis of various opinions and positions, which is an important professional skill for a lawyer.

Various researchers showed better learning outcomes among students involved in project tasks (Guo et al. 2020; Sharma et al. 2020).

Within project-based learning (PBL), the educational objectives are aimed at achieving the following outcomes:

- Students can define and set the goal of their work, detailing the objective into tasks and presenting a clear structure of the work and its content;
- They proficiently identify project problems, conduct assessments, and undertake a proper search for solutions;
- They determine the adequacy of existing conditions for project implementation, including material, financial, and temporal resources and potential team members' capabilities, among others;
- Development of the ability to assess the adequacy, timeliness, and necessity of informational resources (information describing the studied problem, legislative acts regulating the relevant sector, court case precedents, etc.);
- They create a roadmap for project implementation, can coordinate it with the instructor and experts, and are acquainted with and adhere to its implementation stages;
- They plan methods and means to achieve set goals and tasks, simulate possible solution pathways;
- They justify solution methods and forecast project outcomes;
- They possess skills to verify and describe obtained results, when possible, comparing them with benchmarks;
- They conduct adequacy checks of the methodologies and methods they employ in solving assigned tasks;
- They can justify their actions at the stages of solving assigned tasks;
- A significant portion of the work is directed towards self-development of soft and hard skills.

Project-based activities form the basis for developing and cultivating the following competencies:

- Development of critical thinking skills;
- Ability to express one's opinion within the scope of the studied subject and problem;
- Capacity to argue one's judgments;
- Logical coherence between the elements of the presentation content;
- Skills in organizing events and leadership potential;
- Orientation towards teamwork interaction;
- Adherence to ethical principles in communication;
- Motivation for self-management, self-regulation, and self-improvement.

The authors utilized project-based learning (PBL) to teach the course "Environmental Law" to the multi-profile regional university's law faculty.

The organization of activities was designed in two forms:

- Offline: team consultations and their representatives were conducted, presentation of work results, conclusion, and reflection;
- Online: the initial general meeting, team consultations (in the form of webinars, through the creation of communities on social networks, and posting instructions and formatted projects in Google Classroom).

To shape and develop eco-legal competence, the authors employed the following existing approaches used in environmental education:

- Emphasis on environmentally responsible behavior and conscious resolution of existing issues;
- The state encourages enlightenment in the environmental field, including implementing special programs at the federal and regional levels.

In the structure of eco-legal competence, components such as motivational-value, cognitive, and activity-oriented can be distinguished.

To develop eco-legal competence among students based on PBL, the authors created a prototype including the following:

- The necessary level of knowledge on the researched topic (environmental and legal);
- Skills in analyzing current legislation, judicial practice, and their adequate application in their work;
- Teamwork;
- The role of the teacher as a tutor and facilitator;
- Vertical and horizontal forms of communication during project execution between the teacher, students, and experts (specialists from various fields);
- Established requirements for the level of assimilation of certain knowledge and the development of specific skills;
- An open system for monitoring and forming elements of eco-legal competence.

The stages of project work are presented in the form of a diagram (Fig. 1).

A positive trend was identified in the indicators characterizing the high formation level of the studied competence. Thus, a significant increase in all indicators assessing the formation of ecological and legal competence was noted ($p < 0.05$).

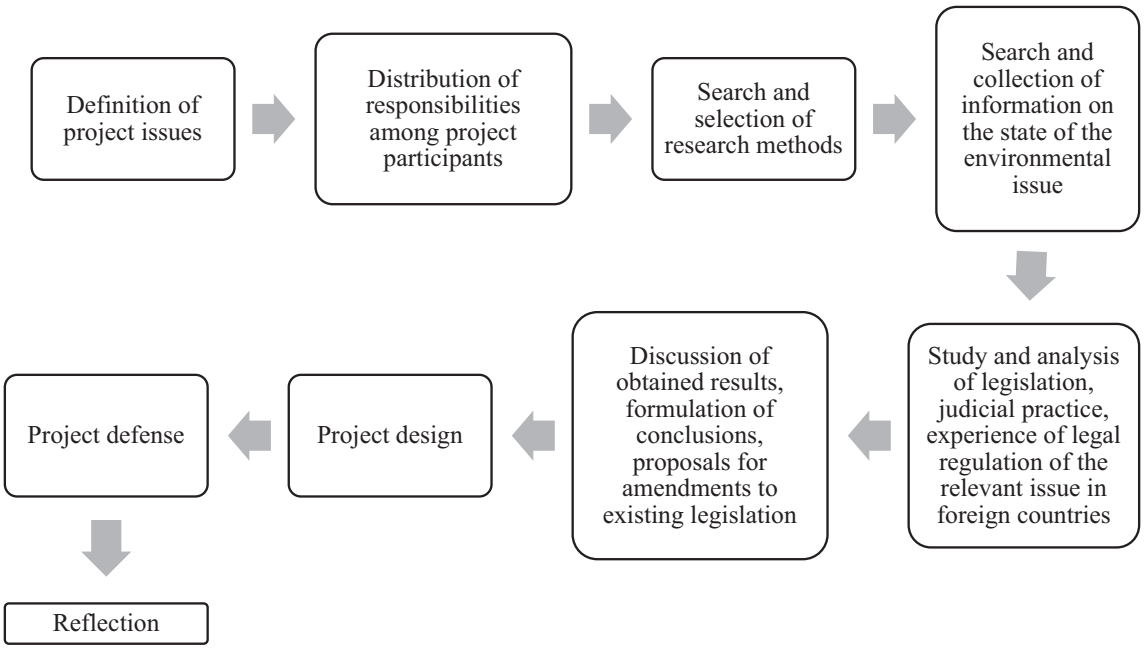

Fig. 1 Stages of project activities for the formation of environmental-legal competence. *Source* Developed by the authors

It was established that the number of experiment participants increased several times due to the use of interactive methods and online consulting among those with average and high levels of ecological and legal competence. All students expressed their opinion on the novelty of this work format.

Participants were also asked about the possible outcomes of project-based learning. Thus, 23.75% of the participants indicated that project-based learning helps develop professional skills (hard skills) more quickly. According to 37.5% of the participants, project-based learning makes it possible to develop teamwork.

The analysis results demonstrate that the chosen method of education increased the proportion of students who are well-versed in the theory of ecology and environmental law, solving proposed tasks based on the use of relevant legal norms, and materials of judicial practice.

Project-based learning made it possible to increase the proportion of students with a high level of ecological and legal competence.

4 Conclusion

The conclusions align with previous studies that emphasized the relevance of project-based tasks for learning. After the development of project assignments, students demonstrated improvement in their ecological and legal competence, manifested as follows:

- They were able to incorporate more ideas and concepts to support their project proposals;
- Specific legal skills were demonstrated when solving particular tasks during discussions and project defenses;
- Their proposals were also more contextualized and less abstract or theoretical.

It should be noted that the project-based task successfully contributed to the development of students' ecological and legal competence and solved complex tasks using environmental and other legislation.

The conducted work highlighted to students the importance of emotional involvement in their work, teamwork, and reflection. Based on problem-solving, these educational tasks have a profoundly positive impact on students' acquisition of critical thinking skills and research competencies, which are also crucial for the legal profession.

In the context of using digital technologies, the effectiveness of project-based learning is also enhanced through the rational use of time resources and interpersonal interaction, as well as mechanisms for searching, processing, and analyzing information.

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Formation of Soft Skills Among Students in the Additional Education System

Marina L. Gruzdeva, Zhanna V. Smirnova, Evgeny A. Semakhin, Mariia V. Mochalina, and Elena V. Romanovskaya

Abstract

The research discusses the problem of developing flexible skills in students, considered supra-professional, flexible competencies that lie outside the boundaries of a specific profession and are of great importance in any field of activity. Researchers agree that soft skills are particularly important and, in many ways, surpass hard skills in the path to success. On the one hand, specialists with complex and narrowly focused skills are valued. On the other hand, in the context of digitalization, new technologies are rapidly emerging that can master the functionality of professions in almost any field of activity and completely replace a living person in the workplace. The authors are confident that the formation of flexible skills occurs most optimally in the system of additional education due to mobility and the absence of strict requirements from state educational standards. The authors describe the results of experimental activities to develop flexible skills among students in the additional education system, which are the basis for successful employment in a dynamically changing world. The authors are confident that the issues of developing soft skills among students of educational institutions of additional education for children require further research and the introduction of methods for developing soft skills in the learning process in the system of additional education for children because mastering soft skills helps young people to be more successful in life and professional sphere, which, in turn, strengthens the socio-economic potential of Russia.

Keywords

Flexible skills · Soft skills · Education Center for Children's Creativity · Technopark · Additional education

JEL Classification

R11 · R12

1 Introduction

At the present stage, the view on the competitive advantages of specialists in the labor market is changing. Previously valuable professional skills and abilities are gradually giving way to supra-professional, flexible competencies that lie outside the boundaries of a specific profession and are of great importance in any field of activity.

Technological and socio-economic transformations that are currently occurring in society create new requirements for the set of knowledge, skills, and abilities of a person.

Machine labor is gradually displacing people from the professions we are accustomed to. Changes in the labor market increasingly require the inclusion of additional communications due to the integration of various professional fields. Developing knowledge-intensive industries requires personnel with a fundamentally new set of knowledge and skills. To remain a sought-after specialist throughout life, one must master supra-professional skills that will help quickly adapt to changing conditions, switch between work functions, set up effective communications, and understand the need for constant self-development and self-improvement. Thus, the totality of the developed specific skills of a person should

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_30

include a special group of skills that will make it possible to become more flexible and adaptable to new environmental conditions. Such a group of skills in the total number of specialist competencies are flexible or soft skills.

The concept of soft skills came into Russian from the USA and does not have a strictly defined translation from English. Various Russian-speaking experts use soft skills in the following forms: soft skills, flexible skills, or universal skills. In this research, the authors use the concept of soft skills.

Despite lacking a single generally accepted interpretation of this term, we can highlight a generalized approach to its definition. Soft skills are a set of skills that are universal, supra-professional, meta-subject, and complementing special skills (hard skills), which, as opposed to soft skills, are directly related to a particular profession. The soft skills group contains elements of communication and intellectual activity, self-organization, and self-control.

In various studies, in the professional world and everyday life, soft skills are used synonymously with the following concepts:

- Life skills—the ability for adaptive and positive behavior that allows people to cope with life's difficulties effectively; life skills usually include a huge number of skills (e.g., communication skills, housekeeping skills, critical thinking, etc.);
- Employability skills—a group of skills necessary for successful employment, to which employers often include such qualities of potential employees as responsibility, reliability, punctuality, hard work, etc.;
- Skills for social progress—a group of skills used in social interactions, designed to improve a person's standard of living and based on leadership qualities, effective communication, and emotional stability;
- People skills—skills that shape a person's behavior pattern in society and social interactions, implying relationships with people based on understanding and respect as a way to increase productivity at work, as well as obtain personal benefits from effective communications.

Based on the active use of these concepts as synonyms in various contexts, we can conclude that the possession of soft skills contributes to more successful employment, productive communication, and the establishment of useful connections, maintaining one's competitiveness in the labor market and overall higher quality of life.

2 Methodology

At this stage of educational development, teachers are faced with the task of identifying ways to acquire soft skills. Educational institutions of various types are mostly aimed at acquiring professional competencies by students; the acquisition of additional universal skills occurs only indirectly.

In the authors' opinion, additional education is the most suitable platform for developing flexible skills in students due to its mobility and the lack of strict requirements from state educational standards. In some institutions of additional education of an innovative nature, targeted methodological activities are already being carried out to develop soft skills in students. However, there are still some uncertainties in this issue. It is unclear by what criteria to evaluate the presence of soft skills and the degree of their "pumping," what set of skills and quality is optimal, etc. In this regard, the issue of studying the potential of educational organizations for additional education in developing flexible skills in students and subsequently in training competitive specialists is relevant and in demand.

Flexible skills, or soft skills, are supra-professional skills that contribute to more effective interaction between people, professional productivity, and personal success in general.

3 Results

In most cases, the Russian practice of researching soft skills is based on comparing hard skills and their opposition to each other. It is worth noting that the conceptual apparatus for this problem is still not adequately developed. However, approaches to defining concepts have a common direction.

Let us consider approaches to defining soft skills. The Cambridge Dictionary defines soft skills as a set of communication skills that enable effective communication and teamwork. This dictionary gives a short definition without clarifying details; the description of soft skills in the dictionary is quite vague.

Some researchers equate the possession of soft skills with a high level of emotional intelligence (EQ—emotional intelligence quotient), while professional skills, hard skills, and refer to a person's intellectual, thinking, and logical abilities (IQ—Intelligence quotient). Research by David Caruso and Daniel Kahneman shows similar findings that empathic people with high emotional intelligence achieve greater success in the professional world. According to the results of research by these experts, mastering soft skills as an indicator of a high level of emotional intelligence in the world can be more important for personal success than relying solely on hard skills.

Russian researchers consider soft skills from similar positions in general. D. Tataurshchikova defines soft skills as unified skills and personal qualities designed to increase work productivity and the effectiveness of interactions between people (Tataurshchikova 2023). We are talking about qualities such as time management, leadership behavior, first aid skills, persuasion skills, etc.

O. Sosnitskaya believes that soft skills are communication and management talents. As soft skills, Sosnitskaya cites similar qualities and skills as Tataurshchikova and adds public speaking, conflict resolution, the ability to make presentations, and some other skills (Sosnitskaya 2009).

Shipilov (2016) equates soft skills to socio-psychological skills that help a person in various life situations in interactions with people. Chulanova et al. (2017) have a position similar to Shipilov, analyzing the social aspect of the use of soft skills. In their opinion, soft skills allow one to make useful connections that help improve the quality of a person's daily life and success in the professional field.

Chulanova and Ivonina (2017) generalizes and systematizes the approaches of various experts to the definition of the concept of soft skills. In her opinion, "soft skills are a social and labor characteristic of a set of knowledge, abilities, and skills, as well as motivational indicators of an employee in interactions between people."

Let us present a methodology for developing soft skills among students in the additional education system, developed in the process of researching the problem of developing soft skills. The technique consists of the following structural components:

- Target block;
- Conditions for implementing the methodology;
- Stage of primary diagnosis;
- Formative stage;
- Stage of re-diagnosis;
- Effective block (Gruzdeva et al. 2023).

These structural components reveal the stages of implementing the methodology for developing students' soft skills in the field of additional education.

Let us reveal the target component of the soft skills formation methodology. The goal is to develop soft skills in students in the process of implementing additional general education (general development) programs to prepare them for successful employment in the future. According to Vostorgova et al. (2019), "the result of diagnostics for further development of soft skills should be data on the level of formation of four main groups of soft skills: communication, creativity, cooperation, and critical thinking" (Cherney et al. 2023a). Due to the lack of means for assessing the level of development of soft skills among students, the development of assessment criteria is also required.

The primary diagnostic stage is a combination of two diagnostic methods: a survey of students to self-assess their level of development of soft skills and a creative task adjusted to the direction of a specific creative association in which the work is being carried out. The survey is carried out so that students understand why we conduct these classes and what skills we develop to form their understanding of the importance of soft skills in our time and to fully assess the level of development of soft skills. At the stage of re-diagnosis using a questionnaire, it is expected to see confirmation that students are becoming more confident in their skills and feel the result thanks to this technique. Since such abstract skills are difficult to assess objectively or mathematically, an additional survey method was chosen for the creative task.

Students perform a creative task in small groups. During the task, several teachers observe the children and evaluate their individual level of soft skills development using a special rating scale.

The methodology for developing flexible skills among students in the additional education system is based on a competency-based approach, which consists of shifting the emphasis from subject skills to meta-subject, universal competencies that allow one to solve various kinds of problems in everyday life effectively and the professional sector using special knowledge in the discipline (Cherney et al. 2023b). In the methodology for developing soft skills, we will describe the forms, methods, and means of training.

The form is mainly used in groups for several reasons, first, due to the difficulty of implementing an individual approach to each student in the process of developing soft skills. The additional general education (general development) program is aimed primarily at the formation of subject skills corresponding to the discipline in children. The inclusion of the formation of flexible competencies based on individual approach would take too much time, reducing the hours allocated to the mastering of the main part of the program. Second, such components of the 4 K system as communication and cooperation are formed in the process of joint activities that require communication and coordination of actions between students. Thus, the group form of work makes it possible to integrate the formation of soft skills among students into the curriculum of the program without wasting time and contributes to the additional development of soft competencies. Therefore, it stands out as the main form of training in this methodology.

The teaching methods include developmental classes with training elements, exercises, business games, the project method, the case method, and discussions. For example, as part of one of the tasks, students and a teacher identify fake news using a discussion method—this is a critical thinking task. In one of the creativity tasks, children come up with 50 actions that they would never do and describe them in a special table; this kind of task develops creativity because it gives children the opportunity to see connections between seemingly unrelated objects and come up with new and unexpected uses for ordinary things. Some tasks directly prepare students to perform a creative task at the re-diagnosis stage, such as the team role test and the

game "Group City," where children simultaneously draw the city's infrastructure on one sheet of paper (cooperation task), while others are aimed at the development of soft skills in general. It is necessary to include different types of tasks because various tasks train students' behavior patterns and problem solving. All tasks proposed in this methodology are presented in specially developed methodological recommendations posted on the website of the institution of additional education where the experiment was conducted (Fidyunina 2015; Smirnova et al. 2023). Vostorgova et al. (2019) proposed the following methods for developing soft skills (Table 1).

Various audiovisual teaching aids are used when implementing the methodology for developing soft skills among students in additional education. Technical equipment (a computer, an interactive whiteboard, and a projector) is required to play videos and presentations in the process of completing tasks, conducting trainings, and organizing interactive games in a group. The teacher uses methodological recommendations as a source of assignments for students.

As part of this research, the authors carried out experimental activities necessary to confirm the hypothesis that to develop flexible skills among students in the additional education system, which are the basis for successful employment in a dynamically changing world, specially organized and targeted methodological activities for their development are necessary. Another hypothesis is that students with a higher level of soft skills are more successful in various types of educational activities.

The purpose of the experiment is to test the effectiveness of the developed methodology for developing soft skills in children in the additional education system using the example of students at the children's creativity center.

Conducting a comparative analysis of the development of soft skills among students of the Municipal budgetary institution of additional education "Center for Children's Creativity" (CCC) of the Kanavinsky District and the State Budgetary Institution of Additional Education "Center for Youth Engineering and Scientific Competencies 'QUANTORIUM'" included the following stages:

- Survey of teachers to determine their attitude towards soft skills and their use in the learning process;
- Interviews with heads of additional education institutions to identify methods used to develop flexible skills in students during the learning process. This survey was carried out in Google Forms. Two teachers of the children's technology park of the "IT-QUANTORIUM" and one teacher of the CCC in the Graphic Design circle took part in the survey. Having considered the answers of teachers in a questionnaire to determine their attitude towards soft skills and their use in the learning process, teachers at the CCC believe that soft and hard skills are equally important for a young specialist to be in demand and competitive in the labor market. Teachers at the children's technology park argue that currently, possession of soft skills is becoming a more important factor for successful employment because employers begin to pay attention to the presence of flexible, trans-professional competencies in a potential employee.

The surveyed teachers, to one degree or another, use soft skills in the teaching process, of which the teachers of the children's technology park chose the answer "yes," and the teacher of the CCC gave the answer "sometimes" (Fig. 1).

Teachers from the CCC claim that they attend courses, trainings, and other events aimed at developing flexible competencies. Technopark teachers develop their competencies according to their own development program (Fig. 2).

All teachers surveyed rated their creativity as a "4" on a scale of "1–5." In terms of critical thinking, two teachers also rated themselves a "4," and a third teacher gave themselves a perfect score. When assessing such a soft skill as communication, the answers were different: teachers rated themselves 2, 4, and 5 points. In the "coordination and teamwork" column, teachers gave themselves scores of 3, 4, and 5.

Table 1 Methods for developing soft skills

Skill group	Skill development methods
Critical thinking	To develop critical thinking, developmental classes with training elements are used ("List of critical thinking skills," "Concentration of attention," and "Types of thinking")
Creativity	To develop creativity and creative abilities, developmental classes with elements of training, the case method, discussions aimed at developing creativity, training the imagination, and teaching methods for overcoming procrastination are used ("Three most difficult questions," "Imagination and creativity," etc.)
Communication	To develop communication skills, developmental classes with training elements are used aimed at developing empathy, active listening skills, and non-verbal communication. Separate trainings for public speaking and presentations are provided
Cooperation	To develop teamwork and cooperation skills, teamwork and developmental activities with training elements, business games to develop communication skills are used ("Form a Circle," "Group City," etc.)

Source Compiled by the authors

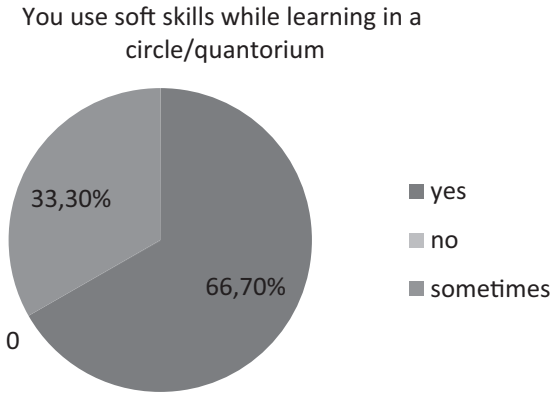

Fig. 1 Using soft skills in the learning process. *Source* Compiled by the authors

Thus, all teachers surveyed rate their level of soft skills as high or above average. In this regard, it is expected to see a reflection of the high level of development of soft skills among teachers in the competencies of their students at the next stage of experimental activities.

4 Conclusion

This research examined the problem of developing soft skills (flexible skills) among students of educational institutions of additional education for children, which is currently relevant due to the rapid development of technology and changes in trends in personnel policy around the world, including Russia.

The study of well-known works of researchers and additional literature on the topic of soft skills, as well as the analysis of the state of the problem of organizing the formation of soft skills among children studying in educational institutions of additional education, provided the following results:

1. To formulate the concept of soft skills, which are supra-professional skills that contribute to more effective interaction between people, professional productivity, and personal success in general;
2. To clarify the classification of soft skills and determine the most optimal approach to determining the list of soft skills for use in the process of developing soft skills among students in the additional education system—the "4 K" system;
3. To reveal that conducting targeted methodological activities to develop soft skills among students in additional education institutions is naturally reflected in numerous victories of students in various competitions and excellent statistics on graduates' admission to Russia's leading universities and employment in top companies.

The effectiveness of methodological activities was tested experimentally during an experimental study at the Center for Continuing Education of the Kanavinsky District in the city of Nizhny Novgorod. The study showed the following:

- The results of monitoring the implementation of a creative task increased on average by 14% for critical thinking, 8% for creativity, 13% for communication, and 19% for cooperation;
- The results of the survey increased on average by 18% in critical thinking, 9% in creativity, 13% in communication, and 20% in cooperation;
- The overall increase in the level of the development of soft skills among students based on the totality of all research methods was 70% before and 84% after. On average, students' soft skills levels increased by 14%.

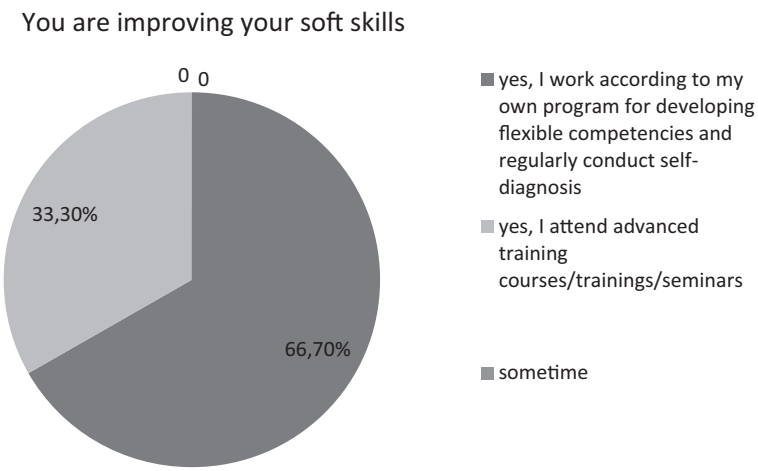

Fig. 2 Level of soft skills proficiency. *Source* Compiled by the authors

The issues of developing flexible (soft) skills among students in educational institutions of additional education for children require further research and the introduction of methods for developing soft skills in the learning process in the system of additional education for children because mastering soft skills helps young people to be more successful in life and the professional sphere, which, in turn, strengthens the socio-economic potential of Russia.

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The Role of the Educational Space in the Process of Informatization of Society

Mariia V. Mochalina, Marina L. Gruzdeva, Zhanna V. Smirnova, Zhanna V. Chaykina and Tatyana N. Tsapina

Abstract

The research examines the teacher's role in implementing the processes of informatization of society. A teacher's most important task is to develop students' information and communication competence to prepare them for professional activities in the information space. The information space provides teachers with an extensive arsenal of educational Internet resources that can provide a new quality of teaching. Thus, using information and communication technologies can significantly increase learning efficiency and students' interest in the subject and develop students' digital skills. The research presents the results of experimental work, convincing of the positive impact of information and communication technologies on the educational process. The research analyzed and compared Internet resources in the educational environment that a teacher can use when organizing the learning process and identified the features of their use in the learning process. Educational Internet resources have been selected for all stages of the training lesson. Programs and websites designed for studying the subject area "Technology" have been identified and analyzed because the teacher's task is to select educational Internet resources that will contribute to the effectiveness of student learning and facilitate the teacher's work in organizing the educational process.

Keywords

Educational Internet resources · Information and communication technologies · Information and communication competence of the teacher and student · Educational process · Subject area "Technology"

JEL Classification

I21 · I23 · I25 · I28

1 Introduction

The FSES of the third generation prescribes the need to form and develop students' information and communication competence as the most important competence that a modern school should give to students in the process of preparing them for professional activity in the digital society.

The law "On education in the Russian Federation" also draws attention to the need to use e-learning in educational institutions. This law establishes the possibility of using new information and communication technologies and the obligation to provide access to educational resources in electronic form.

Training teachers capable of solving these problems falls on pedagogical universities and institutes (Jorayev and Pakhmutova 2019; Smirnova et al. 2022). Formed information competence will allow teachers to be guides in ensuring the digitalization of the educational space (Chaykina et al. 2022; Mukhin et al. 2022). In the pedagogical literature, the information and communication competence of a teacher is defined as a set of knowledge, skills, and abilities formed in the process

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of teaching information technologies, as well as the willingness and ability of a teacher to independently and responsibly use these technologies in their professional activities (Gerasimova et al. 2017; Gorbunova and Semibratov 2004).

To solve these important problems, the teacher must know the content of the most popular educational platforms of the open information educational environment, determine the advisability of accessing a particular electronic resource, and motivate students to actively work in the information environment (RIAMO 2017). Therefore, the increase in demand for students to access information and educational resources has necessitated the need to study the representation of educational Internet resources and electronic educational platforms and identify opportunities and features of their use (Gryaznova 2023, Mukhina et al. 2021).

Thus, the relevance of the research problem is dictated by the following:

- The social order of society to prepare students who can navigate the information space and use electronic resources in any type of activity;
- The need to develop information and communication competencies of teachers;
- The need to actively use information and educational resources at all stages of the learning process.

2 Methodology

The problem of effective use of information and communication technologies (ICT), as new educational tools for improving the quality of education, is reflected in the works of Gruzdeva et al. (2022), Gerasimova et al. (2017), Polat (2023), Robert (2014), Rudinsky and Zabolotnova (2014), (Mukhin et al. 2022; Smirnova et al. 2022), and other experts. In their opinion, the introduction of ICT in the educational process is designed to increase the effectiveness of lessons. These educational technologies are necessary tools at the present stage of education informatization.

The study consisted of the following two stages:

1. Conducting a pedagogical experiment to identify the influence of information and communication technologies on the quality of knowledge acquisition;
2. Analysis and identification of features of educational Internet resources that are advisable for teachers to use in the learning process.

The research was carried out based on the following methods: study and analysis of scientific articles on the research problem, pedagogical experiment, survey and interpretation of research results, and analysis and comparison of educational Internet resources to identify their capabilities and features of use.

The research aims to analyze and compare the most popular resources of the electronic educational environment that a teacher can use when organizing the learning process and identify the features of their use in the learning process.

The research objectives are as follows:

1. To study the impact of the use of ICT on the quality of education.
2. To reveal the capabilities of the most well-known educational Internet resources in the pedagogical environment, which are advisable to use in the learning process.

3 Results

Mastery of digital skills is now becoming an integral part of the preparation of a person. To increase the population's digital literacy level, the introduction of information and communication technologies into the education system must be carried out at all levels of education. Thus, the school is actively involved in this process (Gorbunova and Semibratov 2004, Mukhina and Pletneva 2015).

The State Standard of the Russian Federation (SS) R 52,653–2006 defines information and communication technologies as information processes and methods of working with information carried out using computer technology and telecommunications.

Introducing information and communication technologies for education in schools is one of the leading areas for improving student training. The solution to the problem is to intensify the development of materials based on information and communication technologies by school teachers. The conducted experimental study made it possible to verify the effectiveness of the use of ICT in training (Mukhina et al. 2021). Let us briefly describe the experiment performed. Two groups of sixth-grade students from a school in Nizhny Novgorod took part in the pedagogical experiment. In the first group, lessons were conducted traditionally. In the second group, lessons were conducted using ICT. To develop information and computer tasks, the authors used several electronic resources, including EdWordle.net (EdWordle 2023), Mindmeister.com (MindMeister 2023), Planner5d.com (Planner 5D 2023), Learningapps.org (LearningApps 2023), online offers on the Google platform, etc. The examples of completed tasks are available at https://mm.tt/1502093472?t=P80qHh5Kt6 (Technologies of construction of buildings and structures 2023) and https://planner5d.com/view/?key=8b683b910a556feea030fe250eb695e1 (Open lesson 2023).

The lesson materials were adapted to the architecture of the platforms used. After conducting lessons in classes, the

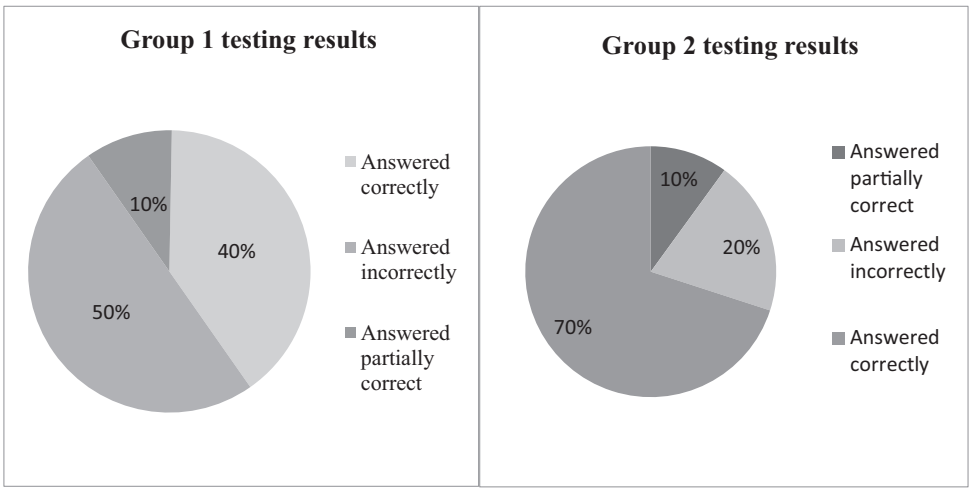

Fig. 1 Student testing results. *Source* Compiled by the authors

results of students' knowledge acquisition were determined through testing (Fig. 1).

According to Fig. 1, the students of the second group, where the lessons were organized in electronic information and educational environment using ICT, passed the test better.

Thus, we can conclude that the lessons developed using the information and educational system increased the efficiency of the educational process. Knowledge acquired through the electronic information and educational environment was better absorbed by students than knowledge acquired through traditional teaching methods. Students of the second group noted that their classes were more interesting and active and that information was presented in a creative form, which they liked (Mukhina et al. 2021).

The survey of teachers showed that they most often use information technology to post homework and display current student grades. Thus, the potential provided by information technologies is not fully utilized (Mukhina et al. 2022).

To activate the information and educational environment, the teacher needs to do labor-intensive work: analyze various platforms, master them, place lessons on these platforms with various interesting and interactive materials, provide students with the opportunity to work with these resources, etc. In this research, the authors will analyze the Internet resources presented in the information and educational environment to identify the ease of using them by the teacher.

When working with outline plans, teachers can access the following platforms: Open lesson Pervoe Sentyabrya [September 1] (2023), Uchitelskiy portal [Teacher's portal] (2023), Russian electronic school (2023), Lesson notes (2023), and Info urok [Info lesson] (2023). The analysis and evaluation of the listed sources were carried out according to the following criteria: assessment of reliability and correctness, determination of the legal status of the resource, assessment of the degree of relevance of information, didactic significance, and accessibility of information. The results of the platform comparison are presented in Table 1.

According to Table 1, the website "Uchitelskiy portal" [Teacher's portal] received the highest points. The website has links to developers so that one can ask questions. The website is not difficult to use and is updated promptly. All information is presented according to the age of students and educational standards. Simultaneously, the teacher can build their work based mainly on one well-studied electronic resource but, if necessary, use the "strengths" of other Internet sources.

To check the mastery of the current topic, one can successfully use well-known office programs such as Word, Paint, Excel, and special programs developed for this purpose. Thus, there are many different shells for creating dough. Let us compare some of them. We present the data in Table 2.

According to the selected criteria, it is more advisable for the teacher to use the YeachLab test shell. It is easy to use and provides the teacher with maximum opportunities when creating tests.

To conduct lessons, the teacher needs visual materials because they increase the effectiveness of the educational and cognitive process. Teachers often use the classic PowerPoint program to create presentations. It can be diversified with a large number of animations or background modes using the following programs:

- Google presentations;
- Prezi.com;
- Classroom management—presentations on Yandex servers;
- Canva is a graphic editor for presentations and other visuals.

Table 1 Analysis of Internet resources (sources)

No.	Evaluation criterion	Open lesson on Pervoe Sentyabrya [September 1]	Uchitelskiy portal [Teacher's portal]	Russian electronic school	Lesson notes	Info urok [Info lesson]
1. Assessing the reliability and correctness of information:						
1.1	Availability of a link to indicate who is responsible for the website's content (organization or individual)	2	2	1	2	0
1.2	Links to a page that describes the goals of the organization that owns the website	1	2	2	1	0
1.3	Information on the author's qualifications to speak on the issue	2	2	1	1	1
1.4	Availability of links to sources of information so that it can be checked in another publication	0	1	0	2	1
1.5	Stability of the website address	2	2	2	2	2
2. Determining the legal status of a resource:						
2.1	Compliance with copyright when posting materials	2	2	0	2	2
2.2	Compliance with moral and ethical standards in posting information	2	2	2	2	2
2.3	Availability of contact information to communicate with the site developer	2	2	2	2	0
3. Assessing the degree of relevance of information:						
3.1	How long ago the information was posted	2	1	1	1	1
3.2	When the site was last updated	1	1	2	1	2
4. Didactic significance and accessibility of information:						
4.1	The degree of completeness and representativeness of the information presented	1	2	1		
4.2	The degree of compliance of information with the goals and content of training	1	2	2		
4.3	The degree of the correspondence of information to the age characteristics of students	2	2	2		
4.4	Ease of navigation and the ability to use materials for independent work by schoolchildren	1	1	2		
	TOTAL:	23	26	21		

Note Where 0—no information, 1—information is provided incompletely, 2—information is provided in full.
Source Compiled by the authors.

Some of the proposed options may be paid. However, teachers can choose a program they feel more comfortable with. With the advent of interactive whiteboards and software in schools, it becomes relevant to use hyperlinks to various programs when a teacher uses a presentation created in PowerPoint or Smart Notebook.

We will separately consider programs and sites designed specifically for studying the subject area of "technology" because it is advisable to use many information technologies in the process of studying this field of knowledge. Turning to these technologies makes it possible to solve theoretical and practical problems, providing significant

Table 2 Comparison of shells for tests

Test shells	Comparison criteria			
	Number of questions in the test	Number of answers per question	Additional options for wording questions	Price
My Test	No restrictions	10	You can attach a picture or sound file	For free
Super Test	1000	10	You can only attach a picture	For free
YeachLab	No restrictions	No restrictions	You can attach a picture or sound file	For free

Source Compiled by the authors.

time savings and convenient visualization. After analyzing possible websites, the authors selected electronic resources that were interesting for teachers and described their capabilities. They are as follows:

(1) The "Sweet Home 3D" program is perfect for studying the "Interior" section in 5th grade. The application makes it possible to work in three-dimensional space and develop a room design. Students are given the opportunity to choose from the available list of furniture items needed, design their arrangement, and select wall and floor coverings. They can choose the best option that meets the requirements of the task.
(2) The "Electric Quilt 5" (EQ 5) program will help one to conduct intensive and creative classes on creating a patchwork product. The program makes it possible to create and print patterns. In their work, students can use appliques, calculate the width of the seam, use ready-made elements from various collections created by other designers, and use stencils and transparent rulers to create parts of various shapes. EQ 5 contains over 8000 fabric samples from renowned manufacturers. Students can create their own fabric library by scanning and saving them. One can use these fabrics by incorporating them into their projects. It is also possible to create one's own colors. EQ 5 can automatically arrange elements in a free style.
(3) The "Red Café" program is designed to create clothing patterns automatically. The program includes the basics: men's, women's, and children's clothing. The capabilities of this program are wide. One can print patterns according to a given size and model patterns. The downside of the program is that it recently became paid.
(4) The "Stitch Art Easy" program is designed to convert various pictures into embroidery patterns. One needs to upload a picture into the program, and it will be converted into a diagram.
(5) On the website Dagaz.ucoz.ru, one can work on the "Types of machine seams" simulator.

4 Conclusion

A study of the problem of using Internet resources in the educational space showed that the information educational environment presents a wide range of different educational platforms, websites, and digital tools that are available to the teacher. The teacher's task is to organize the educational process as clearly and effectively as possible for students. The teacher's use of ICT solves the problem of low cognitive interest and student independence, reduces the gap between the process of searching for information and its application in practice, ensures its new quality, and also establishes interdisciplinary connections.

A teacher must use a variety of programs, websites, and digital tools to make learning interesting and productive for students. The arsenal of electronic educational resources increases annually. Thus, teachers need to promptly select tools that will be appropriate for students of various levels of training and facilitate the teacher's work in preparing the educational process.

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Sustainable Social Trends Application in Modern Fashion Brand Development in Russia

Anastasia A. Irkhina, Diana O. Yampolskaya, and Sergey U. Chernikov

Abstract

The research discusses the search for motives for positioning modern Russian brands by applying social trends to the target audience. The relevance of the chosen topic is due to the change in the economic and competition structure of Russian clothing markets, the increase in the number and diversity of registered social trends in modern society, and, accordingly, the growth of business interest in their application within marketing programs. Upon increasing competition in the market, it becomes increasingly difficult to position a brand; it can seem that exploiting a social trend may simplify this task. The difficulty is to identify the relevant social trend suitable for strengthening the company's and brand's marketing position and avoiding reputational damage to the existing positioning. However, an interesting research question is the potential range of social trends as a basis for positioning the Russian LIME clothing brand in the conditions of existing competition. The research conducted by the authors through expert interviews shows that although most respondents favorably perceive the concept of social trends as a positioning factor, its practical application is doubtful. The reason for the latter is the significant orientation of consumers to the quality and price characteristics of the goods, which are better stimulated by discount type of marketing events. The research concludes that thematic collections are preferred to weave social trends into LIME promotion.

Keywords

Social trend · Fashion market · Russian brands · Positioning · Expert survey

JEL Classification

M31 · M14 · L31 · L81

1 Introduction

Marketing is responsible for the overall interaction with the real and potential target audience of buyers, the main goal being holistic communication with relevant consumer groups to generate product sales. This implies the need for marketers to study various market and social factors that could be important for demand formation in general and corporate brands in particular. In the current situation of redistribution of sales markets, relying only on rational consumption factors (price, quantity, and characteristics of the goods consumed) is difficult. Social trends in the development of demand of the company's target audience undoubtedly affect their consumer choice. However, it is not easy to assess this impact.

The most general definition of a social trend can be presented as "the dominant trend in social development or public opinion; a relatively stable leading trend in the development of a social phenomenon or process." It is revealed through empirical observation and scientific and theoretical analysis of social reality. The concept is used to identify the trend of gradual and steady change in a process or phenomenon (National Encyclopedia Service 2023). This interpretation is being developed by various social researchers who note the mutual influence and interaction of the external environment and society in the process of trend formation (Knyazeva 2013). The understanding of the phenomenon is further complicated by the fact that the social trend rarely

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_32

has a clear manifestation and boundaries. They can be global and regional in nature. Within the framework of society's economic behavior, consumer trends are constantly emerging that determine the behavior of individuals and groups of people with the help of culture and subcultures, social classes, representative groups, and families. In the fashion business, there are specialized consulting agencies that study such trends, the most widely known of which are Trend Union, WGSN, Carlin, and the Laboratory of the Future (Kvachadze 2023). Although there are practically no similar agencies in Russia, the usage of social issues in reputation building has a long history in Russian business in the form of corporate social responsibility (Kondratieva and Kreidenko 2020).

This research aims to consider the possibility of using social trends for the competitive positioning of brands in the clothing market. The main questions are whether it is possible, given the impermanence of social trends that can change quickly, and whether this would provide the brand with a sustainable competitive advantage. This research presents the results of content analysis on the marketing policy of Russian and foreign brands, as well as the results of an expert survey of specialists of various profiles and end consumers about their attitude to this issue.

2 Methodology

Within the goal of determining the possibility of social trends application in brand positioning, the authors used content analysis of recent business publications and a second-order expert method using the calculation of the success rate of a marketing project. These methods are most applicable in this situation because traditional mathematical and statistical methods work inaccurately in a rapidly changing political and economic environment due to the high volatility of the initial data. These methods are used by well-known companies in the clothing, design, and interior market to predict consumer trends (Kvachadze 2023).

3 Results

The volume of the Russian clothing market for 2022 amounted to $22.05 billion. On average, 9.2 items of women's clothing were purchased per consumer, 6.9 items of men's clothing, and 3.7 items of children's clothing (Statista 2022). By the end of 2022, the market fell compared to last year because the Russian fashion market has lost a significant share of foreign players; consumer demand has shifted towards the lower price segment due to the population's desire to maintain their savings. In 2022, the number of participants in the fashion retail market significantly decreased. Approximately 50 foreign brands have officially suspended their activities in Russia or left the Russian market. These include large foreign holdings such as Inditex group, LPP, H&M group, Levi's, and others. Adapting to new conditions, Russian companies and retailers of foreign brands that remained on the market felt the influx of customers.

Consumers began to pay more attention to Russian brands. Sales growth of Russian brands was also observed until March 2022 (starting from January-April 2021) (Zinchenko et al. 2022) because users began to search for Russian clothing and footwear brands almost three times more often. At the top of the choice of Russian users are basic, sports, and street-style clothing, which is visible by the extensive growth of views of "bombers" (+43%), "anoraks" (+27%), and "ponchos and T-shirts" (+21% each) (Retail 2022). Russian customers are becoming more price-sensitive and rational when making purchases: abandoning impulse purchases, reducing the consumption of excess goods, and preferring lower-quality tissue. Despite the increased demand elasticity, Russian companies (such as LIFE, 2 mod, 12storeez, and Zarina) increased prices by 15–20%, even despite cost-cutting measures (Shevchenko 2022).

Many publications focus on existing and emergent trends, especially with application to the sustainable consumption issue (Saginova et al. 2023). Some focus on specific socio-economic issues (Zhou 2023) and make an extensive overview with proposals (Batool et al. 2023). Others are making a general overview of the trends and providing an outlook into the near future. The popular social issues that frequently can be found in the appropriate publications and are relevant at global and Russian levels are as follows (Krasyuk 2023):

(1) Poverty and income inequality (Ghukasyan 2023);
(2) Ecology and environment concerns (Saginova et al. 2023);
(3) Gender inequality and imbalance (Rebrey 2023);
(4) Health concerns and healthy lifestyle (Rodionov et al. 2021);
(5) Social justice and individual freedom (Volkov 2022);
(6) Personal digital security (Saginova et al. 2023);
(7) Consumption localization (Saginova et al. 2023);
(8) Cultural diversity aversion (Akulova 2017).

The assessment of the prospects for the application of social trends was carried out by an expert method. The LIME clothing brand was taken as the research object. LIME

clothing brand positions itself as a brand focusing on the latest global trends to give every woman a choice of what best suits her and reflects her personality. Although raised by 15–20% in March-June 2022, the brand's prices remain in the middle price segment, thus remaining accessible to its target audience. The target audience of the LIME brand is girls and women from 16 to 30–35 years old who care about looking stylish and fashionable and are ready to spend a considerable part of their budget on it. The company also plans to incorporate young men (from 16 to 35 years old) and children into the target audience because they forecast a steady drop in their current female consumer count in the future due to increased competition. In the Russian market, LIME focuses on the niche that Zara occupied until 2022—the brand was focused on current fast-fashion trends and creating original items accessible to the average consumer.

One of the major issues in corporate social activities is that they have to be consistent with the company's image. Otherwise, these investments do not positively impact corporate image (Korytina and Surnina 2020). The most frequently researched trends in the fashion business are connected to sustainability (Grieco et al. 2023) and ecological consciousness (Kim and Suh 2022). With this in mind, the authors have selected several social trends applicable to the clothing market as part of the current study (Welters 2023):

- Ecology and environment concerns;
- Social justice and individual freedom;
- Cultural diversity aversion.

The first stage of research was forming the expert survey group. Thirteen experts were selected according to the following four categories: sociologists, advertisers, managers of clothing companies, and experienced consumers (people perceiving the purchase process as a creative act). Each person was asked first to determine the significance of a criterion and then evaluate it with a 100-point scale. The evaluation structure consisted of "1—excellent" (81–100 points), "2—good" (61–80), "3—satisfactory" (41–60), "4—unsatisfactory" (21–40), and "5—terrible" (1–19). The list of evaluated survey criteria is given in Table 1. The calculations of the evaluation were carried out according to the following formula:

$$r_x = \frac{n_{i1} \times 1 + n_{i2} \times 0.75 + n_{i3} \times 0.5 + n_{i4} \times 0.25}{n_{i1} + n_{i2} + n_{i3} + n_{i4} + n_{i5}},$$

where:

r_x—a weighted estimate of the x criterion.

n_{ij}—the number of experts that gave the evaluation in a certain point range by the i criterion.

The total "success" indicator is calculated using the following formula:

$$R = \frac{\sum r_x}{\sum p_x},$$

Table 1 Success rate of social trend applied in the LIME brand promotion

Criteria	Weighted average score	Weight (significance)
The social trends' influence on people's behavior in society	0.8654	72
Possibility of attracting a new target audience interested in the trend	0.8846	68
The long-term impact of trends application	0.6538	73
The period of trend relevance	0.6731	62
Risks of losing the customer trust upon inappropriate trend application	0.8462	85
Consumer's willingness to accept new brands	0.7307	67.5
The number of advertising materials based on social content	0.7692	57.5
The level of social trends' content influence on the attitude to the brand	0.8654	75
The possibility of increasing profits by using the social trend	0.8462	95
The possibility of using the social trend as a competitive advantage	0.7885	70
Loyalty of minorities	0.5577	63.75
Consciousness of the social trend application	0.6923	81.25
The level of solvency	0.75	97.5
The level of interest in social trends	0.7692	75
Total Σp_x:		1042.5
R = (0.8654*72 + 0.8846*68 + 0.6538*73 + … + 0.75*97.5 + 0.7692*75)/1042.5		
R =		0.7679

Source Composed by authors based on expert answers

where:

Σr_x—the sum of all criteria evaluations;

Σp_x—the sum of all criterion weights;

Based on the data obtained, the authors calculated the success probability indicator of applying a social trend as a fashion brand development driver (Table 1).

The success rate was 76.79%, which is a relatively high indicator and suggests that social trends supported by various companies can serve as a driver for brand positioning. However, one can see that the population's solvency is of the greatest importance (97.5). Experts also see the possibility of increasing profits using social trends (95). Following social trends gives companies a competitive advantage and customer loyalty. However, this trend is only in development, although it can become more relevant in the future. The weak point of using social trends is considered to be the loyalty of minorities (0.5577; the importance of this factor is 63.75), from which it can be concluded that most businesses do not focus on them (Table 2).

An in-depth interview was conducted for a more complete analysis of the listed trends. The in-depth interview aimed to determine the possibility of applying a social trend as a driver for developing the LIME brand. The respondents were six people representing the brand target group. The following tasks were set to achieve the goal:

- To find out how consumers relate to various social trends;
- To find out consumer opinion on the products that are associated with social trends;
- To compare consumers' attitudes to ordinary products or services and the products or services of companies that support social trends and movements.

The questions asked to the respondents were divided into three blocks:

1. The introductory block to reveal attitudes to social trends in general;
2. The attitudes block to reveal consumers' attitudes to products related to social trends;
3. The block of questions on comparison to compare the attitude of consumers toward ordinary products and services with products or services that are related to social trends and somehow support them.

As a result of the interview, the following fundamental points can be identified:

(1) Respondents know what social trends are and understand what they are talking about, especially when specific examples are given. These associations mostly have a positive connotation. The negative connotations are based on the oversaturation of the information space with social topics. Respondents also mainly identified two groups of people in society in relation to social trends: those who take them into account and those who do not care.

(2) None of the respondents adhere to clear requirements to support social trends when choosing clothes and mostly look only at the quality characteristics of clothes. The respondents named Koton, BeFree, H&M, Nike, and Reebok among the clothing brands that somehow support social trends. Support of social trends is perceived positively by respondents. However, it is not the main characteristic when choosing clothes.

(3) With all other things being equal, respondents are ready to choose a product of a company that supports a social trend. Almost all respondents are ready to overpay from 500 to 3000 rubles for this product. However, it is essential for all respondents that the quality characteristics of clothing meet the requirements and that the company's support for social trends is easily checked and transparent. The amount that respondents are willing to overpay to support a social trend directly depends on their disposable income—the higher the income, the greater the amount of possible overpayment.

(4) It is also important to note that respondents declare their willingness to overpay for trends related to ecology and environmental protection.

4 Conclusion

The authors identified three main social trends that are most relevant to clothing brands: (1) ecology and environment concerns, (2) social justice and individual freedom, (3) and cultural diversity aversion. Based on the research results, the authors can conclude that social trends are generally considered an acceptable incentive for developing brand positioning. The success rate is around 80%. However, the conducted in-depth interviews revealed an ambiguous attitude to this issue.

As part of the in-depth interview, it was also revealed that consumers are aware of social trends. The problem lies in the fact that this is passive knowledge. In other words, it

Table 2 In-depth interview results

Question	Answers
1.1 Does the respondent know what social trends are, and can he or she give examples?	Half of the respondents could not immediately say what social trends were. However, everyone immediately understood what was at stake when the author listed examples of the studied social trends. The other half of the respondents identified social trends as what society is concerned about and what is often covered and supported by commercial and non-profit organizations
1.2 What associations can the respondent give related to social trends?	The following associations were named: growth, development, details, help, generation Z, reasonableness, openness, change, movement, improvement, renewal, commercialization, tolerance, condescension, negativity, globalization, perversion, support, kindness, oppression, excess, and propaganda
1.3 How does the respondent think the public perceives social trends?	Two groups of people in society were identified in relation to social trends: those who do not care about them and those who care about problems covered by social trends. Basically, those who support trends said that they are from large cities, younger, and more educated. Moreover, those respondents who are glad that commercial companies support social trends and those who find them rather annoying noted that support for social trends is important although a balance is needed in this matter
2.1 What, apart from the price, style, and material of the thing, does the respondent pay attention to when buying clothes?	Half of the respondents do not pay attention to anything other than the listed factors when choosing clothes. However, some of the respondents indicated that they pay attention to the store's website if they order clothes online, the combination of clothes with things already purchased, and current trends in fashion
2.2 in the respondents' opinion, what products highlight problems related to social trends?	Clothing brands (especially sportswear) and cosmetics were named. Nevertheless, half of the respondents said that all large companies should somehow support social trends so that society does not "cancel" them
2.3 If the respondent finds out that the company supports social trends, will his or her attitude to the company's product change? If it does, how?	The opinions of all respondents will either remain the same or change for the better regarding the company. The opinion about the product is likely to remain the same
2.4 The respondent's favorite brand openly begins to support social trends; how will the respondent react to this information?	For many respondents, it is important that if the company supports a social trend, the qualitative characteristics of the product do not change. If these characteristics remain the same, support for social trends is an additional advantage for many respondents (especially if this support is transparent, easily tracked, and is manifested in helping real people or situations). One respondent even said they would tell their friends about it because it would make them very happy
2.5 A friend of the respondent, at the respondent's request, advises a certain brand of clothing, arguing that the brand supports a social trend. Will the respondent buy a thing of this brand, or does the respondent need additional information?	All respondents said they would look for more information to find more relevant offers or check how exactly the company supports social trends
3.1 The respondent needs to buy a piece of clothing, and the choice is between two very similar models at the same price. One of the companies supports social trends. What product will the respondent choose?	All other things being equal, all respondents said they would choose a piece of clothing from a company that supports a social trend. However, this is only an additional advantage, and the respondents will first focus on the style, material, and other qualitative characteristics of clothing
3.2 The respondent needs to buy a piece of clothing, and the choice is between two very similar ones. One company supports social trends, and its product is more expensive. What product will the respondent choose? If the respondent is willing to buy a more expensive product, how much is he or she willing to overpay?	Almost all respondents said they are willing to overpay for supporting social trends, provided that they are satisfied with the quality characteristics and can easily track how the company supports social trends (e.g., cooperates with charitable foundations or provides evidence of assistance to real people). If the respondents are satisfied with the qualitative characteristics and the transparency of the company's activities is easily tracked, respondents are ready to overpay from 500 to 3000 rubles

Source Composed by authors based on in-depth interview answers

is a good supplement to the product, nothing more. It is still relevant for brands to develop a line of merchandise that visually supports a social trend suitable for the brand concept, a percentage of the sale of which goes to support the corresponding social project.

Since not all customers of mid-price segment fashion stores realize the importance of supporting ecology, minorities, and other social trends, it is important to clearly explain the reason for supporting any social trend. Otherwise, these consumers might refuse to purchase a

company product and make a choice in favor of more traditional brands. Content marketing can help with this issue. Well-structured content about a social trend or a social project supported by the company can convince doubting consumers that the company is engaged in more than commerce and is interested in socially relevant and important projects to aid society.

Additionally, respondents noted the importance of companies' real support of social trends, not just mentioning them in advertising campaigns. Thanks to social networks, consumers have much more opportunities to check what the company is doing; any fraud from the company side would quickly become widely known. Thus, the risks of loss of consumer confidence are very high. With the support of social trends, it is important to focus on social projects with practical results.

As for pricing policy, regardless of which price segment the company operates in, it can raise prices by 5–10% for products that it positions as supporting a particular social trend.

Based on the content analysis and expert survey results, it is difficult to say how stable social trends are in the target group of this study. From this, we can conclude that the use of social trends in the Russian segment as the basis of competitive positioning will not bring the desired effect. However, there is also no point in refusing to use social trends. On the one hand, the instability in time and the positive attitude of the target audience toward social problems close the possibilities for long-term strategies. On the other hand, it makes it possible to use the tactical positioning of local (seasonal) clothing collections with event marketing. Since LIME company is currently focused on women aged 16–35 who support a healthy lifestyle and respond positively to the trend of environmental protection, limited capsule clothing collections devoted to certain aspects of current social trends are being released.

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Eco-Green Tourism from the Perspective of Consumer Demand as a Driver of the Territory's Economy

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Abstract

In contemporary reality, ecotourism, as a variety of sustainable alternative forms, is gaining increasing popularity and demand within the context of the green agenda for preserving the ecological homeostasis of the planet. Furthermore, the appeal of ecotourism is attributed not only to the diversity and scenic beauty of tourist and recreational attractions but also to the hospitality of the local population. The variety of additional services that fill the journey with positive emotions and impressions enhances the consumer demand for creating memories of the trip. This research is based on the hypothesis of the interconnection between economic feasibility, the social role of business, the preservation of ecological homeostasis, and the need to satisfy the demand for services in the emotion and impression industry as a driving force for the sustainable development of the face of the recreational sector, contributing to the economic and social well-being of the territory. The authors present the factors restraining the sustainable development of the tourism industry, negatively impacting the satisfaction of consumer tourist demand, and contributing to the potential likelihood of a lack of positive economic and other effects for the territory of the intended journey. The experience of Germany in promoting tourism in rural areas through state support programs and industry protection in the eastern lands is cited. The necessity of forming the philosophy of an ecotourist in connection with maintaining a balance of interests and trends in digital development is addressed. The fundamental principles upon which the research methodology is built include the economic, ecological, and social content of sustainability in the development of the tourism industry as a constituent element of economic activity determining the economic success of the territory.

Keywords

Sustainable development of the territory · Industry of emotions and impressions · Philosophy of ecotourist · Variative potential of transformation · Ecological and socially responsible approach · Eco-green tourism

JEL Classification

O14 · Z32

1 Introduction

The consideration of the necessity of territorial planning within the framework of the toolkit for implementing the goal-setting of progressive development, unifying the economic, social, and ecological components converging into industry-specific directions to achieve regional development efficiency, including social justice, environmental safety, and economic well-being, underscored the relevance of creating prerequisites for the sustainable development of tourism and the marketing of innovative tourist products.

This need is elucidated by the negative ecological consequences of the impact of human anthropogenic activity through tourist endeavors. The concept of sustainable tourism emerged in the early 1980s, implying social and ecological responsibility (Golubeva et al. 2017) for the individual's influence on the ecosystem.

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In this context, the research objective is to identify the trends in the development of ecotourism in the realm of factors determining the industry's sustainability in correlation with a mindful approach to the environment, social responsibility, and consumer demand for tourist services.

2 Methodology

The theoretical foundation of the methodology is based on the results of scientific research by Russian and international authors in the field of sustainable development of ecotourism. During the research, the authors applied general scientific approaches and specialized research tools, including synthesis, analysis, generalization, a comprehensive approach, scientific abstraction, the method of comparative analysis and geographic comparison, tabular interpretation, a systemic approach, and the method of empirical observations, enabling the analysis of necessary trends in the ecologization of tourism in the context of its impact on the economic sustainability of the territory.

3 Results

The demand for natural and socio-cultural resources has contributed to the formation of consumer demand for the natural, cultural, and tourist environment, presented in the overall framework of commercial attractiveness in the provision of tourism services. Such an effect has led to the formation of the concept of over-tourism, semantically denoting mass tourism that carries negative consequences for the tourist landscape, diminishing the quality of life for local residents and the territory's economic sustainability.

As its antithesis, we designate the definition "sustainable tourism," commonly used in scientific literature as a direction in tourism and economic activity aimed at satisfying the traveler's consumer demands while simultaneously oriented towards preserving ecological homeostasis, the interests, and needs of the local population, considering the current and anticipated impact on the socio-economic and ecological components of society in line with the interests of the whole industry (Pirogova and Pirogova 2017, p. 306).

Maintaining a balance of interests implies a certain innovativeness in activity. Consequently, this concept is complemented. Ecotourism (eco-green tourism) represents an innovative direction of sustainable alternative tourist-recreational activity, implying the development of a specific potential, including infrastructure formed based on the interconnection of supply and consumer demand as elements of the economic subjectivity of the territory while maintaining an economic, ecological, and cultural balance. Thus, the authors rely on the widely accepted view of ecotourism as a formal variety of sustainable tourism.

Considering the presented conceptual-categorical apparatus, the authors understand sustainable development of the territory as a complex of measures contributing to the synergy of the harmonious evolution of economic, social, and ecological subsystems and the search for optimal satisfaction of the diverse needs of present and future generations of civilization.

In the context of the complexity of sustainable development of ecotourism and the territory, let us outline the following. As noted by experts from the World Tourism Organization (UNWTO), the share of ecotourism is segmented in the range of 10%–15% of the total volume of tourist services. Nevertheless, it represents the most promising direction in the industry of emotions and impressions. The tourism industry accounts for almost 10% of the global GDP. In Russia, the largest country in terms of territory, with unique recreational potential and resources, ecotourism services constitute approximately 1% (Golubeva et al. 2016). On a global scale, ecotourism in the tourism industry structure grows annually by 20%, which is six times faster than the tourism industry in general (Brockington et al. 2008). Thus, the sector is growing more rapidly compared to the average indicators of other segments of the world economy. In monetary terms, the annual contribution to the global economic system from tourism activities is around $4 billion per day (World Tourism Organization 2016), emphasizing the significant impact of the industry of experiences on human economic activities, leading to a sequence of changes in other sectors of the economy.

The tourism industry, with a specific agenda of sustainable ecological orientation converging with other development tools of the industry, possesses a versatile potential for transforming the economy with an environmentally responsible approach. This model is applicable to underdeveloped territories and, with appropriate institutional support, will contribute to the development of regions in a socio-economic and other context, facilitating the utilization of tools for the efficient use and prudent conservation of local resources.

The evolution of the regional tourism and hospitality sector stimulates more than half a hundred sectors of the economy (Garina 2019), triggering the employment rate, which is of strategic importance in mitigating the threats of rising unemployment among youth and in rural areas (Lepshokova 2017). Additionally, the tourism industry has the potential for rejuvenation in the conditions of economic turbulence at the regional level—when adhering to sustainable development principles.

The potential for the development of the tourism industry implies eventual opportunities and potential risks. Close cooperation and active interaction between the tourism sector and other sectors of the economy (e.g., transportation, culture, education, construction, etc.) presuppose high environmental and social responsibility by the subjects of this area of economic activity.

Based on the interpretation of the research topic, let us indicate the factors restraining the sustainable development of eco-green tourism as a segment of the territory's economic sustainability:

1. An insufficient (low) competitive environment manifests as an imbalance between demand and supply, leading to a decreased interest in this type of alternative leisure. To mitigate this limiting factor and enhance the attractiveness of competitive advantages, it is advisable to segment the tourist pool and offer services based on age groups, travel purposes, route-geographical factors, economic needs, comfort preferences, etc.;
2. Climate change implies financial and other expenses for preventive measures against technological disasters and the elimination of the consequences of natural disasters, as well as enhancing the safety of enterprises, etc.;
3. Depletion of essential natural resources includes the uniqueness of tourist locations. Environmental degradation is a factor leading travelers, whose main focus is on ecological priorities (around 30% of tourists), to refrain from availing of tourism services;
4. Escalation of international conflicts serves as an inhibiting factor for conscientious tourists making travel decisions, as positive experiences and emotions take precedence over the consumption of the service itself.;
5. Lack of sufficient state and municipal support to counterbalance the listed constraints to development (Yumashev and Utyuzh 2017).

Let us consider Germany as an example of state protection of the tourism industry. In Germany, state programs regulated and supported the sustainable development of rural areas, which is particularly relevant for the eastern lands—the former territory of the German Democratic Republic. Domestic tourism in Germany remains the most affordable form of travel, making it possible to direct consumer demand towards the development of the national tourism sector. This is in harmony with the German mentality, characterized by a careful attitude towards the environment and a tendency to minimize financial expenditures, thus creating a unique consumption culture.

Following Germany's example, it is expedient to implement state protection for the ecological direction of tourism in conjunction with the formation of the ecotourist philosophy, popularized through the information space and digital technologies, including the following:

(a) Priority of green tourism: emphasizing emotions, impressions, memories, and new knowledge acquired through cultural events during travel, contributing to subsequent motivational aspirations for continued journeys.;
(b) The need for reconnection with nature as an alternative to living in urban agglomerations and the permanent stress of urbanization;
(c) The ecological component involving the need to visit natural areas that have preserved the pristine appearance of biodiversity. It is implied that the journey leaves a minimal tourist footprint on visited places, attracting an additional pool of conscious travelers who mentally acknowledge the need to preserve the planet's natural homeostasis.

For the promotion of the eco-green tourism brand in the international tourism industry, the widespread marketing toolkit for popularizing specific eco-hotel infrastructure is commonly used (Aseeva and Zolkin 2020). This infrastructure correlates with the concepts of ideological eco-travelers, collectively forming a synergistic effect of cooperation between economic, marketing, and psychological approaches (Shumilina et al. 2023) to increase the demand and consumer demand for eco-travel. This experience will be beneficial in Russian realities, considering the diversity of natural areas across the vast territory of Russia, to enhance the environmental culture of the population. As an indicator of the prevalence of such marketing, we can cite a number of countries leading in the number of eco-hotels, which reflects the consumer demand for this type of service and the relevance of such an approach in the marketing lineup for the development of green tourism (Table 1).

There is an ongoing debate about the limits of impact on the environmental component and biodiversity of a geographical attraction (Mironchuk et al. 2022), considering economic feasibility and determining the point at which a journey can be considered ecotourism. The scientific community and environmental organizations tend to advocate for the formation of an ecological mindset, emphasizing the permanence of ecological education to promote a conscious, minimal impact on nature. In the paradigm of commercial activity, tourism companies are more focused on the product in the tourism industry as the equivalent of profit generation and meeting consumer demand.

A model of responsible tourism business is widely adopted in the international tourism industry. The model is built on ESG principles (environmental, social policies,

Table 1 Ranking of countries according to the number of eco-hotels

No.	Country	Number of eco-hotels
1	Italy	3500
2	Germany	2400
3	France	2000
4	Austria	1900
5	Brazil	1800
6	Spain	1700
7	USA	1300
8	Greece	1000
9	Turkey	1000

Source Compiled by the authors based on (Kireeva and Kravchenko 2022)

and corporate governance). In a broader sense, ESG principles imply sustainable business development, deciphered as follows: E—responsible attitude towards the environment, S—a high level of socially oriented responsibility, and G—corporate governance characterized by a high degree of quality (Kondratenko 2022).

Following this paradigm, a model of a sustainable, socially oriented tourism industry is being formed, consisting of the following three main directions:

1. Measures to prevent, minimize, and mitigate the harmful impact of the tourism industry on the environment, cultural, and religious landmarks of the region. As an example, tactical balancing of tourist traffic capacity and the number of tourists can be observed;
2. Supportive measures of a social nature are based on the needs of the local population, tourism industry workers, and travelers. Respecting the traditions and cultural heritage of indigenous people in the geographical area, contributions from profits obtained from resource use to the local budget, social and other guarantees, respect for the work of tourism and hospitality industry workers, and the provision of quality and diverse services that satisfy consumer tourist demand contribute to the formation of a sustainable concept of building a green model of the tourism industry of emotions, memories, and impressions;
3. Territorial marketing measures with a focus on sustainable tourism development, including:
   (a) Strategic planning for the industry, considering geopolitical tensions, geo-economic uncertainties, and turbulent events (e.g., COVID-19) and their consequences.;
   (b) Building and maintaining a business reputation as a guarantor of commercial commitments, which creates conditions for building trust;
   c) Generating consumer attractiveness by using marketing tools that involve market residents, considering their needs and interests, and creating value for the tourism product (Kotler et al. 2005);
   (d) Organizing management throughout the hierarchical structure based on the principles of contemporary management theory.

4 Conclusion

In the conditions of escalating competition for the consumer as the bearer of demand for a specific type of tourist services, each tourist destination is in a perpetual search for unique proposals and mechanisms for their development in the industry of emotions and impressions, marketing models of promotion through which these locations can be identified by the uniqueness of the brand of the originality of the territory, ultimately predetermining the driver of its development.

In the new realities, consumer demand in the tourism industry is oriented not only towards obtaining positive memories, emotions, and impressions but also pays significant attention to the philosophy of changes in the world and the individual in it, to ecologically-oriented consumption and resource regeneration—the so-called generation of transformative travelers.

Nevertheless, the existential ecologically-oriented responsibility of the tourism business remains relevant in the inseparability of the permanent evolution of stereotypes for preserving the homeostasis of the planet and the development of society on a global scale, which entails additional costs and contributes to the moral satisfaction of representatives of the business community and serves as an activator of foresight projects and new approaches in the tourism industry. This variation leads, for example, to the formation of new directions in the tourism and hospitality industry.

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Green Technologies for Improving the Quality of Life of the Population

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Abstract

Recently, the issue of ensuring the population's quality of life has become even more pressing, a circumstance further exacerbated by the global COVID-19 pandemic. What initially manifested as a healthcare crisis has since evolved into an economic and social collapse. Subsequent sanctions and geopolitical tensions have restricted the production of environmentally friendly goods and hindered the adoption of safe technologies. Geopolitical challenges and the application of isolating measures, coupled with the utilization of hazardous instruments to curtail the development of nations, have reached catastrophic proportions. Global economic woes underpin environmental challenges on a worldwide scale. Their interplay exacerbates the situation in the realm of natural resource management, thereby diminishing the quality of life for the population. Unwise consumer exploitation of natural resources and the persistent increase in environmental pollution over the decades have brought to the forefront the imperative of addressing the population's quality of life through the attainment of goals aligned with the principles of a green economy and sustainable development. On the flip side, the advancement of human thought and the digitalization of all facets of human life present tremendous potential for developing and implementing cutting-edge technologies that consider the interests of nature and society. This research aims to analyze the application of advanced green economy technologies in enhancing the quality of life, assessing their effectiveness, and evaluating their alignment with the population's expectations.

Keywords

Quality of life · Green economy · Technology · Sustainable development · Government support

JEL Classification

F6 · J1 · K3 · Q5

1 Introduction

The population's quality of life is determined by the natural environment, of which humans are an integral part. The impact of human activities on the surrounding environment leads to a disruption of the balance in natural ecosystems, a matter increasingly discussed by scientists, practitioners, and government representatives worldwide over the past decades, given the global nature of the issue. It becomes evident that the improvement of the natural ecosystem's condition is possible only through changes in the economy, towards the refinement of applied technologies, resource conservation, and the adoption of waste-free technologies. This shift will contribute to reducing harmful emissions into the environment, enhancing the population's health and quality of life. A comprehensive approach to environmental preservation is feasible by applying green technologies, which can be implemented across all sectors of human economic activity.

The understanding and resolution of the challenge of ensuring the desired quality of life for humans lie in the hands of humanity, an element within a complex ecosystem

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_34

whose state is determined by human activities and requires careful consideration. The cultivation of ecological awareness and a set of measures to enhance the quality of life constitute a national task addressed through green technologies and implemented in the form of a national strategy.

2 Materials and Methods

As a socio-economic category, the quality of life has been the subject of investigation for a century. However, it retains its relevance due to its dynamic nature, driven by changes in human nature, its demands for quality of life, and the environment that transforms under the influence of human activities. The expansion of the categorical understanding of the quality of life from socio-economic to socio-ecological-economic (Toffler and Inozemtsev 1999) can be observed at the turn of the twenty-first century, where the content and assessment of the quality of life are conducted with consideration for the ecological component, determining the physiological condition of individuals and their capacity for active living (Forrester 2003). The comprehension of the quality of life of the population as a combination of conditions ensuring comprehensive human health (Reimers 1990) has firmly entered scientific research aimed at developing goals and fundamental directions for sustainable (including green) development in the Russian Federation (Government of the Russian Federation 2021). Nowadays, the term "quality of life of the population" primarily encompasses a comprehensive characterization of the natural-climatic, socio-economic, ecological, and socio-cultural conditions of the population's life activities and an individual's position in society (Zakharova et al. 2022), p. 26]. The socio-economic aspect of the population's life activities is realized in the economy, which is not independent of the natural environment, effectively functions, and is closely linked and dependent on the surrounding environment. According to scholars, such an economy is referred to as a green economy. According to the authors of the research, as a component of the natural environment system, the green economy ensures the growth of social well-being, rational use of natural resources, and the minimization of risks to the environment and human health. Crises and disruptions in developing national and global economies can be observed due to social and economic imperfections. A significant number of people still face the problem of hunger, estimated by experts to be over 700 million, with the number of those experiencing hunger growing in recent years. Moreover, two billion people lack access to safe drinking water. Such ecological issues in the civilized world indicate high inequalities among people and catastrophic disparities in quality of life. Thoughtless consumption of natural resources for economic purposes leads to their depletion, affecting not only valuable minerals but also soils, forests, air, and water – the factors essential for human existence. These issues require immediate resolution, a task that the green economy can significantly contribute to.

3 Results

In a broad sense, green economy technology can be understood as the activities of individuals, economic agents, society, and countries aimed at achieving economic growth while considering the balance of interests among the economy, society, and the environment (i.e., sustainable development). Consequently, green economy technologies encompass the methods employed by the subjects of the green economy to achieve the Sustainable Development Goals (SDGs), namely the preservation and improvement of both the biosphere and civilization. In our view, green economy technologies can be divided into the following two complementary groups:

- Macroeconomic technologies are applied to address global issues and are typically implemented by a collective of economic entities;
- Microeconomic technologies are oriented towards specific issues in particular places and times or focus on challenges within human activities.

Additionally, green economy technologies can be divided into groups depending on the subject, and several technologies have a cross-cutting character, but in general, they can be divided into technologies of the state, business, and population. State technologies of the green economy are aimed, first of all, at supporting the achievement of sustainable development goals (Fig. 1).

In 2021, a classification of green projects was approved to regulate the implementation of green economic technologies. Globally, this practice is referred to as green taxonomy, encompassing "pure" green projects and "adaptive" projects that do not fully comply with established international green criteria but yield similar environmentally beneficial results.

The state exerts a direct influence on the quality of life through the VEB.RF State Corporation, which participated in the implementation of 28 green projects in 2022. Over 73% of the expenditures (1.1 trillion rubles) were financed through the corporation's funds. An allocation of 97 billion rubles was dedicated solely to addressing waste management issues. The VEB.RF strategy incorporates key principles aligned with the UN SDGs and strategic directions of activity, including the following:

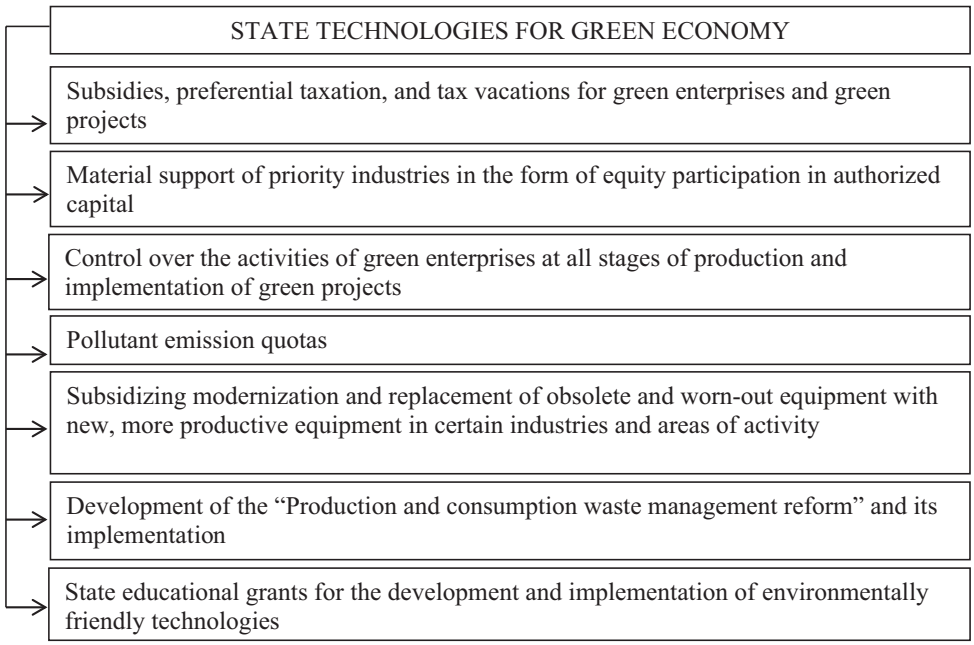

Fig. 1 State technologies for green economy. *Source* Compiled by the authors

- Green projects for developing urban infrastructure, economy, transportation networks, water supply, etc.;
- Social projects based on public–private partnerships, including the construction of schools, student campuses, and citizens' social and environmental initiatives;
- Projects aimed at forming financial market infrastructure to ensure optimal accessibility of financial resources for realizing green and social projects.

Green business technologies are multifaceted. First, business profitability is ensured by implementing cutting-edge technologies that address challenges related to energy efficiency, waste utilization, and waste-free production. Even the transition to electric transport, primarily an economically advantageous green project, yields substantial ecological benefits by reducing emissions in urban airspaces. Surveys of entrepreneurs show that for 51% of industrial enterprises, the motivators for implementing eco-technologies are "reducing environmental impact" and "compliance with environmental, health, and safety standards" (Kokourova 2022). Second, "pure" green technologies applied by businesses aim to preserve the environment and improve the quality of life. Technologies for the production of environmentally safe and clean products take precedence. Compared to 2021, there has been an increase in industrial enterprises actively obtaining certificates for compliance with environmental safety requirements for their products. In 2022, the proportion of enterprises holding various environmental certificates increased from 47 to 71% (Lola and Bakeev 2023).

Based on the ranking of green technologies for improving the quality of life in cities, where 75% of the country's population resides, we can identify a range of promising technologies addressing energy conservation and environmental protection. The application of double facades with natural ventilation, consuming no electricity, makes it possible to save up to 60–70% in heating and energy supply costs for buildings. A water purification system using plants forms a beautiful natural-water landscape and initiates a self-recovery process. Such an eco-energetic system project, complemented by infrastructure for water collection and oxygen saturation, has been successfully implemented in the Republic of Tatarstan (Bureau MAParchitects 2015). The reclamation of the urban landfill in Chelyabinsk became possible due to a set of green technologies, transforming the site into a green hill with fresh air (Ministry of Natural Resources and Environment of the Russian Federation 2021).

These initiatives have led to the development of environmental entrepreneurship and environmental management since the late twentieth century. The fundamental principles of environmental entrepreneurship became eco-efficiency and eco-justice, congruent with sustainable development and the green economy. For Russian entrepreneurship, environmental aspects mostly have a forced nature, reflecting an evolving trend. This is primarily because environmental entrepreneurship as an economic entity has not yet fully formed and lacks legal and regulatory support. From the government's side, specific support measures for businesses are implemented through the execution of environmental

projects and programs in response to the aggravation of certain environmental issues. There are currently no tax incentives for entrepreneurs in the field of environmental protection. High prices for raw materials for the production of environmentally friendly products and the final products constrain the expansion of the assortment, require substantial investment, and slow down the development of environmental entrepreneurship.

A source of danger to the environment and a driver of economic growth, people have increasingly embraced green technologies, recognizing the imprudence of an indifferent attitude towards the natural surroundings. It is essential to mention the motivation of the population towards improving the quality of life through the popularization of conscious consumption. The list of green technologies of conscious consumption is quite extensive, including waste separation, avoiding plastic packaging and bags, sharing resources, etc. The Green movement "ECA" has been actively developing since 2010 in Russia. The first green project that united people across the country was the "Plant a forest" program. However, in our view, the key green project and achievement lie in the understanding and organization of projects for eco-education for diverse population segments. It is crucial to comprehend that individuals are the creators of the quality of their lives. The most well-known enlightening green projects are EcoClass.rf, Green Universities of Russia, Ecowiki.ru, and kapoosta.ru.

It is necessary to establish limitations on human interaction with nature. The concept of quality of life rightly notes that by restricting the satisfaction of human needs, we can achieve sustainability for the ecosystem and preserve it for future generations. It is imperative to limit overconsumption of the natural environment by setting norms for environmental protection; restrict environmental pollution from human activities by establishing emission norms, harmful concentration standards, and waste disposal technologies; and develop and implement measures to restore the natural environment. Only through rational use of natural resources can we achieve a sensible interaction between humans and the natural environment. Green technologies play a significant role, reducing the negative impact of humans on the environment, which, in turn, represents the noosphere.

Applying green technologies can be considered a bilateral process involving entrepreneurs and consumers. Each side contributes to shaping the quality of life. Agreeing with the views of Russian scientists, we note that achieving the goal of improving the quality of life, as one of the key directions for ensuring the country's economic security (Presidential Executive Office 2021), can be attained by positioning the country as an environmentally friendly state, implementing environmental protection priorities in foreign and domestic policies. Additionally, we consider it important to strengthen efforts in the fair distribution of responsibility for pollution between producers and consumers of dirty products (Karaganov et al. 2021).

A set of indicators is applied to assess the quality of life and the impact of the results of implementing green projects. We believe that the optimal comprehensive indicator for evaluation could be the index of the quality of life, which considers objective and subjective differences in the location of the assessment subject related to territorial, climatic, ecological, economic, organizational, and demographic characteristics. This indicator forms the basis of a key ranking evaluating the quality of life of the population in Russian cities. It consists of directions, each of which is detailed with aspects such as housing conditions, income and employment, urban improvement, leisure activities, and public activity. Monitoring changes in the quality of life index in cities shows the measures taken by the government and businesses to enhance the population's quality of life and makes it possible to identify which green technologies yield the maximum effect. The significance and informativeness of the index are confirmed by the fact that the quality of life index was updated in 2023, with 103 new cities added to it (now totaling 218).

It is essential to note that digital technologies played a significant role in the application of green technologies and the improvement of quality of life, demonstrating a tremendous effect during the COVID-19 pandemic, sanction restrictions, and natural disasters. Examples include IT projects in the tourism and eco-education sectors. Vertical farms, equipped with software that makes it possible to remotely control the cultivation process, are already designed and operational in major cities. The digital intelligence of smart cities minimizes the time and effort spent by citizens, provides real-time information to all system users, and contributes to time savings, life preservation, crime prevention, reduction of disease spread within the city space, waste reduction, and improvement of social interaction.

The key directions of green technology development to ensure the quality of life in Russia can be summarized as follows:

1. Development of renewable energy sources, such as solar and wind energy, to reduce dependence on fossil fuels and air pollution. It is also important to develop energy-efficient technologies, including energy-saving buildings and energy consumption management systems.
2. Promotion of electric transport, such as electric and hybrid vehicles, to reduce harmful emissions and improve city air quality. It is also crucial to develop autonomous transport technologies that can enhance the efficiency and safety of road traffic.
3. Implementation of water treatment and utilization technologies, as well as the development of water reuse

systems to reduce water discharge and conserve water resources. It is also important to develop water quality monitoring systems to ensure the safety of drinking water.
4. Innovation in waste processing and utilization aimed at reducing landfill volumes and minimizing negative environmental impacts. Developing waste sorting systems and renewable energy sources from waste are crucial aspects.
5. Promotion of organic farming and sustainable cultivation methods to reduce the use of pesticides and chemical fertilizers. Developing new technologies to increase agricultural productivity and efficiency is also important, including the concept of urban farming in megacities based on smart city technologies.
6. Development and production of eco-friendly materials. It is necessary to research and develop new materials that are more sustainable and do not harm the environment during production and use.

By focusing on these key areas, Russia aims to integrate green technologies into various aspects of life to enhance the quality of life, promote sustainability, and contribute to environmental well-being.

4 Conclusions

The aspects of the green economy, sustainable development, and quality of life cannot be considered in isolation from each other. The technologies employed to achieve the conceptual goals of each direction bring about a synergistic effect, complementing one another and motivating individuals toward a more sensible approach to the environment. Government support for the implementation of green technologies to enhance the quality of life should include the following measures:

- Providing subsidies, grants, and preferential loans for the development and implementation of green technologies, which will help reduce financial risks and stimulate commercial interest in the development and use of these technologies;
- Introducing tax incentives and reducing the tax burden for companies utilizing green technologies. This may involve exemptions from income tax, reductions in property tax rates, or value-added tax;
- Developing and implementing laws, standards, and regulatory requirements aimed at supporting green technologies. For example, mandatory targets for renewable energy use or requirements for the energy efficiency of buildings could be established;
- Investing in education and research in the field of green technologies. This will contribute to the development of human capital and scientific research necessary for the improvement and application of such technologies;
- Supporting partnerships and collaboration between businesses, academic institutions, and civil society for developing and implementing green technologies. Such collaboration makes it possible to pool resources and expertise, accelerating the adoption of these technologies;
- Providing information and consultations on green technologies, their advantages, and implementation options. This helps companies and the population make informed decisions in favor of green technologies.

Government support for implementing green technologies is a crucial factor for their successful development and dissemination. It helps create a favorable environment for innovation, stimulates economic growth, and enhances the quality of life for citizens.

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Current Issues of Protecting Citizens' Rights in the Sector of Financial Services Provision

Inna N. Skuratova, Tatiana F. Timofeeva, Viktor V. Timofeev, Olga V. Zakharchenko, and Vera P. Filippova

Abstract

Based on the analysis of contemporary banking legislation, law enforcement, and judicial practice, the authors identified the most typical violations of consumer rights in the rapidly evolving world of financial services. The authors considered an important aspect related to transferring all powers for judicial interpretation of legislation on financial transactions to the Supreme Court of the Russian Federation. Legal positions of judicial practice regarding the protection of citizens' rights, especially in concluding contracts for the provision of financial services, have been changing. Statutory requirements for concluding contracts, aimed at providing citizens with a full understanding of financial services, allow consumers to make informed choices. Furthermore, the authors considered interesting foreign experiences in protecting consumers of financial services. Oriented toward positive experiences, the authors aim to improve the legal status of citizens by enhancing their protection in the provision of financial services. The analysis encompassed the most common situations of violation of rights and legitimate interests of consumers of financial services in Russia when concluding bank deposit and bank loan agreements. Recommendations have also been proposed to reduce risks in protecting the rights of consumers of savings services, which was the research's ultimate goal.

Keywords

Credit organization · Bank · Banking system · Bank deposit · Financial services · Credit agreement · Consumer rights · Bank products · Savings services · Consumer of banking services

JEL Classification

K1 · K14

1 Introduction

Currently, banks provide a whole range of financial services, among which savings services and lending services (credit) hold great significance. Savings services entail the bank's activities focused on preserving an individual's funds at minimal interest rates with unrestricted options for their use (withdrawal, deposit) from the account. One form of savings service is the establishment of a bank deposit agreement. Unfortunately, situations involving violations of consumer rights and interests in financial services occur quite frequently, adversely affecting the citizens' economic status and eroding trust in the state's banking system. Lending services involve the provision of returnable funds to a client by the bank at a specified interest rate. Alongside breaches in the realm of bank deposits, a significant number of violations of banking and civil legislation can also be observed in the execution of legal norms pertaining to credit agreements.

According to the registry of credit organizations registered by the Central Bank, there were 679 credit organizations authorized to conduct banking operations in the Russian Federation as of October 1, 2023 (Central Bank of the Russian Federation 2024). However, out of this number, 311 entities are in the process of license revocation,

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_35

meaning that 368 credit organizations remain legally competent, where operations related to lending, bank account servicing, and depositing are most sought after by citizens. It is precisely lending, as a financial service, that generates a considerable number of disputes between bank clients and credit organizations. Failing to reach a consensus in extrajudicial proceedings, they are compelled to resort to judicial protection of their rights and legitimate interests. The interests of bank depositors are most safeguarded, as evidenced by the functioning of the deposit insurance system and judicial practice.

This research aims to analyze judicial practices and develop recommendations for consumers of financial services, the compliance with which will significantly reduce the risks arising from the conclusion of bank deposit and credit agreements.

In light of the aforementioned, the study of violations of consumer rights in these financial services is relevant and requires further investigation.

2 Materials and Method

The research was conducted based on the analysis of regulatory legal acts of foreign countries and the Russian Federation regulating the provision of financial services. Additionally, the authors examined law enforcement and judicial practices concerning the investigated issue. Materials from the 2022 report of the International Confederation of Consumer Societies on the state of protection of rights and interests of consumers in the market of savings services in Russia were of significant importance for the present research.

During the research, the authors applied general and specific research methods, including systemic-legal, comparative, logical, structural–functional, and others.

3 Results

Norms guaranteeing judicial protection of the rights and freedoms of individuals are enshrined in the constitutions of all democratic countries. In this regard, Russia is no exception. Article 46 of the Constitution of the Russian Federation (hereinafter referred to as the Basic Law of Russia) clearly delineates such a guarantee. Overall, the observance and protection of citizens' rights are unconditional actions. They are realized to adhere to the principles of law and recognition of its supremacy.

In implementing their social and economic rights, as stipulated in the Basic Law of Russia, citizens often turn to banking products widely represented in the contemporary financial services market.

In this regard, the experience of foreign countries is of interest. For instance, the UK has the Financial Services Compensation Scheme (FSCS), which is posted on English bank websites. Following the link, consumers can obtain information about the FSCS and the current restrictions. In addition to posting information on the website, banks must also provide information in branches and annual letters to consumers explaining the limitations. In the UK, a bank accepting deposits must post information on its website in such a way as to optimally convey the information to depositors. The logo "protected by FSCS" or FSCS digital banners must be prominently displayed. The logo or banner must contain links to the FSCS website, the page with information about the FSCS, and the FSCS booklet in PDF format. The digital banner must observe the following requirements:

- Placed to be clearly visible and noticeable on the website;
- Placed on the product's home page (for current accounts and savings accounts);
- Placed on the login or access page for existing customers.

Unlike credit agreements, the sector of bank deposits remains the most stable and well-protected concerning the interests of citizens—consumers of financial services. This circumstance finds reflection in judicial practice. All disputes relate to relations regarding bank deposits (the dates of entry into force of regulatory norms, technical errors by bank employees in deposit operations, etc.). There are no disputed situations "within" the area of such relations. Of particular interest are cases related to the tightening of requirements for personal identification and the security of banking operations in the conditions of digitalization of the economy, which cannot but affect traditional procedures for the execution and withdrawal of funds within the framework of a bank deposit agreement.

An illustrative example is a case considered by the Constitutional Court of the Russian Federation. Of particular interest is the fact that such a high-ranking judicial instance was involved in a similar legal dispute, which is quite rare.

The essence of the case was as follows. In her lawsuit, citizen L. M. indicated that the provisions of the Federal law "On amendments to Article 11 of the Federal Law 'On deposit insurance of individuals in banks of the Russian Federation' (hereinafter Federal law No. 451-FZ) and Article 46 of the Federal law 'On the Central Bank of the Russian Federation (Bank of Russia)'" (Federation 2014) are inconsistent with the provisions of the Basic Law of Russia (particularly Part 2 of Article 4). The plaintiff claimed that the provisions of Article 11 of the Federal

law "On insurance of deposits in banks of the Russian Federation" (December 23, 2003, No. 177-FZ, as amended by the Federal law of December 29, 2014, No. 451-FZ) (Federation 2003) are applied in the event of an insurance event concerning credit organizations only after the entry into force of the Federal law No. 451-FZ.

According to L. M., this particular circumstance was the reason for rejecting her claims. In the plaintiff's opinion, the inconsistency of Articles 2, 18, and 35 (Part 3) and Article 54 of the Basic Law of Russia with the contested norm of law does not provide the retroactive effect of a law that improves or mitigates the position of the client-depositor.

Having examined the essence of the matter and the documents presented, the Constitutional Court of the Russian Federation (the Court) denied the plaintiff's request for a hearing. The Court relied on fundamental postulates inherent in law, particularly the principle of the application of normative acts in time. It is commonly understood that a law extends its effect to those social relations arising after its enactment. However, there is also the concept of "retroactive force of the law," meaning that the law may affect social relations arising before its adoption, but the implementation of this retroactive effect is within the purview of the legislator alone. Thus, the contested provision of Part 2 of Article 4 of the Federal Law No. 451-FZ, which corresponds to the general rules of the law's operation in time and aims to ensure legal stability and certainty of legislative regulation, cannot be considered as violating the constitutional rights of the applicant listed in the complaint.

The following example of judicial practice also presents a certain interest for examining disputed issues concerning consumers of financial services.

Citizen L. filed a lawsuit against PJSC "Sberbank" demanding the recovery of funds from the latter under a bank deposit agreement in the amount of 800,044.43 rubles and compensation for moral damages in the amount of 50,000 rubles. In substance, it was noted in the claim that on April 7, 2014, citizen L. entered into a bank deposit agreement with structural unit No. 7003/0432 of the Sverdlovsk branch of PJSC "Sberbank" under the tariff "Popolnyai" [Replenish]. The closing date of the deposit was determined to be June 12, 2017, with a final amount of 800,044.43 rubles.

According to the terms of the agreement, any settlement operations were prohibited under this contract. However, the credit institution violated the contract's terms, particularly clauses 1.8 and 1.14, by closing the deposit and transferring the funds to the plaintiff's account. Citizen L. claims that she did not request the contract's termination and did not receive the funds. The claim highlights that on June 12, 2017, without her consent, the bank's employees closed the bank deposit agreement; the funds amounting to 800,044.43 rubles were transferred to her card, thereby clearly demonstrating a gross violation of the law and the contract terms.

Due to the lack of practical skills in using a bank card, believing that she was communicating with bank employees, L. carried out all requirements and instructions via mobile phone as she assumed they were from the credit organization's staff, thereby being misled. As a result of her actions, the money was stolen by unknown individuals. Consequently, the plaintiff claims that PJSC "Sberbank," through its actions, allowed the unlawful deduction of the deposit amount with accrued interest, thus grossly violating the plaintiff's legal rights and interests.

During the judicial proceedings, it was revealed that PJSC "Sberbank" concluded a bank deposit agreement with the plaintiff L. on April 7, 2014, under the tariff "Popolnyai" [Replenish], in accordance with the Terms of placement of funds for this financial service in the amount of 150,000 rubles.

The applicant also has a bank card. The plaintiff's acquaintance with the Rules and conditions of using bank cards, the Cardholder's Guide, and the Cardholder's Safety Passport is confirmed by the plaintiff's personal signature on the application form for receiving the bank card. These factual data suggest that the cardholder has the necessary minimum skills to use this tool. These circumstances are also confirmed by the fact that since January 11, 2013, the plaintiff has been subscribed to the "Mobile Bank" service and is also registered and using the Sberbank Online system, for which she has an individual login and password.

Paragraph 1.5 of the Conditions for banking services for individuals establishes that the client of the credit organization has the right to use the service of conducting banking operations on deposit accounts and bank cards remotely, through specially created service channels.

Outside of remote banking services, only a standard list of services related to card services is available, such as cash withdrawals, etc.

The existing automated and secure system in Sberbank (i.e., Sberbank Online) is a part of the remote customer service of this credit organization through its official website and installed mobile applications. This digital innovation allows the bank's clients to always have detailed information on all Sberbank banking products at hand. Moreover, transactions for payment of utility bills, Internet networks, and digital television can be made through this system. Sberbank Online gives clients the right to carry out various transactions between their accounts, including deposits, cards, and savings accounts, as well as to replenish electronic wallets and make money transfers to arbitrary details.

Thus, the client was provided with a remote management service for all banking products (deposits, accounts). Her phone was connected to the "Sberbank Online" service. On June 12, 2017, the day of the disputed transaction,

the plaintiff logged into Sberbank Online by entering a one-time password that had been sent to her phone shortly before.

After entering the registration password provided by the bank, the plaintiff's bank card, referred to as Card N, was linked to the Wallet mobile application (which allows storing all user cards in one place). The bank notified the plaintiff of this operation on June 12, 2017, by sending an SMS message to the mobile phone number associated with Sberbank Online. On June 12, 2017, two contactless payment transactions for goods or services were made using the plaintiff's Card N, amounting to 628,138 rubles at the "SALON KONSUL" and 147,970 rubles at "RSTR MSK MEGA TS" trading and service enterprises. The bank informed the plaintiff of these two contactless payment transactions on June 12, 2017, by sending SMS messages to the smartphone number linked to Sberbank Online.

The plaintiff received 27,320 rubles on June 13, 2017. On the same day, she was notified of the transaction by the credit organization through an SMS message sent to her phone number connected to Sberbank Online.

After examining the matter, the Civil Division of the Sverdlovsk Regional Court issued an appellate ruling, leaving unchanged the decision of the Leninsky District Court of Yekaterinburg dated May 27, 2019. The plaintiff's claims were dismissed (Seventh Court of Cassation of General Jurisdiction 2020).

Another significant issue in the market of savings financial services in Russia is the inclusion of certain conditions in the banking agreement that do not benefit the consumer, coupled with the imposition of additional services. The conditions that do not benefit the consumer include, for example, the credit organization's right to unilaterally change such contract terms as tariffs, automatic contract extension, interest rates, etc.

Specifically, if tariff changes are possible, the credit organization explicitly states such a condition in the agreement. However, in most cases, credit organizations insist that information about tariff changes be provided by posting them on the bank's official website. Often, no other notification is provided. This raises the question of how often the consumer should visit the bank's website, carefully check it, and delve into the latest news always to be aware of the latest changes.

The most popular additional services offered when opening a deposit agreement are the imposition of a bank card, for which a separate account is opened, and the maintenance of which is paid by the client according to the bank's tariffs (usually annually). As a result, part of the interest received on the deposit is returned to the bank by the consumer in the form of payment for accompanying deposit services and the actual (effective) interest rate, based on which the consumer decided to place funds in the deposit, turns out to be lower for them than the declared one.

4 Conclusion

The authors drew several conclusions after analyzing the legislation, law enforcement, and judicial practice concerning the investigated issue. The most significant conclusions are as follows:

1. Providing consumers with standard structured information about all conditions of a banking deposit is essential. Therefore, the requirement for the preliminary provision of structured information to the consumer becomes relevant, enabling them to quickly understand the expenses associated with opening a deposit in a specific bank and assess the interest income from the deposit. On this basis, the consumer can make an investment-based decision on opening or managing a bank account. An important quality of such information, presented in written form, is its brevity, readability, and clarity. Information presented in this way will enable any user to assimilate the details and then compare the expenses and incomes associated with each element of the proposed product.
2. In the context of the digitalization of financial services, the interests of citizens are inadequately protected. However, addressing the problem should be comprehensive, as cases of cyber fraud are often linked, as in this case, to mobile communication means, therefore, depending on the effectiveness of control and supervision in this particular sector.
3. On the one hand, the realization by citizens of the constitutional right to judicial protection of banking services reveals acute and evident problems in this sphere; on the other hand, it contributes to the optimization of banking and civil legislation.

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Conditions for Managing the Innovative Activities of Teachers to Develop Educational Robotics

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Abstract

The research examines the problem of innovative activity of teachers in the education system. The authors note that most often, the stimulus for starting innovative activities is the appearance of low teaching results, the occurrence of failures and difficulties in work, and the lack of compliance of the activities performed with the latest requirements, which are constantly changing. The research discusses robotics, one of the means of information and communication technologies. Robotics is considered a relatively new scientific direction. The authors analyzed the content of educational robotics, which made it possible to note that within the framework of the authors' model, the innovative activity of a teacher is seen as the main direction of development of the process of educational robotics in an organization. Simultaneously, to develop such activities, it is necessary to introduce active forms of learning into the process of pedagogical activity, which are presented in the form of experimental studies conducted by children and project types of work. Introducing educational robotics into the teaching and learning process allows students to be the protagonists of their learning and develop their full potential, creativity, technical and entrepreneurial skills, etc. The use of educational robotics allows teachers to develop at the personal and professional levels and opens up wide opportunities for implementing innovative activities, which, in turn, can contribute to the development of this technology.

Keywords

Management · Innovation activities · Educational process · Robotics · Development

JEL Classification

R11 · R12 · R 58 · Q13 · Q18

1 Introduction

Society places serious demands on teaching staff. The demand and success of teachers in the labor market presuppose their readiness for constant self-improvement and self-development, accepting constant changes in the education system, and understanding of the emergence of possible risks and the presence of a high level of adaptive abilities of the individual.

Innovation is extremely necessary for the existence of society. It helps develop many areas of professional activity and ensures their advancement and improvement.

By the beginning of the twenty-first century, educational innovation gradually took its place in science, becoming a new branch of scientific and pedagogical knowledge. However, its formation as a science is far from being completed. Nowadays, pedagogical innovation is nothing more than a young branch of pedagogy. Its further development has become the subject of many contemporary scientists who devote their works to identifying patterns, clarifying the conceptual apparatus, and formulating principles and other scientific attributes.

The professional activity of a teacher who reproduces existing experience and applies only well-known methods, without striving to improve to achieve better results and develop their personality, cannot be called full-fledged.

In addition to transferring knowledge and experience to schoolchildren, the calling of a teacher is the creative

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transformation of the learning environment, the comprehensive development of students' personalities, and self-development. However, the desires and aspirations of the teacher for innovative activities and personal readiness for them alone are not enough. It is also necessary to provide conditions for this in the educational organization. In connection with the above, the problem of innovation activity is of particular interest in the scientific community and requires constant development, which determines its relevance.

2 Methodology

The innovative activity of a teacher cannot be carried out without implementing a creative approach because it lies at the heart of any innovation. This is confirmed by the opinion of M. A. Kuprina, who believes that implementing innovative activities is inaccessible to teachers who do not have intellectual and emotional development, especially those deprived of creative potential (Emelyanova et al. 2018).

An innovative teacher must be able to generate and produce new ideas and be fluent in the ability to design and model in practical forms of activity (Cherney et al. 2023a).

As it becomes clear from the above, the concept of "teacher-innovator," which denotes the main character in innovation activity, is closely related to the concept of "innovation activity."

According to N. V. Yadrovoy, such teachers modernize and modify existing ideas, principles, and teaching methods, developing and educating schoolchildren, and creating new ones, successfully implementing them in their activities (Mukhina et al. 2022).

An innovative teacher is a developer of educational programs that reveal novelty and difference from previously existing ones and improve them. An innovative teacher also creates technologies, distinguished by "the consistency of methodological techniques, the originality of their combination in an integral system that corresponds to a single plan and personal experience, and the author's style of pedagogical activity" (Cherney et al. 2023b).

According to the author, this is the direction of innovative pedagogical search in educational institutions (Diri and Rudneva 2017). Thus, an innovative teacher is a person who demonstrates the highest degree of creative skill during the educational process and takes part in innovative activities, proposing new ideas and developments.

In this research, the concepts of innovation and novelty are recognized as synonyms that complement each other.

The authors agree with the opinion of I. V. Nikishina, who states that "innovation always carries within itself the essence of the content and organization of the new, while innovation carries within itself the essence only of the organization of the new." Thus, "innovation" is the broadest and deepest concept, in a sense identical to the narrower concept of "innovation." Innovation refers to the element that is identified and realized in the innovation activity (Gruzdeva et al. 2023).

Based on these concepts, we can identify the following main features of a teacher's innovative activity:

- Creative ability to create new concepts and ideas and apply them in practice;
- The desire to learn and accept new things, which indicates a high level of tolerance and the presence of such thinking characteristics as flexibility and panoramicity.

Accordingly, it is not at all necessary to develop something fundamentally new, non-standard, or original to become an innovative teacher.

Innovation activity includes any transformation of an existing one, any detail of the educational process that has not previously been used in the proposed form.

The main requirement is that the changes be significant and transform the way of activity, style of thinking, etc. Before proposing any innovation for implementation, teachers must analyze their experience in teaching, then check whether the ideas they propose already exist in pedagogy, and only then do they creatively rethink their innovation, transforming it into a significant result. Additionally, there are certain rules for participation in innovation activities. Thus, it must comply with certain principles.

Therefore, innovative activity makes it possible to change the components of the pedagogical process and form a conscious attitude towards one's work, realize one's potential, etc.

Innovative activity is of developmental importance for a teacher. It allows them to move forward in their professional activities and improve themselves.

This research examines the conditions for managing the innovative activities of teachers to develop educational robotics in educational institutions.

3 Results

Information and communication technologies are one of the areas of pedagogical activity in which one can demonstrate their innovative abilities. The federal state standard of the new generation, in view of changing requirements for the goals and objectives of education and lesson organization, calls on teachers to change approaches to teaching academic disciplines using new pedagogical technologies. Information and communication technologies (ICT) in pedagogy is the latest pedagogical technology, which is increasingly developing and expanding annually.

The use of ICT in the educational process helps activate the cognitive activity of schoolchildren, increases the motivation to learn, comprehensively develops the personality of students, helps them realize the value of knowledge, etc.

With the use of ICT in education, many different innovations can be implemented, which will help improve the quality of education (Smirnova et al. 2023).

Implementing innovative activities with all its principles and conditions is impossible without using ICT in all areas of education: in the educational process, research work, extracurricular activities, and additional education.

An innovative teacher cannot help but apply the latest technologies to improve educational processes, including ICT.

Thus, the innovative activity of a teacher is nothing more than purposeful pedagogical activity based on comprehension and reflection of one's experience, creative transformation of existing ideas, systems, methods of organizing the educational process to introduce qualitatively new pedagogical practices to improve the quality of education.

In accordance with the goals and objectives of this research, it should be noted that in the conditions of scientific and technological progress, the most important place in the innovation process is occupied by information and communication technologies, which have become an integral part of contemporary education.

Through their use, many positive results can be achieved, including improving the teacher's personality and the comprehensive development of students' personalities, including forming their information and technical competencies.

One of the ICT tools is educational robotics, which opens up wide opportunities for implementing innovative activities, which will be studied in this research.

The innovative activity of a teacher is impossible without the use of ICT, which are the latest tools for improving the educational process.

Robotics is one of the ICT tools, considered a relatively new scientific field. Based on the latest achievements of science and technology, robotics is developing continuously and rapidly.

Educational robotics is gaining particular popularity in the pedagogical environment, causing high scientific interest.

However, before considering the specifics of educational robotics, it is necessary to define the concepts of robot, robotics, and educational robotics.

The standards include the State All-Union Standard (SUS) R ISO 8373–2014 "Robots and robotic devices. Terms and definitions" and the international standard ISO 8373:2012 "Robots and robotic devices—Vocabulary." A robot is defined as "a drive mechanism that is programmable in two or more axes, has some degree of autonomy, moves within its working environment, and performs tasks for its intended purpose" (Gruzdeva et al. 2023).

A more comprehensive definition of the concept of "robot" is given by A. A. Gulyuta and V. N. Kazagachev. They understand robots as technical means that can be effectively used to perform work in the following cases (Zheleznyakova 2018):

- When high accuracy and speed are required;
- In inaccessible and dangerous conditions and environments for life and health;
- When it is necessary to introduce technology that replaces the hard physical labor of tens and hundreds of people;
- When it is necessary to increase the efficiency of protecting the state, the environment, and human life;
- When it is necessary to automate the prevention of disasters and accidents;
- When it is necessary to increase labor productivity, etc. (Gruzdeva et al. 2023).

On the one hand, educational robotics implies using special technical equipment for educational purposes. On the other hand, it involves introducing children to engineering and technical creativity and their inclusion in this process.

Within the framework of this research, educational robotics is of particular interest as a means of developing the ability of teachers to create and implement the latest educational tools in the field of additional education, as well as introducing children to scientific and technical creativity.

In other words, the value of this research lies in the development of didactic and methodological aspects of the problem, which, as noted during the study of scientific literature on the chosen topic, receive insufficient attention.

In the authors' opinion, each educational organization needs to evaluate the totality of available resources for implementation.

The result of the teacher's innovative activities will be analyzed through diagnostics of children carried out before and after the program's implementation.

An additional educational program aimed at children aged 11–17 years was developed as part of the research. The base for the program is the Center for Youth Engineering and Scientific Competencies "Quantorium" (city of Nizhny Novgorod). For more effective activities, groups are formed with children of different ages. The program aims to teach children how to design and program controlled electronic devices based on the Arduino computing platform. Based on the analysis of the content of the educational program and the theoretical data obtained, the authors carried out various experiments under the guidance of a teacher.

Experimental activities are innovative because the teacher pays attention to each student, talking about the main aspects of a particular device. Simultaneously, having studied theoretical aspects and conducted experimental research, students will be able to get involved in a new direction of innovative activity of the teacher—design. Designing is very important for developing creativity and communication skills. It was assumed that the most appropriate approach would be for the teacher to assist in preparing and defending the students' primary projects and then to develop the children's independent abilities in this activity.

Based on the program, the authors developed a process model for developing educational robotics in an organization (Fig. 1).

The analysis of the model allows us to note that within the framework of the developed model, the teacher's innovative activity is seen as the main direction of development of the process of educational robotics in the organization. Simultaneously, to develop such activities, it is necessary to introduce active forms of learning into the process of pedagogical activity, which are presented in the form of experimental studies conducted by children and project types of work. Simultaneously, so that children do not get used to monotonous activities, the teacher needs to replenish the methodological base on educational robotics, study foreign experience, and, on this basis, introduce new forms and methods of work to develop children's creative abilities.

The program made it possible to determine the criteria for developing educational robotics in an organization based on innovative pedagogical activities. They include the following:

1. Improving student results in educational robotics using creative tasks and methods for determining the development of technical thinking;
2. Constant replenishment of the teacher's knowledge about existing forms and methods of working with children in educational robotics, including with the involvement of foreign experience;
3. Increasing the methodological support of educational organizations with manuals on educational robotics;
4. Development by teachers of their own innovative ideas on educational robotics every quarter.

The planned results are as follows. Students will know the basic laws of electricity, the principles of operation of electrical elements and sensors, and the basics of programming microcontrollers. They will also be able to read circuit diagrams, use electrical elements and modules, and program a microcontroller. Students will also be able to master the basics of design and programming. Personal results include learning public speaking, developing communication skills, and observing safety precautions when working with electronic devices. The following meta-subject results are considered: students will be able to operate with the concepts of algorithm, robot, and performer, as well as to plan ways to achieve goals and adjust them independently.

The program results were assessed using previously presented diagnostics—a creative task and a methodology for assessing the development of Bennett's technical thinking.

Thus, a program for conducting courses in educational robotics with children aged 11–17 was developed. It was built based on the Arduino designer.

Thus, classes will involve studying theory and practical tasks related to performing experiments. At the end of the program, project forms of work are tested to develop children's communication skills. The main outcome of the program is the development of creative thinking of students and the introduction to design and programming activities.

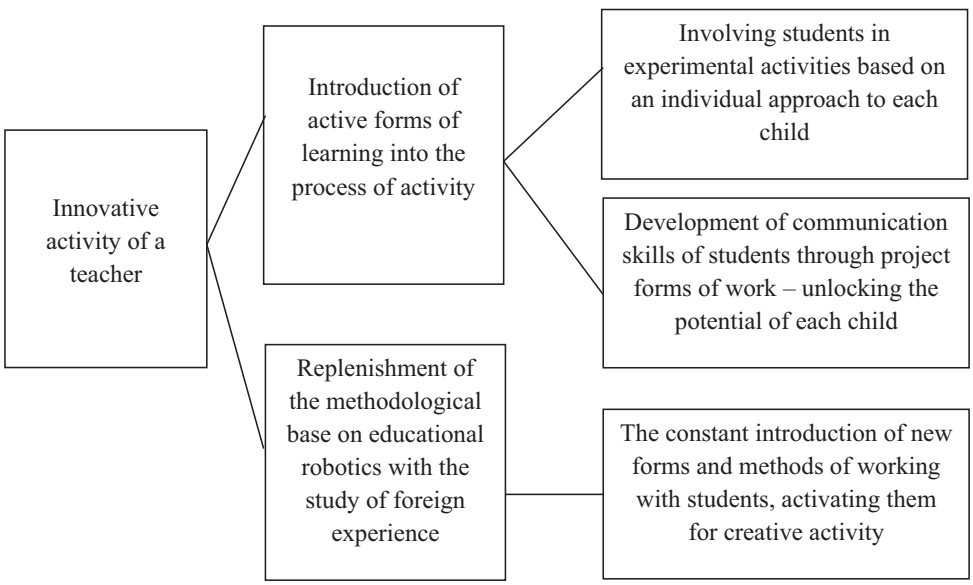

Fig. 1 Model of the development process of educational robotics in an organization. *Source* Compiled by the authors

The program's effectiveness will be analyzed in accordance with tests containing a creative task, as well as a methodology for assessing the level of development of students' technical thinking.

4 Conclusion

Within the framework of this research, the authors considered the specifics of the teacher's innovative activity. As a result, the authors conclude that innovative activity is the main indicator of the level of development and competence of teachers, as well as their skills and creative potential. It gives a teacher the opportunity for self-realization and professional and personal growth. The teacher must be ready to participate in innovative activities at the psychological, personal, and professional levels. Therefore, this activity requires competent support and guidance.

Educational robotics is considered the latest pedagogical technology. The authors formulated their own definition based on individual theses of interpretations of the concept by various authors. Educational robotics is understood as an interdisciplinary direction of teaching schoolchildren through the use of ICT (robots), which involves involving children in engineering and technical creativity and laying a strong foundation for systems thinking.

Educational technology is the latest pedagogical technology, the use of which is useful for students and teachers. Introducing educational robotics into the teaching and learning process allows students to be the protagonists of their own learning and develop their full potential, creativity, technical and entrepreneurial skills, etc. The use of educational robotics allows teachers to develop at the personal and professional levels and opens up wide opportunities for implementing innovative activities, which, in turn, can contribute to the development of this technology. However, in science, there are no specific recommendations regarding the successful organization of innovative activities of teachers to develop educational robotics.

After conducting an experimental study, the conditions for managing the innovative activity of a teacher were formulated to teach educational robotics. It was found that it is necessary to control the process of replenishing the teacher's knowledge about the methods and techniques used in teaching educational robotics, including when using foreign experience. The teacher also needs to self-develop and expand their knowledge base. Let us note that the teacher needs to use a person-oriented approach towards students, which is facilitated by a system of motivation and rewards. The innovative activity of a teacher when teaching robotics can become more effective with the introduction of a diagnostic system for teachers so that they increase their creative abilities and creative thinking.

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Cooperative and Managerial Mechanisms of Sustainable Development and Green Growth of Business and Economy

Development and Implementation of Mechanisms for Sustainable Economic Development of Industrial Parks

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Abstract

The authors identify the need to develop and implement mechanisms for the sustainable economic development of industrial parks in the context of ESG. The authors note that industrial parks are developing new approaches to attracting investments to the regions to solve sustainable development problems. The research aims to develop and implement priority areas, streamline development mechanisms, and bring them to a unified system of investor support measures depending on the specifics of sites and the purposes of using the means of developing industrial parks. The authors analyze the problems of integrating industrial parks into the global transition processes to sustainable development. The research notes that investors are increasingly interested in partnering with venues that take sustainability issues seriously. The developers of industrial parks are transforming their business models and adapting to international standards to attract investors. The ESG paradigm and requirements to adhere to this concept are not built into the Russian legal system. The need for this measure is a debatable issue. Given the current geopolitical situation, it is possible that the development of ESG in the country will slow down somehow, and its vector will shift. In 2022, the emphasis was placed on the environmental aspect of ESG. In 2023, a reorientation to the social agenda was organized.

Keywords

Design · Implementation · Mechanism · Sustainability · Industrial parks · Metascience approach

JEL Classification

L5 · N6 · O1

1 Introduction

The relevance of the ESG agenda for business, the level of ESG transformation of Russian sites, and the need to implement a sustainable development strategy are determined in the study (Andryashina 2014).

The introduction of ESG principles into the business processes of industrial parks increases investment attractiveness and improves the image. The ESG agenda is working, making it possible to attract additional funding. Industrial parks acquire loans linked to KPI and ESG rating as part of the implementation of sustainable development principles, which positively affects the cost of financing (Garina 2014).

In 2022, 12 issues of Russian sustainability bonds were placed, which speaks in favor of ESG in the country. There is a greenie effect when the coupon rate is reduced because Russian sustainable development bonds are popular and in great demand. The effect is insignificant and not stable. However, it exists. Therefore, besides image bonuses, sites receive real economic benefits from implementing ESG principles (Egorova 2014).

The balance of economic growth and environmental and social problems is ensured by ESG when developing industrial parks does not harm people or nature. The concept is characterized by sustainable development, which determines the essential paradigm. A set of metrics, criteria, and

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parameters is implemented using the ESG paradigm. An important direction is the inclusion of ESG in the legislation (Zagidullin et al. 2007).

2 Materials and Method

The works of the following authors are devoted to studying the mechanisms of sustainable economic development of industrial parks in the context of ESG:

I. Ajzen, L. Chen, R. Farel, C. Godfrey, R. Goetzel, A. M. Hein, M. Jankovic, S. Parrott, K. Peterson, K. Proper, M. Raw, V. Silis, M. Spence, G. A. Stain, A. Strittmatter, T. Yamashita, and B. Yannou.

Such an aspect of the problem as sustainable development, considered in the study, has not been sufficiently studied. The scientific literature does not widely consider the development and implementation of mechanisms for the sustainable economic development of industrial parks.

3 Results

The main objectives of the sustainable economic development of industrial parks (until 2023) include the following:

- Addressing issues of obtaining integrated environmental permits;
- Development of federal law on non-public reporting;
- Changing sustainable development strategies, increasing attention to the problem of biodiversity reduction, and developing or strengthening programs aimed at nature protection;
- To ensure transparency of the green portfolio of the banking market, it is necessary to agree on a voluntary reporting format that discloses the general parameters of the green asset portfolio or ESG in terms of volume, dynamics, industry profiles, and the taxonomy used to achieve a result (Mironov and Blaginin 2017).

In 2022, a full cycle of changing opinions on the suitability of the ESG agenda for Russia was developed. The ESG agenda remains relevant even in the new reality.

It is necessary to prescribe the principles of ESG in the legislative field because human activities and built business models aimed at hedonistic values and profits have shown destructive results of management organized without observing ESG principles (Mironov and Dubrovsky 2018).

Under these conditions, the search for the most optimal model for project implementation is one of the key tasks of legal expertise:

- Eco-industrial park (EPP) as a kind of industrial park—as an independent legal idea;
- Agreement on public–private partnership (PPP);
- Concession agreement;
- Special investment contract (SPIC);
- Investment agreement (Mironov 2018).

The turn to the East will not bring significant changes in the ESG agenda towards easing because Asian countries, including China, and even neighboring countries, such as Kazakhstan, are actively developing this agenda and introducing green financial instruments. The reorientation of potential exports to the East meets the same rules, problems, and discussions that are present in the West.

In 2023, the ESG agenda will develop further in various directions, penetrating deeper into the sectors of human activity, the ESG training market is expanding, and educational programs are being improved (Ajzen and Fishbein 1980).

Eco-efficiency is a critical element of the ESG paradigm. It is determined by reducing energy costs, materials used in production, and the formation of by-products and toxic waste, as well as the rational use of renewable natural resources (Chen et al. 2015).

Raw materials and energy resources are optimally used. The volume of waste in industrial ecosystems, which are raw materials for some processes and the production of others, is reduced. The industrial ecosystem is an interconnected network of industrial parks in the region. Industrial enterprises dispose of products, waste, and energy generated in the production process in the following ways:

- Reducing the volume of primary raw materials consumed, the degree of environmental pollution, the volume of waste, and the cost of their disposal;
- Increasing the efficiency of energy use and reducing the consumption of primary energy resources (Goetzel and Ozminkowski 2008).

The built ecosystem allows industrial parks to reduce production costs and reduce pollution in the region. It is possible to draw the following general conclusions on the organization and functioning of the ecosystem:

- Ensuring cooperation of industrial parks;
- The conclusion of economically attractive agreements and contracts between industrial parks (International Labor Organization (ILO). Official website 2023).

Conditions are emerging for economically and environmentally efficient organization of life in the region. A special form of industrial ecosystems is realized in the EPP.

As a result of the formation of a new technological order, a transition is being made from industrial parks to EPP. Sustainable industrial parks that implement the concepts of industrial ecology are EPP (Parrott et al. 2000).

Based on the concepts of industrial ecology, collective strategies include the synergy of energy systems and industrial parks. Industrial parks are being integrated to solve joint problems, in which a systemic approach is implemented (Peterson 2012).

EPPs are developed by upgrading strategies in existing industrial parks. EPPs are used as an incentive for economic diversification in a community or region. Anchor residents, bioproduct producers, or waste-to-energy parks attract additional residents; as a result, eco-industrial strategies are implemented (Proper and Mechelen 2007).

The following mechanisms for sustainable economic development of industrial parks need to be developed and implemented:

- To create EPP in industrial and municipal symbioses;
- To implement projects to create and develop EPP in the regions (Silis 2010).

Efficient solutions for energy recovery and reuse throughout the entire life cycle include the use of recuperators, the use of excess thermal energy in buildings, premises, and data centers, and the use of wastewater heat.

When moving from sources to networks, the following possibilities are used:

- Laying of engineering systems for heating, cold, air, and water supply in single collectors, the use of modern economical materials and technologies. The effect is brought by circuit solutions;
- Development of an EPP heat supply scheme modeled on a village heat supply scheme, which will make it possible to balance the load and optimize sources. In the future, one can efficiently operate the system and simulate various development situations.

Creating a unified electronic information system for monitoring and analyzing parameters is a component of the energy-efficient operation of the EPP complex. Monitoring systems, certification of objects, detailed commercial and technical accounting of the consumption of fuel and energy resources, and a management decision-making system make it possible to achieve savings of 20–30%.

The principles of energy management are applied—organizational and managerial potential. Management technologies (effective organizational structure, motivation, workflow, performance analysis based on key performance indicators, etc.) will give a 7–15% effect. The key factor is to build interaction between the authorities, the business community, and public organizations to implement large-scale and long-term directions, apply an integrated approach, and solve problems in the field of sustainable economic development of the Novgorod Region.

An Ecotechnopark of the Real-Invest Group of Companies was created in the Novgorod Region. The volume of investments at the beginning of 2021 amounted to 51.1 billion rubles, an increase of 25.3% compared to the previous year.

The volume of foreign direct investment amounted to $1.2 billion and increased 2.3 times compared to the previous year.

The growth of investment activity is noted in the manufacturing industry, more than 17 billion rubles, and 30% more than in 2020. The volume of investments in the production of vehicles amounted to 2.9 billion rubles (1.9 times more) and to 800 million rubles (1.6 times more) in paper production. Parks invested 900 million rubles in the production of non-metallic mineral products (Spence 2011).

At the end of 2020, the industrial production index amounted to 93.4 and 92.8% for processing. The chemical industry and metallurgy are key industries for the Novgorod Region; the most ambitious projects have been launched in these segments.

The launch of the project to create Europe's first green full-cycle metallurgical complex in Vyksa in 2025—the Ecolant complex—was announced as the largest investment project in metallurgy. Investments in the enterprise amounted to 150 billion rubles.

The production of the Ecolant complex, with a capacity of 1.8 million tons of steel per year, is carried out using coke-free technology. Products in the form of slabs and round billets will be produced using direct reduction technology using iron ore pellets and natural gas. The complex will not emit emissions associated with the production of coke, sinter, and pig iron, in contrast to the traditional converter technology. Emissions of carbon dioxide and sulfur oxide will be up to three times lower than in traditional steel production.

OMK's Vyksa plant in the Novgorod Region will produce steel products with a low carbon footprint that meet the prospective requirements of the EU. Stainless steel will be used to produce large-diameter pipes, main pipelines, wide plates for shipbuilding, seamless pipes for oil production, and railway wheels. Green technologies will make it possible to avoid additional customs and tariff regulation (environmental duty) for deliveries to other countries that apply such regulations, improve product quality, and reduce the burden on nature.

The project and partnership with Ecolant will become a benchmark for introducing new technologies into domestic metallurgy and improving the environment in industrial regions, which will make it possible to reach a new level of supply of low-carbon steel blanks at the base production site in Vyksa.

The peculiarity of the complex is that the metalized pellets will be sent to the arc furnace in a hot form. The resulting steel will be poured into a wide range of products, all within the framework of a compact technology. This will be the first plant in Europe to integrate a complex for the production of metalized pellets according to DRI (Direct Reduced Iron) technology together with electrometallurgical steel production and two continuous casting machines (St George et al. 2012).

4 Conclusion

During the construction period, 2000 jobs will be created in the region. When the complex starts working, there will be more than 700 jobs in it. The effect of the creation of new production is estimated at 5% of the increase in gross regional product (GRP). The launch of the plant will enhance the competitiveness of metallurgical products and create new opportunities for developing the industry in Nizhny Novgorod (Strittmatter 2001).

The first special investment contract (SPIC 2.0) for the period of 20 years in the Novgorod Region was concluded for the complex. Ecolant is implementing the project using advanced technologies and will receive income and property tax benefits, as well as guarantees of stable working conditions. The benefits will be valid for the entire duration of the agreement, starting from the moment the taxable base arises. Due to the scale of the metallurgical complex and the involvement of a large number of contractors and equipment suppliers, tax deductions will exceed 30 billion rubles during the SPIC period. After the expiration of SPIC 2.0, Ecolant's work in synergy with other industries will make it possible to pay about 5 billion rubles to the budget in taxes per year (Yamashita 2009).

The success of the implementation of the ESP depends on the actions of the investor and the size of the initial investment at the initial stage. Investments in EPS are long-term, inertial, and investment-intensive. The following are of great benefit:

- Material effects;
- System effects, achieving the effect of capitalization and multiplication (environmental effect, advancing technological development due to innovative technologies, management methods). EPP is becoming a platform for advanced engineering and management technologies. The scaling of experience to other subjects in the territory and the multiplication of the effect will begin.

Savings, quality of growth, increased attractiveness for investors and residents, sustainability of development and prospects are characterized by the energy efficiency of the industrial park. Using the EPP, it is possible to attract investors, industrialize the region, develop engineering and management technologies, and become a multiplier of innovations for the entire economy of the region.

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Comparative Analysis of the Tourist and Recreational Potential of Agglomeration Territories (Using the Regions of the European North of the Russian Federation as an Example)

Anna V. Shpengler, Anastasia A. Sozinova, Anton O. Nikitenko, Yana Yu. Bondareva, and Danil A. Rudakov

Abstract

The research discusses the main approaches to assessing the tourist and recreational potential of territories. The authors identified three groups of indicators, which can serve as the basis for conducting a comparative assessment of the tourist and recreational potential. The proposed integrated approach is based on the point-rating principle and expert evaluation. The authors propose three groups of parameters of the potential for recreation and tourism activities of the territory for the purposes of comparative analysis. The research was carried out to assess tourist destinations located in the zone of the European North of Russia (ENR). The research objects are the subjects of the Russian Federation included in the active zone of the ENR, whose territories are subject to agglomeration processes and urbanization. The scientific novelty of this research lies in applying an integrated approach to assess the tourist and recreational potential of the region and urban agglomeration and identify key indicators of its development. The relevance of this research is determined by the significant role of tourism in developing economic sectors in the agglomerated territory and in the subject as a whole.

Keywords

Agglomeration · Tourism · Tourist market · Territorial development · Sustainable development · Point-rating assessment · Tourist and recreational potential

JEL Classification

L83 · Z30 · Z31 · Z32 · Z33

1 Introduction

The strategic vector of spatial development, characterized by the stability and sustainability of processes, determines the formation of favorable conditions that have the greatest impact on the result based on the principles of economic, social, and environmental sustainability. Sustainable tourism development requires balancing economic, social, and environmental interests. This point is extremely important for preserving the values of the Russian Federation, particularly cultural and historical values, increasing the comfort of life in the territory, developing effective business relationships, and ensuring healthy competition in the tourism industry. The agglomeration process formed within the European North of Russia (ENR) has a unique natural and cultural-historical potential that creates opportunities and prospects for developing various types of tourism (Kondratieva 2022). Of additional importance and value for the economy as a whole and its individual structural elements in particular is the value-added effect, called the multiplier.

The research aims to assess the development parameters of the potential for recreation and tourism activities of the territory of the subjects of Russia, related to the tourist destinations of the ENR. The research objects are the regions of the ENR, covering a certain part of the Arctic territories of Russia, where the processes of urban agglomeration

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_38

have been formed or are developing. The information base includes the works of Russian and international scientists and statistical data from the Federal State Statistics Service of the Russian Federation (Rosstat).

The scientific novelty of this research is the application of an integrated approach to assess the tourist and recreational potential of the region and urban agglomeration and identify key indicators of its development (Palkina et al. 2023; Schmidt et al. 2016; Savelyeva et al. 2023; Voroshilov 2021).

2 Methodology

The prospects for developing Arctic tourism are the subject of research by various leading Russian and international scholars, who identified and studied the elements of the future development of tourism of the ENR (Kharlampyeva 2016; Lukin 2016; Sevastyanov 2017; Zabaznova et al. 2022).

In a stable economic and political environment, tourism can influence the formation of economic and social advantages and the desire for permanent residence in the territories. The correct direction of efforts to develop the tourism potential of the regions and the creation of favorable conditions for tourism significantly influences the country's social and economic development. In the process of increasing the socio-economic sustainability of territorial development, a certain role is assigned to the tourism market, including the following:

1. Economic contribution and tax revenue: The tourism and hospitality industry could become a growth center for the territory's economy. It helps increase government revenue through taxes and fees on the tourism industry. A large flow of tourists brings significant income to budgets of various levels;
2. Job creation: The development of tourism contributes to the creation of new jobs directly in the tourism sector and in related sectors of the economy (e.g., hotels, restaurants, transport services, small businesses, etc.). This is especially important for remote northern territories, where tourism can become a major source of employment;
3. Development of complementary sectors and industries of the economy (health care, health resorts, trade, public catering, agro-industrial complex, manufacturing industry (food production), etc.);
4. Affects the quantitative and qualitative parameters of the infrastructure of the territory (hotel, transport, sports, trade, etc.);
5. Interregional and intercountry relations: Tourism provides opportunities for the region to participate in interregional and international trade and economic relations. The development of tourism makes it possible to attract external investment and develop foreign economic activity in the region;
6. Multiplier effect: The development of tourism contributes to the growth of other sectors of the economy. For example, growth in tourism demand can contribute to increased consumer lending in the banking sector and stimulate the development of small and medium-sized businesses and other industries (Boldyreva 2018).

The analysis of strategic planning documents for the regions of the ENR made it possible to define the following main areas of activity for developing and improving the regional tourism sector:

1. Enhancing the attractiveness of the proposals of regional tour operators will reduce the share of the shadow market and increase revenues to the regional budget;
2. Developing and improving the road network and the work of customs points will make it possible to develop tourist logistics, provide year-round availability of tourism facilities, and develop inbound tourism;
3. Referring to the second point, it is necessary to note the simplification of the regime for the stay of foreign tourists in the border zones of some regions (e.g., in the Republic of Karelia in the case of comforting intercountry relations;
4. Ensuring close cooperation between municipalities and developing an inter-municipal network of tourist routes will create unique routes through the territory of urban agglomerations and increase the attractiveness of little-known and unclaimed objects in tourism;
5. Improving the communal infrastructure will increase the number of accommodation and public catering facilities on the territory of the constituent entities;
6. Maximizing infrastructure facilities and boosting tourism development in the region will help increase the number of tourists and jobs. As a result, the population's quality of life will improve, and the volume of revenues to the regions' budget will increase.

The formation of a model of sustainable growth of the tourism industry in the ENR regions will require consolidation of efforts at the strategy level and joint interaction between government officials and business representatives to achieve long-term development goals for the regions of the ENR. The study of the territorial features of the tourist market formation and development of municipalities is a relevant direction of the regional social and economic policy of the regions and urban agglomerations. The monitoring of the main indicators is carried out on an ongoing basis, as well as the rating of territories according to the

main parameters of tourism development. The latter is one of the most common tools to assess the tourism and recreational sphere of territories, which makes it possible to grade market leaders to outsiders. In general, it is worth noting that the ratings have a certain effect on the formation of tourist interest and their preferences and stimulate the attraction of investors to the regional tourism field. The analysis of the works of Russian scientists allows us to conclude that there are methods generally recognized by the scientific community and proprietary methods. For example, V. N. Myakshin, A. E. Shaparov, and D. V. Tikhanova note the limitations in the expert approach on which the rating is based. Others offer their own approaches to calculating the region's tourism potential (Orlova 2017, 2021).

Based on the methodology of systemic and structural–functional analysis by N. Leiper, a team of scientists proposed an assessment of the tourism potential of the regions of the Arctic zone of Russia (Myakshin et al. 2021). The positions of the tourist rating of the ENR regions are assessed (Kondratieva 2022).

The research objects are the regions of the ENR. The main features of this geographical location are determined by the large front of the water area and the presence of large ports, which explains the favorable economic and geographical position (EGP) of the region. The ENR includes the Republic of Karelia, the Komi Republic, the Arkhangelsk Region, the Yamal-Nenets Autonomous Area, the Vologda Region, and the Murmansk Region.

Based on the considered methods, the authors proposed to assess the potential for recreation and tourism activities of the territory based on the use of a point-rating approach and analysis of the following groups of parameters:

1. Group M—material heritage of the territory, including the following:
   - M1—objects of cultural significance at the federal level, units;
   - M2—objects of cultural significance at the regional level, units;
   - M3—UNESCO cultural sites, units;
   - M4—museums, units;
   - M5—cultural events on site, units.
2. Group N—natural factors of the territory:
   - N1—specially protected natural territories (PAs) of federal significance, units;
   - N2—PAs of regional significance, units;
   - N3—UNESCO sites with the status of natural significance, units;
   - N4—the share of pollutants emitted into the atmosphere from stationary sources;
   - N5—environmental quality.
3. Group Q—qualitative and quantitative indicators of tourism infrastructure:
   - Q1—the number of travel companies, units;
   - Q2—the number of collective accommodation facilities (CAF), units;
   - Q3—the number of places in the CAF, beds;
   - Q4—the quality of the urban environment.

In the process of calculations, absolute values (abs) were used for each parameter of the study.

The methodology was tested in the ENR regions and in the Petrozavodsk urban agglomeration.

3 Results

The stages of the proposed approach to assess the tourist and recreational potential are as follows:

1. In the first stage, groups of criteria for assessing the tourist and recreational potential and their constituent indicators (groups M, N, and Q and the corresponding criteria M1–M5, N1–N5, and Q1–Q4) are determined;
2. In the second stage, absolute indicators ("abs") of tourism development in the territory of the studied regions of the ENR are calculated;
3. In the third stage, the step is calculated to determine the range of indicators. The degree of potential of each region will be examined on a five-point scale. To assign a scoring indicator, it is necessary to calculate the "Range" of the absolute values of each criterion. For this purpose, it is required to determine the "Step." Then, the ratio of the difference and the number of points on the assessment scale is calculated;
4. In the fourth stage, the ranges are found for the indicators M, N, and Q. The range of assigning a scoring value is set as the sum of the smallest "abs" and "Step." Next, the resulting number is summed up with the "Step" for each of the five points. Based on the "abs" indicator, a score is assigned to each criterion in accordance with the rating scale and "Range";
5. In the fifth stage, the weight coefficients are determined ("Wij," where i is a group of evaluation parameters and j is the corresponding criterion), reflecting the importance and advantage of one criterion over others. To assign "v.k.," we will use the method of peer review, which we will present as a survey for experts in the field of tourism. The survey's purpose is to identify the importance of each proposed criterion on a scale from 1 to 10, where 10 is the highest score;
6. In the sixth stage, the final indicator for each group of criteria is determined;

7. In the seventh stage, the total final indicator is calculated as the sum of all final values for each of the criteria groups M, N, and Q;
8. In the eighth stage, the contribution of the agglomeration to the formation of the tourist and recreational potential of the region is assessed.

During the first stage, we defined the groups of assessment parameters: Group M—the material heritage of the territory, including criteria M1–M5; Group N—natural factors of the territory, including criteria N1–N5; and Group Q—qualitative and quantitative indicators of the tourist infrastructure, including criteria Q1–Q4.

Next, during the second stage, the authors systematized and calculated the values of the indicators of each group in the framework of the studied territories based on open data (Table 1).

During the third stage, the authors determined step sizes in the context of all evaluation parameters. Next, switching to the fourth stage, the authors determined the ranges for indicators M, N, and Q.

The calculation results for Stages 3 and 4 are presented in Table 2.

During the fifth stage, the weight coefficients ("Wij") were determined using an expert survey of tourism specialists from different regions and scientists specializing in this field of research. The weight coefficients in the context of criteria groups were as follows:

- Group M: $W_{M1}=0.2$; $W_{M2}=0.1$; $W_{M3}=0.3$; $W_{M4}=0.2$; $W_{M5}=0.2$.
- Group N: $W_{N1}=0.2$; $W_{N2}=0.1$; $W_{N3}=0.3$; $W_{N4}=0.2$; $W_{N5}=0.2$.
- Group Q: $W_{Q1}=0.4$; $W_{Q2}=0.1$; $W_{Q3}=0.2$; $W_{Q4}=0.3$.

During the sixth stage, the authors carried out calculations among all presented territorial units for the development of tourism and determined the final indicator for each group of criteria (Fig. 1).

During the seventh stage, the authors counted the overall final indicator as the sum of all final values for each of the criteria groups M, N, and Q. The obtained results are as follows:

- Republic of Karelia—3.9;
- Komi Republic—2.8;
- Arkhangelsk Region—3.7;
- Yamal-Nenets Autonomous area—1.8;
- Murmansk Region—2.6;
- Vologda Region—3.2.

In the final, eighth stage, using the example of the leader of the rating, the Republic of Karelia, the authors consider what contribution to the tourist and recreational potential is made by the Petrozavodsk urban agglomeration, which includes three municipal districts (periphery of the agglomeration): Kondopoga, Pryazhinsky, and Prionezhsky districts and the core of the agglomeration—the city of Petrozavodsk. On this basis, the authors analyzed the tourist and recreational potential of these territories (in the context of parameters identified by statistical accounting for municipalities) and determined the share of the agglomeration contribution to the resulting indicator.

The contribution of the Petrozavodsk urban agglomeration to the absolute indicators of group M was:

Table 1 Summary values of indicators of the potential for recreation and tourism activities of the territory of the ENR

Regions	Values of the parameters of the tourist and recreational potential of the territory				
	Group M—tangible heritage of the territory				
	M1	M2	M3	M4	M5
Republic of Karelia	4200	3451	2	35	11
Komi Republic	337	673	0	49	8
Arkhangelsk Region	4340	1550	1	62	12
Yamal-Nenets Autonomous District	16	198	0	5	0
Murmansk Region	57	366	0	32	8
Vologda Region	716	1720	1	86	10
Regions	Group N—natural factors of the territory				
	N1	N2	N3	N4	N5
Republic of Karelia	10	147	0	113.62	111.32
Komi Republic	7	238	1	450.89	79.03
Arkhangelsk Region	8	100	0	150.93	85.63
Yamal-Nenets Autonomous District	2	12	0	10.,02	123.74
Murmansk Region	12	62	0	242.92	110.99
Vologda Region	4	172	0	428.67	114.81
Regions	Group Q—qualitative and quantitative indicators of tourism infrastructure				
	Q1	Q2	Q3	Q4	–
the Republic of Karelia	11,571	146	293	9	–
Komi Republic	7631	102	136	8	–
Arkhangelsk Region	13,077	141	196	11	–
Yamal-Nenets Autonomous District	287	2	10	10	–
Murmansk Region	9684	108	188	8	–
Vologda Region	14,738	128	265	9	–

Source Compiled by the authors based on Rosstat (2022) and Open Data Portal of the Ministry of Culture of the Russian Federation (2023)

Table 2 Determination of the step and range of assessment in terms of M, N, Q

The algorithm for assigning points for each indicator according to the ranges and steps in the group M														
M1			M2			M3			M4			M5		
Point	Range	Step	Point	Range	Step	Point	Range	Step	Point	Range	Step	Point	Range	Step
1	16–880.8	864.8	1	198–848.6	651	1	0–0.4	0.4	1	5–21.2	16.2	1	0–2.4	2.4
2	880.8–1745.6	864.8	2	848.6–1499.2	651	2	0.4–0.8	0.4	2	21.2–37.4	16.2	2	2.4–4.8	2.4
3	1745.6–2610.4	864.8	3	1499.2–2149.8	651	3	0.8–1.2	0.4	3	37.4–53.6	16.2	3	4.8–7.2	2.4
4	2610.4–3475.2	864.8	4	2149.8–2800.6	651	4	1.2–1.6	0.4	4	53.6–69.8	16.2	4	7.2–9.6	2.4
5	3475.2–4340	864.8	5	2800.4–3451	651	5	1.6–2	0.4	5	69.8–86	16.2	5	9.6–12	2.4
Scoring algorithm for each indicator according to ranges and steps in group N														
N1			N2			N3			N4			N5		
Point	Range	Step	Point	Range	Step	Point	Range	Step	Point	Range	Step	Point	Range	Step
1	2–4	2	1	12–57.2	45.2	1	0–0.2	0.2	5	100.02–170.194	70.174	1	79.03–87.964	8.934
2	4–6	2	2	57.2–102.4	45.2	2	0.2–0.4	0.2	4	170.194–240.368	70.174	2	87.964–96.898	8.934
3	6–8	2	3	102.4–147.6	45.2	3	0.4–0.6	0.2	3	240.368–310.542	70.174	3	96.898–105.832	8.934
4	8–10	2	4	147.6–192.8	45.2	4	0.6–0.8	0.2	2	310.542–380.716	70.174	4	105.83–114.766	8.934
5	10–12	2	5	192.8–238	45.2	5	0.8–1	0.2	1	380.716–450.89	70.174	5	114.76–123.7	8.934
Algorithm for assigning points for each indicator according to the ranges and steps in group Q														
Q1			Q2			Q3			Q4			–		
Point	Range	Step	Point	Range	Step	Point	Range	Step	Point	Range	Step	–	–	
1	287–3177.2	2890.2	1	2–30.8	28.8	1	10–66.6	56.6	1	8–8.6	0.6	–	–	–
2	3177.2–6067.4	2890.2	2	30.8–59.6	28.8	2	66.6–123.2	56.6	2	8.6–9.2	0.6	–	–	–
3	6067.4–8957.6	2890.2	3	59.6–88.4	28.8	3	123.2–179.8	56.6	3	9.2–9.8	0.6	–	–	–
4	8957.6–11,847.8	2890.2	4	88.4–117.2	28.8	4	179.8–236.4	56.6	4	9.8–10.4	0.6	–	–	–
5	11,847.8–14,738	2890.2	5	117.2–146	28.8	5	236.4–293	56.6	5	10.4–11	0.6	–	–	–

Source Compiled by the authors based on their own calculations

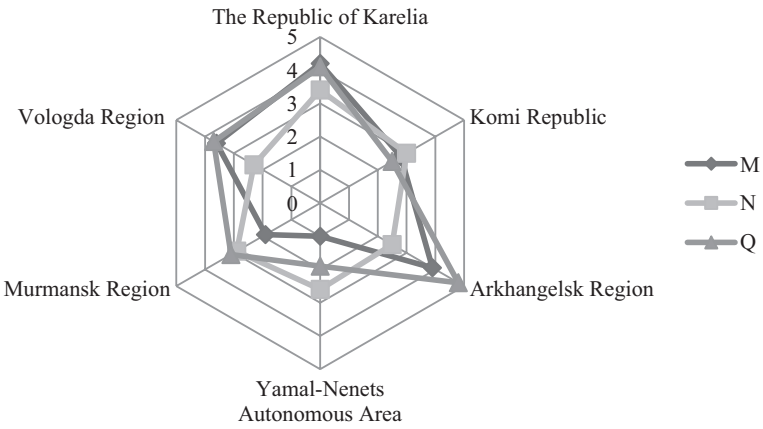

Fig. 1 The results of calculating the summary ratings of potential for recreation and tourism activities of the territory of the ENR regions in the context of indicator's groups. *Source* Compiled by the authors

M1—1.21%, M2—25.3%, M3—0%, M4—43%, and M5—55%; group N: N1—10%, N2—35%, N3—0. The contribution to N4 and N5 cannot be estimated due to the lack of statistical data (the results of the calculations).

The contribution of the Petrozavodsk urban agglomeration to the indicator for group Q (qualitative and quantitative indicators of the tourist infrastructure) was assessed in accordance with financial indicators for OKVED 55—43.8%. However, the figure fell by 7% in 2020–2022. According to OKVED 77, the contribution of Petrozavodsk urban agglomeration in 2022 is estimated at 33.5% (− 1.8% compared to 2020).

4 Discussion

Based on the results of the analysis of the regional tourist and recreational potential of the ENR, the following conclusions can be drawn:

1. The study of the first group of parameters M (Material heritage) showed that the Republic of Karelia has the greatest absolute benefit, which is explained by the large number of cultural monuments in comparison with other ENR regions and the presence of several UNESCO sites on its territory. The next in the ranking are the neighboring Arkhangelsk and Vologda Regions. They also have a fairly high potential for the material heritage of the territory, which is of particular importance for developing cultural and educational tourism.
2. The study of the second group of parameters N (Natural factors) showed that the leader of the rating in the ENR is the Republic of Karelia, known for its magnificent natural landscape, lakes, mountains, forests, and rivers, which create perfect conditions for developing nature and extreme tourism. The Komi Republic is a region also known for its natural wealth. Additionally, among all studied territories, the Komi Republic is the only region that can boast of having a UNESCO monument of natural significance. A significant disadvantage is that the share of emissions of air pollutants is very high on the territory of the Komi Republic, even compared to other regions.
3. The study of the third group of parameters Q (Quality and quantity of infrastructure) showed the leading region of the Arkhangelsk Region. Compared to other studied areas of the ENR, it has the highest level of quality of the urban environment. The next in the ranking is the Republic of Karelia, which is confirmed by the largest number of travel companies. Additionally, the Republic of Karelia has a high indicator of the quality of the urban environment.
4. An evaluation of the integrated rating of the tourist and recreational potential of the EN territories showed that the Republic of Karelia has the greatest potential for the development and creation of tourism activities. The top three potential leaders also included the Arkhangelsk and Vologda Regions.
5. The analysis results of contribution indicators of the Petrozavodsk urban agglomeration to the tourist and recreational potential of the region territory allow us to conclude that many values are insignificant.

5 Conclusion

The analysis of the territorial tourist and recreational potential of the ENR confirmed the relevance of the selected parameters that affect the level of tourism development in the region. As the results showed, the score-rating assessment made it possible to define the interaction of various groups of parameters and their contribution to tourism development in the territory. The method proposed by the authors makes it possible to conduct a comparative assessment of the general parameters for which a quantitative assessment and uniformity of measurements are available.

The advantage of this analysis method is its simplicity and availability for use.

The practical significance of this analysis is the ability to consider its results when making decisions by the regional authorities regarding positioning tourist destinations in the eyes of potential tourists. Annual monitoring will provide the ability to track dynamic changes in the rating of territories on a spatial map.

Most notably, the development of agglomeration relations has a small effect on the existing territorial tourist and recreational potential. However, the prospect of forming agglomerated territories provides for constructing competitive markets for services and goods that affect the tourist attractiveness of the territory. Therefore, tracking the dynamics of modifications in the contribution of agglomerations to the indicators of tourism recreational potential is undoubtedly an important area of social and economic analysis of territories.

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The Fundamental Approaches to Shaping the Ideology of Consumer Cooperation in the Russian Federation as the Basis for the Practical Implementation of the Green Economy Concept

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Abstract

The research comprehensively examines the possibilities and fundamental approaches to shaping the ideology of the green economy in the consumer cooperation system of the Russian Federation. For any economic system and any economic entity, the significance of ideology is undeniably crucial because it determines the tactics and the strategy of conducting business. The goal of business is profit. However, when we speak of civilized business, it is about obtaining profit "not at any cost." Ultimately, the ideology of business defines its relationship with society, its usefulness to society, and its social significance. The absence of ideology may be inherent only in "wild" capitalism. The authors believe that objective prerequisites for the existence of such ideology exist because the consumer cooperation system addresses economic and social problems, undoubtedly shaping the spiritual and moral foundations of business conduct. Cooperative ownership serves as the material basis of consumer cooperation. The spiritual foundation encompasses political, legal, moral, and other relationships, in the development of which the system plays a crucial role in rural areas. The ideology of the green economy in the consumer cooperation system has already taken shape. However, it requires highlighting certain aspects that obligate shareholders and system leaders to address issues related to green development. The research proposes a methodology for shaping the ideology of the green economy in the consumer cooperation system, providing several authorial definitions of key categories used in the presented material.

Keywords

Consumer cooperation · Ideology of cooperation · Green economy · Green growth · Nature-exploiting industries · ESG principles

JEL Classification

F18 · L31 · P25 · Q56

1 Introduction

The phrase "green economy" first resonated in the title of D. Pearce's report, "Blueprint for a Green Economy," in 1989. In the same year, M. E. Colby attempted to define the content of the concept of green growth and its potential use in the forthcoming development of the green economy concept. From this period, roughly until the first decade of the 2000s, these understandings did not receive widespread scientific recognition, although scientific publications indicate the commencement of research in this direction.

The observed instability in global economic development during this period, manifested in socio-economic crises, prompted the global community to seek positions

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that would balance the system of contemporary economic relations or at least draw attention to the need for achieving some form of balance. For this reason, in UN documents (UN General Assembly 2015), over the last decade, the balance of the economy, ecology, and the social sector has been documented as objectively established elements of the process of further stable development of economic relations.

Nevertheless, contemporary society is still characterized as a consumption-oriented society, far from rational, shaped, or, more precisely, imposed by the market, where competition laws have not been repealed. Moreover, imperfect competition is characteristic of this period. As a result, large businesses and business circles in several countries, on the one hand, express the need to transition to a green economy. On the other hand, they practically ignore it, disregarding the impending socio-economic risks caused by the previous traditional approach to achieving the maximum profit.

Several problems are hindering the actual transition to a green economy, including the following:

1. Ensuring economic growth in conjunction with environmental safety. In this case, the primacy of social importance over economic significance is evident. A pronounced priority of the economic aspect is ruled out, as the economic element is foundational within the social context.
2. Global economic relations are deeply politicized, preventing an objective assessment, dissemination, and utilization of the successes achieved by individual national economies and corporations in attempting to implement the concept of a green economy.
3. National economies exhibit specific characteristics of socio-economic development, resource provisioning, consumption patterns, etc. Overall, they differ in the implementation of production-economic relations. It is precisely due to these reasons that the possibilities for embracing the concept of a green economy vary among countries. In any case, its acceptance at the state level requires significant investments, given the specific level of GDP.

A set of economic measures aimed at mitigating negative anthropogenic impacts has been developed by certain Western European countries, the USA, South Korea, China, Russia, and several other countries.

In these circumstances, it is crucial for the country, major corporations, and systems to formulate a contemporary business ideology aimed at substantial approximation to the realization of the green economy concept. By business ideology, we understand the aggregate of rules governing business behavior in economic relations and society, defining value orientations.

The aforementioned substantiates the relevance of the research topic.

This research aims to examine the fundamental aspects of shaping the ideology of consumer cooperation development in the Russian Federation as the foundation for implementing the green economy concept in this economic system.

Consumer cooperation is chosen as the research object, not randomly, because the system is closely aligned with addressing social issues. It engages in diverse activities, making it possible to utilize various green economy technologies and identify the most optimal among them. Over an extended period, it has been oriented towards producing environmentally friendly products.

2 Methodology

Currently, the strategic documents shaping the development of consumer societies include the following:

- Resolution of the Government of the Russian Federation "On the approval of criteria for sustainable (including green) development projects in the Russian Federation and requirements for the verification system of sustainable development financing instruments in the Russian Federation" (September 21, 2021 No. 1587, as amended on March 11, 2023) (Government of the Russian Federation 2021);
- Decree of the President of the Russian Federation "On national goals and strategic objectives for the development of the Russian Federation until 2024" (May 7, 2018 No. 204) (Presidential Executive Office 2018);
- Program for the development of the consumer cooperation system for 2023–2027 developed by the Central Union of the Russian Federation (Centrosoyuz) (Centrosoyuz of Russia, n.d.);
- National project "Ecology" (Government of the Russian Federation 2018).

In accordance with these documents, priority directions for the development of consumer cooperation include the following:

- Expanding employment opportunities for youth and women;
- Creating healthy and safe working conditions;
- Improving the conditions and procedures for remuneration, ensuring wage growth, including considering annual inflation;

- Providing social guarantees and social protection and implementing benefits for employees;
- Stimulating high-productivity labor;
- Creating conditions for the professional growth of workers.

By 2024, there are plans to significantly increase the number of small and medium-sized enterprises involved in agricultural cooperatives. These directions have a distinct social character and can be addressed in conditions of stable system development. In this case, the green economy offers the possibility of achieving strategic or prospective stability.

During the research, the authors applied the following methods: definitions, division, and inference based on systemic analysis, statistical method, cyclical method, rules of deductive reasoning, balance-normative method, principles of correlating thoughts, sociological research methods, etc.

In preparing the publication, scientific studies (publications) by Russian and international authors on the studied problem were utilized, such as Antonova et al (2022), Bobylev (2021), Bobylev and Revich (2018), Bobylev and Zakharov (2011) Kadirova and Kolomeiko (2022), Kodaneva (2022), Kolesnikov et al. (2022), Onishchenko (2022), Gurova and Shentseva (2013), Gurova and Yakovleva (2015), Silvestrova et al. (2019), Trofimova (2019) statistical data from the Federal State Statistics Service of the Russian Federation (Rosstat); media publications; and Internet resources.

3 Results

Upon studying the materials on this issue, the authors arrived at the following understanding. In the Russian Federation, the existing export-oriented raw materials economic model has been characterized by several negative trends, the most prominent of which are as follows:

- Export focused on the extraction of natural resources;
- Depletion of natural resources, including non-renewable ones;
- Inadequate assessment of the true value of natural resources;
- A predominant share of nature-exploiting industries in the economic structure;
- The use of physically outdated equipment in industries;
- Environmental pollution with adverse consequences for human livelihood;
- An increase in the intensity of pollution indicators;
- A decline in overall macroeconomic characteristics that consider the ecological factor;
- The absence of an environmentally balanced investment policy, etc.

Against this backdrop, an attempt has been made in Russia to justify the necessity of further sustainable development within the framework of the green economy concept. In this case, it involves a system of sustainable development for industries and regions of the country amidst an increase in the share of environmentally friendly production. Such a concept for Russia aligns with official international documents. It is confirmed, in particular, by the Resolution of the Government of the Russian Federation "On the approval of criteria for sustainable (including green) development projects in the Russian Federation and requirements for the verification system of sustainable development financing instruments in the Russian Federation" (September 21, 2021 No. 1587, as amended on March 11, 2023) (UN General Assembly 2015), which legislatively reflects the main guidelines for the formation of the green economy in Russia. This document also extends to the activities of consumer cooperation and serves as the basis for the system in adopting green development criteria.

For the green economy concept to be implemented at the national level in Russia, it is necessary for economic entities, regions, industries, and systems to adopt an ideology representing a system of norms for the use of green economy elements in their activities.

Nowadays, consumer cooperation in Russia is primarily a socially oriented system aimed at satisfying consumer demands for quality goods, services, and works at affordable prices, simultaneously ensuring employment for the population, thereby contributing to social stability and equalizing the economic development of regions. Undoubtedly, the consumer cooperation system is a significant means for developing economic relations and social infrastructure in rural areas of the Russian Federation.

In terms of its content, consumer cooperation is a socio-economic structure addressing two issues in rural areas: socio-economic and spiritual-moral. In the Russian Federation, it serves approximately 25% of the country's population.

The concept of green economy in consumer cooperation is closely aligned, as the social significance of the system has always prevailed over the economic significance. The multi-industry activities of consumer cooperation encompass wholesale and retail trade, public catering, procurement, industry, and the provision of various services. It has always been oriented towards providing high-quality, environmentally friendly products, utilizing regional resources, economic feasibility, and efficiency, with subsequent waste processing wherever possible.

This nature of consumer cooperation's activities emerged primarily because it was initially formed as a voluntary association of consumer societies and unions of consumer societies of various levels, created by citizen-shareholders to satisfy their needs for a diverse range of

high-quality goods and services. Historically, the primary task of consumer societies was the elimination of poverty.

The above significantly distinguishes consumer cooperation from other social phenomena.

Structural and technological changes are already taking place to transition to a green economy in the consumer cooperation of the Russian Federation. The task is to reduce the cost intensity of such transformations and effectively utilize existing resources, including preventing losses. There is often a need for compensation for external costs and environmental losses imposed on society and nature.

The existing competitive environment obliges the consumer cooperation system to reduce costs, apply innovations, diversify production, and transition to widespread deep processing of raw materials. This is crucial for enhancing energy efficiency and reducing the environmental footprint of production.

An essential component of the ideology of consumer cooperation is the orientation towards environmental legislation and the implementation of requirements for the environmental safety of goods and services.

To shape the ideology of consumer cooperation, serving as the basis for the practical transition to implementing the concept of a green economy, it is necessary to systematize the content of the system that is already well-known and recognized, generalize the patterns of the system's development in the last decade, and formulate objectively established logical foundations. In essence, this is the path or the methodology for forming the ideology of a green economy in the consumer cooperation system.

The system's ideology should be oriented towards the incorporation of ESG principles. This will ensure the presence of a business model in which there are no contradictions between economic development and the environment, logically leading to an understanding of the environmental responsibility of shareholders and system leaders.

The emerging ideology should guide consumer cooperation toward developing effective risk management because potential problematic areas will undoubtedly arise during the transition to a green economy.

Generally, the ideology of consumer cooperation should guide the system towards developing so-called ethical business, morally responsible. For this approach to be realistic, indicators characterizing the implementation of ESG principles must be included in the economic and financial performance indicators of the consumer cooperation system. Material capital is combined with intellectual capital. Business relationships are built on a system of respect for society. The characterization of business reputation should include a moral component, ultimately helping to resolve many business issues or conflicts.

The ideology of consumer cooperation must pay attention to creating dignified working conditions for the system's employees. Otherwise, their absence is detrimental to the business.

The presented material attempts to draw workers' attention within the consumer cooperative system to reevaluate the ideology of consumer cooperation in the new context of the green economy, understanding consumer cooperation as a system with significant potential for further development in the new conditions of economic management. The provided material cannot be considered complete because if the material basis of consumer cooperatives is the cooperative ownership of its members, the spiritual foundation has always been legal and moral relations. This signifies that there is an objectively profound opportunity for the transformation of the system's ideology. The authors outlined only some weighty accents that require attention in the formation of ideology and the integration of elements of the green economy.

The authors have been engaged in a socio-economic analysis of the realities, prospects, and challenges of consumer cooperation for a considerable period. The challenges of contemporary socio-economic reality demand a reassessment of the potential of consumer cooperation in realizing the concept of the green economy. The understanding presented by the authors has been discussed over the past five years in scientific debates, practical conferences within the university, inter-university, and international formats. The authorial team has prepared a monograph titled "Resource opportunities of consumer cooperation in implementing the green economy concept" (in press). In 2022, a scientific-methodological seminar was conducted on this issue, with the participation of chairpersons of consumer societies from the Udmurt Consumer Union.

4 Conclusion

The Central Union of Consumer Societies of the Russian Federation (Centrosoyuz), the Russian University of Consumer Cooperation, the Cheboksary Cooperative Institute, and other universities within the system organize scientific-practical conferences, meetings, and off-site seminars. Moreover, they conduct professional development courses to shape the ideology of socially oriented business. In essence, the formation of the ideology of the green economy concept is part of a shared understanding of the necessity, complexity, cost, and prospects of a socially oriented economy. This ideology will make it possible to merge the concepts of economic freedom and the emerging social necessity. It is crucial to understand that the array of social needs continues to grow. Nevertheless, their satisfaction must be combined with prudent use of resources and property, environmental preservation, and sensible management of the quality of life.

ESG principles should be recognized as criteria for the feasibility of economic projects adopted by the system. The authors acknowledge the need for additional investment in implementing green projects. However, they believe that the expanded content of the consumer cooperative ideology will enable a proper evaluation of managerial decisions.

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Case of Consumer Cooperation: Innovations in Environmental Safety

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Abstract

The research aims to explore the issue of plastic pollution and waste. Consumer cooperatives engaged in solving this problem with their new initiatives. Consumer cooperation contributes to reducing environmental pollution and transitioning to eco-friendly packaging, as demonstrated in pilot projects and action programs on plastic waste based on examples from consumer cooperatives in the United Kingdom, Slovakia, Spain, Italy, and Sweden. The innovative approaches of these cooperative organizations offer significant environmental benefits. Consumer cooperatives engaged in retail trade can play a role in reducing plastic waste. Currently, cooperatives allocate less attention to this area compared to recycling. In cooperative trade, several measures have already been taken to address environmental issues and protect the environment. In this activity, the issue of packaging-related waste is just as important as the other two issues—climate change and resource use. Laws combating plastic pollution and the organization of plastic recycling control should serve as a catalyst for the use of recycled plastic and incentivize and subsidize enterprises that ensure the use of only such packaging that can be recycled again in the future.

Keywords

Consumer cooperation · Recycled plastic · Cooperative projects · Environmental safety · Internal control · Financial management · Waste issues

JEL Classification

M21 · P13 · G32 · H25 · M48 · O38 · Q53

1 Introduction

Environmental pollution currently causes widespread concern and worry. Particularly, significant damage to the planet's population is caused by single-use plastic products, primarily as packaging material. Annually, 350 million tons of plastic waste are produced globally. According to Eurostat data in 2020, each resident of the European Union generated an average of 34.6 kg of plastic packaging waste, of which only 13 kg were recycled. Europe generates 24 million tons of plastic waste, of which only a third is collected or recycled. These wastes pollute the environment. For example, the marine environment is polluted by 85% (European Commission, n.d.).

This environmental problem has required urgent and decisive measures. In 2019, the European Union issued the Single-Use Plastics Directive (SUPD)—a comprehensive legislative act aimed at preventing and reducing the environmental impact of certain plastic products. For example, 40% of plastic packaging is used for food and beverage packaging. The directive sets targets for separate collection of plastics for recycling (a target of 90% separate collection of plastic bottles by 2029 and 77% by 2025), which can be

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achieved through deposit return schemes or separate collection targets for extended producer responsibility schemes. In November 2022, as part of the "European Green Deal" (approved in 2020), the European Commission also proposed a revision of its Packaging and Packaging Waste Directive (PPWD) (European Parliament and Council of the European Union1994; TOMRA 2021).

Consumers are increasingly concerned about the negative impact on the environment. Environmental issues are becoming more important to them each year. Organizations and businesses in the production, trade, and service sectors are forced to consider and enhance the transparency of their activities.

Global Sustainable Development Reports show that those who make frequent purchases are more concerned about sustainable development and ethics. Therefore, many consumers want to place more responsibility on retailers. A Greenpeace report indicates that only the top ten supermarkets in the UK flood the planet with 810,000 tons of single-use plastic annually. However, supermarkets can reduce the amount of single-use plastic packaging by at least half through reuse. Other environmental organization reports also confirm the colossal volume of pollution that is not subject to secondary processing. According to the Greenpeace report, half of this reduction (the remaining quarter) should be achieved by transitioning to reusable packaging systems. Other actions include selling fruits and vegetables without packaging and eliminating unnecessary plastic from packaging materials. Greenpeace also warns that the current efforts to address environmental issues are insufficient, as less than a tenth of all plastic produced worldwide has been recycled. Therefore, a real solution is not just recycling produced plastic but reducing its usage (Greenpeace 2020; United Nations 2019, 2023).

2 Methodology

The methodology employed in this research is based on the importance and priority of ecology and the factors determining it. The paradigm of sustainable development with minimal risk to the environment is accepted. Therefore, among the successfully operating consumer cooperatives, mainly from European countries, organizations that have already launched programs to combat plastic waste were selected. These cooperative organizations demonstrate the initial experience of innovative environmental protection campaigns. In particular, several consumer cooperative organizations have results from their pilot projects and action programs on plastic waste.

The results of research conducted by organizations such as Greenpeace, the Environmental Investigation Agency, and Euromonitor were used to determine how effective reduction and reuse models can be in reducing the amount of single-use plastic used in supermarkets. Consumer cooperatives in the United Kingdom, Slovakia, Sweden, Spain, and Italy were studied and analyzed because cooperatives in these countries initiated campaigns, achieved initial success, and provided reports on reducing their volumes of used plastic packaging.

3 Results

Many consumer cooperatives have joined the initiative and are taking corresponding measures to combat waste generated by packaging materials. For example, in 2022, Slovakia implemented a deposit return scheme (this measure is provided for by the Single-Use Plastics Directive). For Slovakia, this measure aims to achieve a 90% return rate by 2027 (which exceeds the directive's targets, requiring the same return rate only by 2029). The action scheme is straightforward. Consumers can deposit all single-use plastic bottles and beverage cans ranging from 0.1 to 3 L for storage. Each purchaser pays an additional fee (15 cents) when buying a plastic bottle or can. However, consumers can get this money back by returning the undamaged packaging to supermarkets that have joined the deposit system (TOMRA 2022).

Retailers themselves choose how they want to implement this scheme: the store can take in the returned packaging manually at the checkout or do it automatically through reverse vending machines. The consumer cooperative Coop Jednota has launched a PET bottle and can recycling system with 1100 collection points in its stores. The cooperative's reverse vending machines are supplied by the company TOMRA. In 2022, the national deposit return system (DRS) in Slovakia recorded 820 million returned containers, exceeding the expected return level by more than 70% (TOMRA 2022).

A leader in reducing plastic packaging volumes is the British consumer cooperative Co-op Group, which has the lowest volume of plastic packaging among all retailers (less than 5000 tons). It also leads in terms of own-brand packaging that is recyclable (making up 79% of the volume, while most other brands have lower figures—58%–70%). Ahead of other supermarkets in the UK in producing recyclable own-brand packaging, Co-op Group recycles, for example, soft plastics (such as chip bags and bread bags, including packaging from products purchased from other retailers) in more than 2200 of its grocery stores nationwide, with the goal that all plastic packaging will be recyclable by 2025. Since 2015, when retailers in supermarkets began charging for single-use plastic bags, their use has decreased by 98% (Hadfield 2021).

Another successful example is the innovative pilot project launched in July 2023, which aims to revolutionize

food delivery. As part of this initiative, the consumer cooperative Coop Sweden, in collaboration with Gordon Circular (a company for home delivery of goods), started delivering groceries to customers' homes in reusable (circular) packaging, effectively replacing traditional paper bags. It was found that the development of circular packaging is necessary as the volumes of everyday consumer goods continue to increase.

The reusable packaging system represents a comprehensive approach to optimizing home delivery of goods in Northern European countries. The system consists of three key components: physical packaging, logistics solution, and technological solution for tracking and communicating with the customer. The physical packaging consists of two main parts: (1) a sturdy and rigid outer shell—a box designed to protect the product during transportation to the consumer; (2) a soft reusable bag specifically designed to meet the needs of Coop Sweden, facilitating efficient packing and transportation of goods from the store to the customer. After delivery, customers can return these boxes to Gordon during their next order or delivery. The boxes then undergo thorough cleaning and preparation for reuse in subsequent deliveries to Coop's customers. This new approach offers significant environmental benefits. Life cycle analysis of the packaging shows that the reusable package only needs five cycles within the system to surpass the climate impact of a disposable paper packaging bag. If the box is reused twenty times, its overall climate impact is reduced by 65% compared to the impact of a disposable paper bag (Packman 2023).

In this way, the consumer cooperative Coop Sweden is seeking the best ways to facilitate its customers' experience in e-commerce while simultaneously reducing resource usage. By adjusting cooperative activities, Coop Sweden aims to expand, with the goal of involving more customers in this process. Customers of Coop Sweden show great interest in the reusable packaging system, which they plan to scale up and distribute nationwide quickly. This combination aligns with consumer and environmental benefits, providing consumers an easy way to receive and return reusable packaging bags.

Changing consumer behavior can also be achieved through increasing awareness of the importance of a green or circular economy. Spanish consumer cooperatives are currently working towards this goal by organizing an online school on circular consumption called "Escuela de la Consumo Circular—ECC." Launched in 2022, the project is funded by the Ministry of Consumer Affairs of Spain and managed by Hispacoop (the Spanish Federation of Consumer and User cooperatives, encompassing cooperatives from various sectors, from retail to energy and housing construction). The main goal of the school is to raise awareness to change consumer-customer behavior and stimulate the transition to a closed-loop model (EuroCoop 2023).

Through its web platform (Escuela de Consumo Circular), the school provides various resources, including video lessons for different initial learning levels. Distance learning is also extended to schools, educational centers, and youth centers across the country as part of the distribution and communication strategy of the Unified Service System. All educational materials are accessible for free to any user (not just teachers), teaching consumers to appreciate existing resources, and encouraging responsible shopping and consumption practices.

The school has become unique in Spain, able to empower consumers through consumer cooperatives. Its methods include exchanging clothes, sports equipment, gadgets, or video games. Instead of buying, using, and discarding, children are taught to share, donate, use rental services, repair, restore, reuse, and recycle. They are also educated on how to learn more about products, research brands, and ensure their environmental friendliness before making purchases. This is responsible consumption in a circular economy, and cooperatives have an advantage as their values and principles align with those of a closed-loop economy.

Finally, another successful example is the consumer cooperative Coop Italia, which applies a circular economy approach. From 2018 to 2021, the retailer replaced 10,000 tons of primary plastic with recycled plastic. Since 2019, it initiated a campaign to remove plastic from Italian seas, deploying devices for collecting trash, using marine drones, and hiring teams of divers. During the campaign from 2019 to 2022, the efforts of the Coop Italia consumer cooperative resulted in the collection of 42 tons of plastic (BCCM 2022).

Despite the growing global demand for eco-friendly packaging and ongoing efforts to combat the increase in packaging waste, the consumption of such packaging per capita continues to rise, and it is not expected to decrease in the coming years. This is influenced by several factors, including transformations in consumption patterns, demographic changes, and others.

There are other reasons related to the characteristics of different forms of packaging, leading to decisions about choosing a specific packaging format. It should ideally preserve the product for as long as possible and be safe, attractive, and cost-effective. The increased level of costs complicates the transition to more environmentally friendly packaging for food products. Costs and prices remain significant obstacles to progress. Recycled plastic is sold at a higher price than virgin material. The shortage of available recycled materials, along with the resulting high costs, currently hinders more companies from replacing their disposable packaging. Simultaneously, another trend is the growing demand for environmentally friendly packaging materials and recycled materials. Packaging plays a key

role in the carbon footprint, with companies reporting that they are reducing carbon emissions by referencing indicators provided by packaging. Additionally, companies fall under anti-plastic regulations and requirements to pursue goals for reducing greenhouse gas emissions. Hence, there is a need to comply with these requirements and make significant investments to expand the use of renewable energy sources—a rather complex task in the near term. Therefore, consumers and their consumer cooperatives must play an important role.

Regulations on packaging are becoming increasingly stringent, and food-producing companies will more frequently have to pay for the packaging they release into the market. This will require them to increase the volumes of recycled content, enhance recycling capabilities, and take measures to reduce environmental pollution. In practice, these laws should act as a catalyst for incorporating recycled content and improve the economic justification for investing in facilities where recycled content is transformed into new packaging for food products after consumption. These facilities are urgently needed as the demand for high-quality materials (such as used beverage cans and bottles) exceeds the supply. If domestic markets cannot keep pace, importing recycled materials from other countries may fill this gap, resulting in underutilized domestic resources.

By gathering specific data, we obtain information or knowledge about the studied subject. Thus, the buyer can become an active participant in the production of the product they ordered. Selectively addressing each consumer becomes a competitive advantage and an effective business management tool (Bodrova et al. 2021).

Other international events can also contribute to promoting more sustainable consumption models. In 2022, the United Nations approved a resolution to halt plastic pollution and establish an international, legally binding agreement by 2024. This global initiative can play a crucial role in curbing environmental pollution caused by plastic contamination (UNEP 2020, 2022).

4 Conclusion

Nowadays, three-quarters of all plastic ever produced has turned into waste. This trend may continue unless global measures are taken to reduce, replace, collect, recycle, and sustainably dispose of plastic in accordance with harmonized global rules. For the most part, consumers are concerned about plastic waste. Their attention to waste recycling is growing. However, despite this concern, they are not inclined to change (and often do not change) their habits of buying products in plastic packaging.

On the other hand, entrepreneurs, faced with stricter regulations, understand that their actions are insufficient to achieve goals regarding plastic waste. Therefore, companies producing food products that work in the value chain with many stakeholders are the winners.

Consumer cooperatives can play a significant role in combating the threat of plastic pollution. Some consumer cooperative organizations have started addressing the issue of plastic waste. Nevertheless, many enterprises are not involved in this process. Overall, consumers and businesses would like and expect further measures from governments. However, no one can solve the problem alone, whether it be the government or an international organization—a multisectoral approach is necessary. Only through collaborative efforts can countries tackle the plastic threat.

In this case, consumer actions are crucial. If consumers are not informed or do not demand changes in the impact of plastic on our world, the situation will not improve but rather worsen. Examples of consumer cooperatives in European countries such as the United Kingdom, Spain, Italy, Slovakia, and Sweden compellingly demonstrate how one can fight plastic pollution through specific actions. Until national governments begin to implement a radical policy to stop plastic pollution, consumer cooperatives and their members will have to strive to change the situation on their own terms.

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Corporate Responsibility of Members for the Cooperative's Obligations

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Abstract

The research aims to examine cooperatives as a distinct organizational form of economic activity and identify the peculiarities of holding them accountable. The intention is to formulate directions for changes in Russian legislation that will help eliminate gaps and contradictions in cooperation. Drawing on judicial practice and court explanations, the authors identify the features of the legal regulation of corporate responsibility for cooperatives. The research reveals general theoretical and practical problems of applying responsibility in cooperation. To ensure uniform legal regulation of cooperative activities, it is necessary to develop a unified act encompassing various sectors of cooperation and considering the commercial and non-commercial nature of these activities. The research identifies the peculiarities of holding cooperatives accountable and proposes a mechanism ensuring the enforceability of obligations, using the example of an agricultural cooperative. The examination of various types of cooperatives reveals complex, contradictory, and insufficient legal regulation of cooperation. The absence of a unified act regulating the activities of cooperatives, as well as the lack of specificity in the Civil Code of the Russian Federation regarding the corporate rights of cooperative members, determined the uniqueness of the research findings. The obtained results consider the market needs for goods, works, and services in the extensive area of cooperation. The authors pay special attention to non-profit consumer cooperatives that effectively engage in entrepreneurial production activities, suggesting it might be expedient to allow the distribution of income from such activities among members to guarantee the fulfillment of obligations to the cooperative's creditors.

Keywords

Production cooperative · Consumer cooperative · Responsibility · Corporate relations · Agricultural cooperation

JEL Codes

K150 · Q130

1 Introduction

The legal regulation of cooperative legislation within the framework of the Russian legal system requires the improvement of norms governing the general legal status of cooperatives and specific norms dedicated to various forms of cooperative responsibility.

There is a clear imbalance in the legislative framework, with more extensive legal regulation of the activities of production (commercial) cooperatives compared to consumer (non-commercial) organizations. Additionally, examining responsibility as a legal category is complicated by the absence of a legal definition and the diversity of approaches among legal theorists and various branches of law in understanding responsibility (Kazanina and Shagiyeva 2023; Starodumova et al. 2015).

2 Materials and Method

During the research, the authors employed a complex set of scientific methods of cognition, including the systemic method, method of analysis, formal-legal method,

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Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_41

comparative legal method, and logical method. These methods facilitated the identification of the specifics of legal regulation in cooperatives and corporate responsibility in cooperatives. The implementation of responsibility measures is illustrated through examples from judicial practice and explanations provided by the courts over the past 20 years.

The research draws upon the works of scholars addressing general corporate law issues (Laptev 2019; Litovkin and Gutnikov 2011; Starodumova et al. 2015; Sukhanov 2014), matters related to responsibility (Kazanina and Shagiyeva 2023; Starodumova et al. 2015), and specific types of cooperatives (Medvedev 2002; Minina 2019; Sinitzyn 2019).

The materials examined made it possible to identify practical problems in implementing responsibility norms in cooperatives in Russia and formulate specific proposals for improving Russian legislation.

3 Results

The authors believe it is expedient to adopt a single federal law on cooperation, encompassing various commercial and non-commercial forms, to ensure a uniform legal regulation.

The study revealed that an exception to the general rule is the application of liability for legal entities for the actions of members of production cooperatives.

The authors believe that it is advisable to specify the norm of Article 123.3 of the Civil Code of the Russian Federation, indicating to whom the responsibility for non-payment of contributions is established. First, it is cooperative because the nature of these relations is corporate based on membership. Second, it is the creditors of the cooperative.

Regarding agricultural consumer cooperatives, it is advisable to expand the rights of members to distribute among themselves no more than 50% of the net profit of the cooperative for the past year, specifying that this serves as a guarantee for fulfilling the obligation to make additional contributions in case of losses.

4 Conclusion

Production and consumer cooperatives stand out among other legal entities due to special norms of subsidiary liability for the founders (participants) for the debts of the legal entity, as well as the responsibility of the cooperative for harm caused by its members.

According to the general norms of paragraph 1 of Article 65.3 of the Civil Code of the Russian Federation, cooperatives are considered corporate legal entities (corporations).

The activities of a production cooperative (artel) are regulated by Article 106.1 of the Civil Code of the Russian Federation and the law with the same title (Russian Federation 1996b), which establishes membership (Article 65.1 of the Civil Code of the Russian Federation) and voluntary principles of joint production and other economic activities. The peculiarity of this activity is expressed in mandatory personal labor participation, as well as other forms (e.g., property participation) through the pooling of shared contributions. The founders (participants) of the cooperative simultaneously become subjects of corporate governance within the cooperative (Starodumova et al. 2021).

To reiterate, a production cooperative highlights mandatory personal labor participation (membership) of individuals united by a common entrepreneurial goal and the possibility of participation with the property of both individuals and legal entities.

Members of the cooperative are endowed with subsidiary liability for the obligations of the cooperative, primarily enshrined in laws. Moreover, it should be reflected in the cooperative charter (paragraph 2 of Article 13 of the Federal law "On production cooperatives"). According to paragraph 2 of Article 106.2 of the Civil Code of the Russian Federation, two main grounds for holding members of the cooperative liable are identified: violation of the obligation to make share contributions and violation of the duty to participate personally in the cooperative's activities. Additionally, the charter must reflect the procedure for distributing the losses of the cooperative and establish the size and conditions for applying subsidiary liability of its members for the cooperative's obligations.

Special laws regulating cooperation complement this norm. In agricultural production, members of the cooperative are liable only if the cooperative cannot meet the creditors' demands in the amount predetermined in the charter within the specified period. The minimum amount of such liability cannot be less than 5% of the member's share in the cooperative (Russian Federation 1995).

A creditor can claim a cooperative member only after presenting and not fulfilling this demand by the main debtor, as well as receiving no response to the presented claim.

Judicial practice also supports the necessity of mandatory prior recourse by the creditor to the main debtor through the submission of a written demand. In case of refusal to satisfy the demand or the absence of a response within a reasonable period, the creditor may redirect the claims to the members of the cooperative (Plenum of the Supreme Court of the Russian Federation and Plenum of the Supreme Arbitration Court of the Russian Federation 1996).

A consumer cooperative is a voluntary association of shared contributions of individuals based on membership aimed at satisfying material and other needs.

Simultaneously, the non-commercial status of a cooperative as a corporate legal entity has several peculiarities, including issues related to the application of responsibility norms confirmed by judicial practice:

- Considering its legal entity status, a consumer cooperative acts on its behalf in the interests of its members in dealings with third parties. Consequently, members of the cooperative are not entitled to make claims, for instance, against contractors due to non-performance or improper performance of obligations (Sverdlovsk Regional Court 2016);
- Consumer relations between the cooperative and a shareholder are not subject to consumer protection legislation regarding accountability for legal violations in the relations of citizens' membership in non-commercial corporate organizations (St. Petersburg City Court 2016).

This legal ambiguity arose due to the absence in the Civil Code of the Russian Federation of content and specifics regarding the exercise of corporate rights by a shareholder, conducting transactions with shares, etc. (Sinitzyn 2019, p. 90). However, Article 123.3 of the Civil Code of the Russian Federation significantly burdens participants in a consumer cooperative with additional property obligations, leading to serious sanctions for non-compliance. For instance, failure to fulfill the obligation to make additional contributions in case of losses may lead to the liquidation of a consumer cooperative. A similar provision is established regarding members of agricultural cooperatives. However, the content of Article 123.3 of the Civil Code of the Russian Federation does not specify against whom the responsibility for non-payment of contributions is established; only the personal nature of such responsibility is clearly defined.

According to V. A. Laptev, the obligation of shareholders to compensate for the losses incurred by the cooperative is due to the non-commercial nature of the organization because of the lack of active participation by members in economic activities, which would make it possible to maintain a sufficient financial base to fulfill obligations to the cooperative's creditors (Laptev 2019, p. 159). However, judicial practice indicates that the joint nature of the subsidiary liability of shareholders is limited by the amount of the unpaid primary or additional contribution. Claims regarding this can be made against specific non-compliant members and all members of the cooperative (Arbitration Court of the North-West District 2015).

In this regard, the authors support the opinion of E. A. Sukhanov that covering the losses of the cooperative through additional contributions is a responsibility established before external creditors of the corporation (Sukhanov 2014, p. 146), albeit stemming from the corporate nature of the obligation to contribute membership fees.

The second highlighted type of liability for cooperatives for harm caused by their members is established by Articles 1064 and 1068 of the Civil Code of the Russian Federation.

M. Medvedev notes that paragraph 2 of Article 1068 of the Civil Code of the Russian Federation establishes a new type of liability for a legal entity due to the entrepreneurial nature of the activities of cooperative members (Medvedev 2002).

This position is supported by judicial practice, emphasizing the exclusivity of applying this type of liability for harm caused by members of a production cooperative (Plenum of the Supreme Court of the Russian Federation 2010).

Agricultural cooperatives hold a special place among all cooperatives. Paragraph 2 of Article 50 of the Civil Code of the Russian Federation mentions production cooperatives without distinguishing agricultural cooperation. These entities are subject to special legal regulation by two laws: "On production cooperatives" and "On agricultural cooperation." The latter exhaustively lists the types of cooperation existing in the agricultural sector, including non-commercial organizations. Subparagraph 3 of paragraph 1 of Article 50 of the Civil Code of the Russian Federation specifies non-commercial cooperatives reflecting various types of consumer cooperation, where agricultural consumer cooperatives can also be identified.

Other laws regulating cooperation explicitly state that they do not apply to agricultural relations (Russian Federation 1992, 2009). Conversely, there are laws where such indication is absent (Russian Federation 2007, 2015). The general law "On non-profit organizations" (Russian Federation 1996a) entirely bypasses cooperatives as a category in its enumerations and regulations.

We believe that such diverse legal regulation of cooperation complicates legal application.

E. L. Minina suggests that the current classification of the commercial and non-commercial nature of cooperative activities does not accurately reflect their legal nature and the purposes of their creation. This is particularly evident in the sphere of agricultural production, where agricultural producers establish non-commercial cooperatives to service such production, essentially engaging in entrepreneurial activities, the profits from which they cannot distribute among themselves (Minina 2019).

Scholars emphasize that each type of cooperative exhibits characteristics of commercial and non-commercial organizations, given the social orientation of most production cooperatives and the necessity for consumer cooperatives to engage in entrepreneurial activities to achieve non-commercial goals (Litovkin and Gutnikov 2011).

Furthermore, in the Federal law "On agricultural cooperation," joint production activities, categorized as

commercial under Article 106.1 of the Civil Code of the Russian Federation, are primarily conducted by non-commercial consumer cooperatives, which is not entirely logical.

The categorization of agricultural producers as non-commercial consumer cooperatives is also evident in subparagraph 2 of paragraph 2 of Article 2 of the Federal law "On the development of agriculture" (Russian Federation 2006).

Thus, the activities of agricultural consumer cooperatives, while non-commercial, involve processing sectors related to production activities that are challenging to classify as non-commercial. However, it is precisely this direction that the government supports. A shift in the nature of activities in legislation would lead to a reduction in actual support and subsidization. Additionally, the non-commercial nature of production cooperative activities prevents the distribution of profits generated from production activities, hindering the development of this cooperative sector. We believe that the increased level of responsibility established for consumer cooperatives could be supplemented by the income received, which the cooperative would distribute among its members. Due to the non-commercial nature of such activities, the regulatory limit for distributing profits could be set at no more than 50% of the cooperative's net profit for the past year.

As we can see, the legal regulation of cooperatives requires uniform and more comprehensive legal governance.

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Directions of Innovations and Problems of Their Development in Russian Cooperative Organizations

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Abstract

The research aims to identify the directions and issues of innovations in cooperative organizations in Russia. The research employs methods of data systematization on cooperators' innovations, statistical and economic analysis of funding sources, and the analytical tool of three-stage deduction and conclusions in the analysis of calculated data (the "3 V" analysis developed by N. M. Sharnina). Cooperative innovations in the global practice encompass mergers with other cooperatives, demutualization, establishment of branches, attraction of cooperative investors, adoption of electronic commerce, sales through marketplaces, cooperative training, automation of trade, exploration of new business activities, and expansion of the assortment. In Russia, there is a decrease in the volume of state funding for science and an outflow of scientists. On the other hand, enterprises lack basic assets and professional personnel. The existence of issues in the activities of the Central Union of Consumer Societies of the Russian Federation (Centrosoyuz) from 2019 to 2022 is confirmed by a decrease in performance indicators, an increase in consumer lending volumes, a shift away from external long-term financing with declining revenue, and a reduction in innovation funding sources. According to the survey, cooperators primarily require the introduction of enhanced equipment, new marketing methods, innovative ways of informing and stimulating sales, original products and services, modifications of existing products and services, activity automation, long-term planning, new methods of collaboration with partners, and computerization of operations. The authors analyzed statistical data for the Russian Federation (1970–2022) and financial reports of the Central Union of Consumer Societies of the Russian Federation (2019–2022) and, on this basis, conducted a survey of active cooperators as of October 2023.

Keywords

Cooperative organizations · Innovations · Three-stage "3V" analysis · Problems · Centrosoyuz of Russia

JEL Code

Q01

1 Introduction

Makarova et al. (2020) characterize the term innovation as the introduction of a new invention or improvement (in a production unit, product, service, business process, knowledge, etc.) into business practices with the aim of enhancing operational efficiency and obtaining additional benefits and advantages. Innovations are not only about creating updates to production units but also about implementing these updates in economic activities to achieve a significant positive impact. A distinctive feature of the innovativeness of introduced changes is the need for innovation protection (patenting novelties) due to their ability to lead an organization to superior entrepreneurial results on a national and global scale (in terms of quality, productivity, resource conservation in production activities, sales volumes, and profit obtained).

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Sharnina (2021) supports the opinion on the directions of innovations that cooperative organizations can choose, including the following:

- The use of new materials and types of raw materials (e.g., newly created patented products);
- The implementation of new business processes (e.g., CRM systems, new production, processing, sales, and other technologies);
- Expanding boundaries and creating new markets (deepening existing ones or creating a new consumer segment);
- Introducing innovations into the organization and managing its activities.

According to Makarova et al. (2020) and Sharnina (2021), important directions for enhancing the competitiveness of cooperators include the implementation of product, marketing (strategic product development, packaging design, promotion and sales methods, and pricing techniques), and organizational innovations (formation of strategic, production, scientific, technical, and other alliances; financial-industrial groups; joint ventures; and the use of new methods of organizing and managing business).

Analyzing the principles of the development of cooperative organizations and trends in their progress, Sharnina emphasizes the importance of social or process innovations (Sharnina 2021). As hybrid organizations addressing economic and social issues for the population and small economic entities, cooperatives represent an innovation for society. Through their activities, cooperators can do the following:

- Elevate the overall well-being of society and the quality of life for the population (e.g., providing rural areas with employment and infrastructure points for trade, food, and service; organizing accessible cooperative healthcare and pharmaceutical points, preschool and professional education in urban and rural areas);
- Reduce the negative impact of human activities and economic results on nature (ecosystem and planetary hydro-, bio-, litho-, and atmosphere) in the living area;
- Increase the production capacities of municipalities by developing existing and new industry sectors, reaching out to new consumer groups;
- Alleviate problems of social stratification in society within the market economy system.

This research examines the issues and anticipated directions of innovations in Russian cooperative organizations. The research aims to identify the directions and problems of innovations in cooperative organizations in Russia. The research tasks are as follows:

- To systematize global innovative experiences of cooperators;
- To identify indicators of innovativeness in activities;
- To investigate problems related to cooperators' innovations.

2 Methodology

The authors examined secondary data on the innovation issues of cooperative organizations. Among the methods of statistical and economic analysis, the authors selected the calculation of dynamic absolute and relative indicators. The authors applied the analytical tool of three-stage deduction and conclusion developed by N. M. Sharnina ("3V" analysis) in interpreting the calculated data. As part of the research, the authors surveyed innovation problems among leaders and specialist-cooperators from various regions of Russia in October 2023. The survey involved 24 managers of proactive and financially active cooperatives.

During the research, the authors used the following:

- Published results of research by A. L. Bobylev, N. S. Deshkovskaya, E. A. Gatina, A. Z. Korobkin, E. S. Makarova, Y. F. Nashirvanova, A. P. Panov, and N. M. Sharnina;
- Public materials and financial statements data of the Central Union of Consumer Societies of the Russian Federation (Centrosoyuz);
- Data from the website of the Federal State Statistics Service of the Russian Federation (Rosstat);
- The results of a selective survey of cooperators conducted in October 2023 by M. Akbari, A. M. Amini, H. Azadi, R. Dil, M. S. Ebrahimi, Ch. Chen, G. Christopher, A. Miceikienė, K. Janečková, L. Junpeng, U. Shahzad, P. Sklenička, L. Yao, and others.

3 Results

According to Deshkovskaya (2009), global organizational innovation trends in the cooperative sector include restructuring, transformation, and the formation of alternative forms of cooperation. To resist the pressure from large agricultural holdings and transnational corporations, cooperatives employ various strategies, including the following:

1. Bankruptcy and liquidation procedures to close unprofitable organizations;
2. Merging with other cooperative organizations or private enterprises to jointly reduce production and commercial costs;

3. Demutualization (conversion of the cooperative into a more advantageous legal form) to increase investment opportunities and interest in improving organizational efficiency;
4. Altering the cooperative's identity (division of ownership between cooperators and other individuals, purchasing private enterprises by the organization);
5. Opening branches and joint ventures to attract investors as owners;
6. Increasing the number of cooperative owners through new investors.

N. S. Deshkovskaya notes the inefficiency for cooperative members of transforming cooperative ownership into private ownership, thus recommending the following organizational transformations:

- Integration with the supply chain;
- Exploring internal reserves to reduce cooperative transaction costs;
- Establishing financial departments within cooperatives responsible for attracting and efficiently using their own capital;
- Developing regional cooperation;
- Implementing a differentiated system of rewarding cooperators and distributing overall income;
- Enhancing the professional level of cooperative management.

According to the research of Chen and colleagues (2023), a significant increase in income from selling products occurs for rural households and rural cooperative organizations through the implementation of e-commerce tools. According to the chairman of the consumer cooperative council in Udmurtia (Russia), Karimov (2022), in 2022, the Udmurt consumers' Union placed its products in top positions on the OZON marketplace by presenting fruit and berry preserves, mushroom preserves, birch bath brooms, dry kvass, and breadcrumbs. Over 50 types of products are sold across the Russian Federation, from western to eastern territories. Positive aspects of online sales for cooperators include low risks and resource costs with a relatively fast entry into large sales volumes.

According to Akbari et al. (2023), the most significant contribution to improving the efficiency of agricultural production cooperatives comes from the training provided to their members. According to Panov (2013), an increase in the efficiency of consumer cooperatives occurred in 2013 after the introduction of trade automation using barcoding in retail enterprises (Novosibirsk Region), leading to a more than 40% increase in turnover. Other forms of innovation applied by Russian cooperators include the production of import-substituting products (e.g., receipt paper), the exploration of new directions in production (sand and gravel extraction), and the expansion of the existing assortment with new product modifications.

Thus, global innovation practices in cooperative organizations, despite the broad range of possible directions for innovations to enhance operational efficiency, encompass the following activities:

- Merging with other cooperative organizations to reduce costs;
- Demutualization or transforming cooperatives into more advantageous legal forms;
- Opening branches and joint ventures to invite investors as owners;
- Attracting cooperator-investors;
- Implementing e-commerce tools;
- Selling products through marketplaces;
- Training cooperators;
- Introducing trade automation using barcoding;
- Producing import-substituting products;
- Exploring new directions in production;
- Expanding the existing assortment.

According to Bobilev (2014), the socio-economic evolution of each country follows the following sequential emphasis on development:

- Equipping with production factors;
- Using investment for business development;
- Applying innovations;
- Achieving growth in the welfare of the country's population.

Therefore, until a country reaches a fully pre-innovative stage of development, meaning that the production factors for economic entities are insufficiently equipped, and businesses are not yet focused on investment, innovative processes are less demanded by the economic community; the development priorities are shifted away from innovative processes.

Let us examine the factors influencing the level of innovation. According to the data from state statistics for 2000–2022 (Federal State Statistics Service of the Russian Federation n.d.), the low demand for innovation is confirmed by the following trends:

(a) Low volumes of budget expenditures on science in Russia: the expenditure share in 2022 was 0.41% of the GDP, varying from 0.24% (2000) to 0.58% (2013) over the years. The share of expenditures on fundamental research averaged $33.5 \pm 6.5\%$ (39.1% in 2022);
(b) Insufficient number of scientific organizations (4195 units in 2022), with an average annual increase of 0.17% since 2000;

(c) A decrease in the number of researchers in Russia by an average of 1.23% per year: from 105,114 (2010) to 95,204 individuals (2022). The average outflow of individuals with the degree of Doctor of Sciences is 0.66% higher than that of candidates with the degree of Candidate of Sciences.

The impact of contemporary state policy, prioritizing capital goals over the country's overall economic development, has led to a disruption of the inter-sectoral balance across the regions of Russia, the breakdown of production links, and the cessation of the exchange of knowledge, achievements, experience, and science. The weakness of businesses and the consumer-oriented nature of market entrepreneurship harm the equipping of enterprises with production factors. The following trends can be noted:

(a) The basic funds of Russian enterprises have worn out on average by 45.1 ± 3.1% from 2002 to 2022 (41.4% in 2022). From 2012 to 2022, the coefficient of updating basic funds in Russia (4.28) decreases annually by 3.34%, with a decrease in the retirement coefficient (0.68) by 3.67%. Enterprises require the modernization of the basic equipment complex;
(b) Negative dynamics of investments. The maximum excess of investments in 1970 at comparable prices was observed in Russia in 2007 (45.8%): from 1971 to 1986, there was an increase from 3.9% to 18.5% (average 10 ± 4.15%); from 1987 to 1992—a decline of 15% per year (1992: 50.3% of the 1970 investment level); from 1993 to 2007—an increase of 8.37% per year; from 2008 to 2022—a decline averaging 1.77% per year;
(c) Investments cannot do without attracting external capital since the funds of the depreciation fund are insufficient. The involvement of proprietary capital is as follows: from 1995 to 1999—fluctuations from 49% to 60.8% of the total volume; from 2000 to 2009—a decline from 47.5% to 37.1%; from 2010 to 2014—an increase from 41% to 45.7%; from 2015 to 2021—an increase from 50.2% to 56%. The average share of external sources includes budget funds (19%; 20.4% in 2022), borrowed funds (5.9%), and funds of organizations and individuals for equity construction (3.3%). Other sources together account for 14.9% (10% in 2022);
(d) The low level of real wages in Russia encourages the outflow of professional workers. The growth of the real average monthly accrued wages from 1999 to 2001 by 45% was followed by a decline to 92% of the 1999 level by 2016. In 2022, the excess of real wages over the 1999 level is only 5%.

To assess the innovative activities of cooperative organizations, Makarova et al. (2020), and (2014) propose employing the following indicators:

- Expenditures on innovations by sources (actual and planned levels, increment, structure, plan fulfillment);
- Share of innovation expenses to the enterprise turnover, %;
- Economic effect of innovative expenditures as a percentage of the organization's turnover;
- Level of net present value of innovative expenditures;
- Efficiency of innovations in terms of profit and turnover;
- Payback period for the volume of innovative expenditures (discounted).

In a generalized form, the presence of funding sources for innovations among cooperators can be examined in Table 1, using the example of data from the Central Union of Consumer Societies of the Russian Federation.

To assess the problems and level of innovation, the authors surveyed different types of Russian cooperators (25%—agricultural consumers, 37.5%—consumer societies, 12.5%—agricultural production, and 25%—other). Of these, 29.2% have been working for 1–3 years, 20.8% for 4–10 years, 4.2% for 11–30 years, and 45.8% for more than 30 years. The purpose of the survey is to assess the staffing of cooperators with the main factors of production and identify desirable directions of innovation for them.

4 Conclusion

The reduction of an already modest volume of state funding for science in Russia, slow growth rates of scientific organizations, and the brain drain of scientists diminish the opportunities for creating useful and efficient inventions and innovations for businesses and also reflect the current state's passive stance toward innovation. Russian enterprises are poorly equipped with fixed assets (55% physical depreciation, insufficient investment, depreciation fund, and off-budget financing for renewal) and professional personnel (with a decrease in real wages, there is a stimulation of employee outflow). They are focused on basic production equipment rather than innovation implementation. We presume that contemporary businesses adhere to a consumer-oriented management approach without a commitment to capital accumulation, employee retention, and enterprise development.

Utilizing the analytical tool of N. M. Sharnina's three-step "3 V" analysis, we obtain the following:

1. First stage: Quantitative analysis. The most significant source of innovations for the Central Union of Consumer

Table 1 Dynamics of availability of innovation sources of the Central Union of Consumer Cooperation of the Russian Federation for 2019–2022

Indicator	Years			
	2019	2020	2021	2022
Volume, thousand rubles				
Revenue	329,573	301,395	314,606	317,164
Net profit	237,232	258,321	207,499	158,376
Accounts payable	72,185	87,620	98,259	65,481
Accounts receivable	92,853	138,411	126,030	163,998
Borrowed long-term liabilities	15,000	15,000	15,000	0
Basis growth rate, %				
Revenue	100.0	91.5	95.5	96.2
Net profit	100.0	108.9	87.5	66.8
Accounts payable	100.0	121.4	136.1	90.7
Accounts receivable	100.0	149.1	135.7	176.6
Borrowed long-term liabilities	100.0	100.0	100.0	0.0
Absolute basic growth, thousand rubles				
Revenue	0.0	−28,178.0	−14,967.0	−12,409.0
Net profit	0.0	21,089.0	−29,733.0	−78,856.0
Accounts payable	0.0	15,435.0	26,074.0	−6704.0
Accounts receivable	0.0	45,558.0	33,177.0	71,145.0
Borrowed long-term liabilities	0.0	0.0	0.0	−15,000,0

Source Compiled by the authors based on Checko (2023)

Societies of the Russian Federation from 2019 to 2022 is net profit, the level of which decreased by 78.9 million rubles (33.2%): from 237.2 million rubles (2019) to 158.4 million rubles (2022). Regarding creditor indebtedness as a source of innovation, a decrease is observed from 72.2 to 65.5 million rubles (a decline of 6.7 million rubles or −9.3%). Instead of decreasing, accounts receivable increased from 92.9 million rubles (2019) to 164 million rubles (2022), by 71.1 million rubles (76.6%); it exceeds the annual level of creditor indebtedness by 1.3–2.5 times. Borrowed funds as external sources of financing remained consistently at 15 million rubles from 2019 to 2021 and were entirely repaid in 2022. Meanwhile, the revenue declined from 329.6 to 317.2 million rubles over the analyzed period (a reduction of 12.4 million rubles or −3.8%).

2. Second stage: Qualitative analysis. From 2019 to 2022, the Central Union of Consumer Societies of the Russian Federation is diminishing its potential for financing innovations. The volume of net profit, as the primary source of undistributed funds, is decreasing, limiting the organization's ability to accumulate funds due to delayed payments for supplies. Instead of decreasing, buyer indebtedness to the Central Union of Consumer Societies of the Russian Federation is increasing as its activity volume declines.
3. Third stage: Conclusion on the presence of a problem. The existence of problems in the activities of the Central Union of Consumer Societies of the Russian Federation from 2019 to 2022 is confirmed by (1) the reduction in performance indicators, the lack of their desired stability and growth; (2) the increase in customer borrowing; (3) the shift away from external long-term financing with decreasing revenue; (4) the reduction in sources of financing for innovations. Further research is required to determine which problems have influenced the deterioration of the activities of the Central Union of Consumer Societies of the Russian Federation from 2019 to 2022 and what innovations can enhance its efficiency.

The survey of cooperators revealed that they require updates in various areas: inventory and equipment (83%); household inventory (75%); vehicles, buildings, and computer equipment (71%); other funds (67%); machinery and equipment (63%); structures (58%); tools and administrative buildings (50%); buildings for social purposes, transfer devices, and residential buildings (33%).

Cooperators' problems with the use of fixed assets include the need for high-quality equipment (79%); insufficient qualification of service personnel (71%); issues with computerization and labor automation, material-technical supply, and high energy consumption (54%); low equipment productivity (50%); moral obsolescence (46%); outdated production technologies (38%); underutilization of capacities (33%); equipment breakdowns (29%); mismanagement (25%); prolonged equipment downtime (21%); and excessive equipment (17%).

The following issues persist among the challenges in the personnel policy of cooperators: a shortage of labor (88%); insufficiency of young workforce (84%); inadequate qualification of workers (79%); hiring complexities (63%); weak work motivation (63%); insufficient qualification of employees (63%); low wages for workers (59%); a deficit of employees (54%); high turnover of workers (54%); low wages for employees (50%); weak work motivation for employees (50%); insufficient speed of decision implementation (50%); the lack of coordination among workers (50%); uncertainty in career development within the organization (46%); absence of employee loyalty to the organization (42%); insufficient speed of decision-making (42%); low work discipline for workers (42%); physical exhaustion

of workers (38%); lack of coordination among employees (38%); high turnover of employees (33%); conflicts and communication discomfort (33%); low work discipline for employees (29%).

Cooperative problems in financial stability include high tax burden (63%), high operating costs (58%), a shortage of funds (46%), weak external financing and owner satisfaction (38%), issues with debt repayment (33%), inefficiency in utilizing own financial resources, high levels of accounts payable, dependence on borrowed capital (29%), and the threat of bankruptcy (13%).

Sources of financing for cooperative innovations are profit (88%); other own funds (79%); bank loans and depreciation deductions (58%); contributions (54%); budget financing (42%); insurance reimbursements (38%); funds raised through shares, shares, securities (25%); donations, gratuitous financing, and budget loans (17%); revenue from the sale of intangible assets and commercial loans (13%); bond loans (not available).

Cooperators require the implementation of new improved equipment (83%); new methods of information, sales, and its stimulation (79%); original goods and services (75%); their modifications, automation of activities, and long-term development planning (71%); methods of cooperation with partners and computerization of activities (67%); new activities (58%); production technology (54%); management methods (54%); storage and warehousing methods (50%); organization departments, artificial intelligence, and methods of raw material processing (46%); organizational management structure (42%); and organization branches (25%).

Although cooperators have a need for innovations, the unresolved issues in pre-innovation stage development in cooperative organizations, such as incomplete provisioning of production factors and inadequate investment volume, will impede the innovation process, diverting the resources of cooperators to address basic equipment problems in the organization's areas of activity.

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Project Activities as a Mechanism for Sustainable Development of Cooperatives

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Abstract

Consumer cooperation in Russia is a crucial component of the economy, fostering the prosperity of its members through various activities such as trade, manufacturing, procurement, and agriculture. The distinct role of the cooperative system in Russia lies in its social mission, contributing to the development of social infrastructure in rural areas and working towards ensuring food security for the population in those territories. Despite the consistent growth in economic indicators across all areas of cooperative activities, the contemporary challenges in the country's economy adversely affect cooperation. The Central Union of Consumer Societies of the Russian Federation (Centrosoyuz) has formulated a Development Program for Consumer Cooperation for 2023–2027, encompassing targeted objectives across all cooperative activities. The program aims to establish constant collaboration with federal and regional government bodies, financial institutions, trade unions, and associations of the cooperative and business community, private companies, and the development of cooperation within the framework of the International Cooperative Alliance. The program envisions active participation from all stakeholders in its implementation, involving the creation and development of innovative projects, the establishment of points for economic growth, and collaboration with small and medium businesses, as well as federal campaigns. The achievement of program goals will be facilitated by the trend of involving cooperators in project activities, which will positively impact the sustainable development of the consumer cooperative system. The research highlights the fundamental aspects of project activities as a mechanism for the sustainable development of cooperatives.

Keywords

Project activity · Cooperation · Sustainable development · Project · Strategy

JEL Codes

O29 · L81 · M21

1 Introduction

The economic and political instability in contemporary society, coupled with the active progression of inflationary processes in the national economy and the inclination towards outdated extensive development, poses numerous challenges and risks for businesses in any sector, irrespective of their production scale and ownership structure. Crises that periodically arise in all aspects of societal life further complicate the situation and amplify threats to economic entities. Moreover, in many sectors, the absence of proprietary technologies, coupled with difficulties in importation, presents additional challenges.

Indeed, the effective organization of cooperative development plays a crucial role in addressing the economic problems of Russia and ensuring sustainable development

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in the future. The issues faced by cooperatives in Russia include the following:

1. Lack of accessible funding. Cooperatives often encounter difficulties in securing financing for their development. The inability to obtain loans and investments limits their potential for business expansion and improvement.
2. Insufficient professional skills and knowledge. Problems arise due to a shortage of qualified specialists and knowledge in various areas such as management, marketing, and finance. Without the necessary skills, cooperatives may struggle to manage their resources and develop competitive strategies efficiently.
3. Limited access to markets. Cooperatives may find it challenging to penetrate the market and compete with larger counterparts. They may encounter difficulties in promoting their products or services and attracting customers.
4. Absence of advanced technologies. Some cooperatives may lack the necessary equipment and technologies to enhance the efficiency of their operations. The lack of investment in equipment upgrades can diminish the competitiveness and productivity of a cooperative.

Addressing these problems requires the active implementation of the principle of responsibility to society. Cooperatives should strive to achieve goals that encompass social, economic, technical, and environmental aspects. Profit should not be the sole objective but rather a means to accomplish broader goals. This approach enables cooperatives to focus on sustainable development and participation in addressing the social and environmental issues facing society.

Simultaneously, it is imperative to address other issues, such as ensuring accessible financing, developing the professional skills and knowledge of cooperative participants, supporting cooperative access to markets, and embracing advanced technologies. Only the collective resolution of these problems will enable the effective development of cooperatives and ensure their sustainability in the future. The principles of sustainable development encompass all three aspects: economic, social, and environmental.

The economic aspect implies that a company strives for financial stability and considers its contribution to the development of the national economy. This may involve analyzing the company's financial performance, investing in intellectual capital, and assessing the company's impact on the regions where it operates.

The social sector involves caring for the labor and health of employees and engaging in social programs to assist the population. A company can demonstrate respect for human rights and have personnel management rules, a corporate code of conduct, and community relations in accordance with these principles.

The environmental aspect involves protecting the environment and using technologies that contribute to ecological balance. Key indicators include energy consumption, water usage, and emissions of various pollutants.

Companies adhering to these principles strive to ensure economic success, improve the social sector, and reduce their negative impact on the environment. This forms the foundation for sustainable development and the creation of a favorable future for the entire society (Makarov 2023).

The primary directions of sustainable development for the consumer cooperative system in Russia are outlined in the Development Program for Consumer Cooperation for 2023–2027 (Table 1).

Effective project activities are an important aspect of the sustainable development of cooperatives and the achievement of the planned targets.

2 Materials and Method

According to the sustainable development principles, cooperatives should strive to achieve set goals and actively participate in project activities. Project activities play a crucial role in ensuring the successful functioning of cooperatives and enable them to effectively address tasks related to the development and enhancement of organizational activities.

Project activities encompass the planning, organization, and implementation of specific projects aimed at achieving predefined objectives. In the context of cooperatives, projects may be associated with the development of new products and services, improvement of production processes, enhancement of customer service quality, implementation of new technologies, and other aspects of organizational activities.

Effective project activities require good organization and management. It is crucial to define the project's goals and tasks, develop an action plan, allocate resources, set deadlines for work completion, and monitor progress. Cooperatives can also engage external experts or partners to enhance the quality of project activities and achieve optimal results.

Additionally, it is important to consider the principles of sustainable development when planning and implementing projects. This may involve the consideration of environmental aspects, social responsibility, engaging stakeholders, creating jobs, and supporting the local community. Such an approach will enhance the reputation of cooperatives and establish long-term sustainable competitiveness.

Effective project activities are a vital aspect of the sustainable development of cooperatives, helping them achieve targeted performance indicators and enhance their overall operations.

Table 1 Economic indicators of the "Development Program for Consumer Cooperation for 2023–2027"

Indicator	Unit of measure	For 2018–2022, as of January 1, 2023						2023–2027
		2018	2019	2020	2021	2022	Five years	Plan
Total volume of activity of consumer cooperative organizations	Billion rubles	216.0	189.0	183.4	189.9	197.5	976.4	1248.2
Number of shareholders in the system of Centrosoyuz	Thousand people	1470	1293	1199	1123	1103	–	+15%
Number of consumer societies—members of Centrosoyuz	Organizations	2197	2095	1997	1997	1902	–	+7%
Number of employees of consumer cooperative societies	Thousand people	114.9	103.0	91.8	84.8	78.7	–	+2%
Retail and wholesale turnover	Billion rubles	137.0	122.3	122.6	123.6	129.4	634.9	797
Volume of production activities	Billion rubles	20.9	19.0	18.0	18.9	21.1	97.9	140
Volume of purchases of agricultural products and raw materials	Billion rubles	24.7	22.6	21.5	22.6	22.9	114.3	150
Catering volume	Billion rubles	13.7	13.0	9.2	11.4	11.9	59.2	75
Volume of paid services	Billion rubles	5.0	5.2	4.9	5.7	4.5	25.3	40
Number of students in higher education institutions	Thousand people	27	28	30	32	35	–	+30%
Number of students enrolled in technical and vocational education and training	Thousand people	43	44	45	46	46	–	+40%
Amount of funds received from budgets for maintenance and development of the professional education	Billion rubles	0.806	0.759	1.373	1.832	1.186	5.956	+40%
Taxes and funds paid to extra-budgetary funds	Billion rubles	10.5	11.2	11.9	12.7	13.6	59.9	+20%

Source Compiled by the authors based on the "Development Program for Consumer Cooperation for 2023–2027" (Centrosoyuz of Russia, n.d.)

Integration of sustainable development principles into project management approaches yields several advantages. First, it makes it possible to consider environmental, social, and economic aspects when defining project goals and tasks. For example, a project can be organized with a focus on reducing negative environmental impact or maximizing benefits for social well-being. Second, incorporating sustainable development principles helps minimize risks and enhance the project's long-term sustainability. Undesirable consequences in the future can be avoided by considering financial, social, and environmental sustainability.

The project initiation process is the first stage in project management. It involves a series of crucial steps. It begins with defining the project's goals and requirements, as well as assessing its viability and potential to add value to the cooperative.

One of the key aspects of project initiation is making decisions regarding the need for investments. Cooperative organizations analyze the project's potential, expected returns, risks, and costs to determine whether investing money, time, and resources in its implementation is worthwhile.

Moreover, project initiation is closely linked to the company's sustainable development. It enables cooperatives to define their strategy and develop a plan for implementing this strategy through a set of projects. Project initiation helps cooperatives make important strategic decisions, set priorities, and determine which projects will contribute to achieving their long-term goals.

In conclusion, project initiation plays a crucial role in ensuring the successful implementation of projects, optimizing return on investments, and managing project content from the perspective of the company's sustainable development (Fomichev 2023).

It should be remembered that the term temporary does not apply to the result or service created by the project.

A project can be final, but not the result. A project is an endeavor to create something unique. The project is initially defined, and as the project progresses, the definition is revised, adding more clarity to the project's scope, as well as the fundamental assumptions.

The sequence and names of project stages may vary depending on the specific project, its type, industry, and project management methodology. However, in general, many projects may have the following basic stages:

1. *Initiation.* At this stage, the goals, objectives, and scope of the project are defined. The initial project concept is developed, preliminary research is conducted, and documentation is prepared, including a business plan and project proposal.
2. *Planning.* At this stage, a detailed project plan is developed, including the definition of work, resources,

budget, schedule, risks, and communication activities. The plan provides the foundation for project control and management.
3. *Execution.* At this stage, the works specified in the project plan are implemented. Communication and coordination among project participants are carried out. Work performance, resource allocation, and change management are monitored.
4. *Monitoring and control.* At this stage, continuous monitoring of project progress is conducted to ensure that the project is executed according to the plan. Quality control, risk management, and corrective actions for deviations from the plan are implemented.
5. *Closure.* At this stage, the project is completed and handed over for operation. Project assessment is conducted, including an analysis of achieved results and performance evaluation. All contracts are closed, documentation is archived, and lessons learned are documented.

These stages form the project life cycle and help project managers plan and organize work, monitor progress, and achieve specific results at each stage. They also provide structure and sequence for effective project management.

3 Results

At the present stage of cooperative evolution in accordance with the Development Program for Consumer Cooperation for 2023–2027, it is expedient to apply project activities.

Several important steps need to be taken to establish an advanced infrastructure for wholesale trade in perishable products from small and medium-sized agricultural enterprises.

First, it is essential to develop a storage and logistics system that allows for the efficient movement and preservation of perishable products. This may involve creating refrigerated warehouses, specialized containers, and transportation with the capability to maintain optimal temperature and storage conditions for the products.

Second, effective mechanisms for the procurement and distribution of products from small and medium-sized agricultural enterprises to wholesale buyers should be devised. This may include establishing central collection platforms equipped not only with the necessary technical capabilities but also facilitating direct contact between producers and buyers.

It is also crucial to develop systems for quality control and certification of products to ensure a high standard and safety of goods for consumers. This may encompass the establishment of specialized laboratories and certification bodies tasked with verifying the quality of products.

It is important to consider the following aspects for the procurement organizations of consumer cooperatives.

First, mechanisms for collaboration between consumer cooperatives and agricultural enterprises need to be developed to ensure reliable raw material supply and product promotion. Organizing a system of long-term contracts and incentives for farmers and cooperatives can contribute to improving the quality and availability of agricultural products.

Second, it is advisable to develop a comprehensive system for processing agricultural products, including the establishment of plants and enterprises equipped with state-of-the-art equipment and technologies. This will enhance the efficiency of the processing process and improve the quality of the end products.

Furthermore, it is essential to develop marketing systems and promote the products to ensure their competitiveness in the market. This may involve conducting marketing research, designing packaging, creating a brand, and running advertising campaigns.

The creation of a unified system and infrastructure for efficient procurement and processing complexes based on consumer cooperative organizations implies the following:

- Establishing partnership relations between agricultural enterprises and consumer cooperatives to ensure stable and long-term product supplies;
- Creating a unified procurement and sales system, enabling the efficient supply of agricultural products to consumer cooperatives and their successful implementation in the Russian market;
- Developing infrastructure, including specialized warehouses, transportation, and technological equipment necessary for the storage, processing, and quality assurance of agricultural products;
- Ensuring product quality through the implementation of a quality control and certification system, guaranteeing compliance with established safety and quality standards for agricultural products;
- Developing marketing and product promotion mechanisms to attract more consumers and make consumer-cooperative retail stores competitive and appealing to buyers.

The following measures can be taken to enhance the effectiveness of consumer cooperative retail:

- Improving the external appearance and design of stores, creating an attractive and comfortable atmosphere for shoppers. This may involve updating the interior, installing advanced equipment, and using innovative technologies in the retail process;

- Expanding the variety and quality of the product range to meet the needs and preferences of different customer groups. It is crucial to monitor the relevance and seasonality of offered products and provide eco-friendly and healthy options;
- Implementing advanced technologies in the management and operational processes of stores, such as warehouse operations automation, implementing inventory and planning systems, using electronic payment systems, etc.;
- Developing and implementing marketing strategies aimed at attracting new customers and retaining existing ones. This may include promotions, discounts, loyalty programs, organizing events, etc.;
- Ensuring a high level of customer service, including staff training, creating a comfortable environment for customer interaction, meeting their needs, and providing quality information about the products.

These measures can help improve the competitiveness of consumer cooperative retail stores, increase their attractiveness to customers, improve commercial and operational efficiency, increase the turnover and profitability of public catering enterprises of consumer cooperative societies, and promote the development of tourism in consumer cooperation until 2035.

4 Conclusion

The Development Program for Consumer Cooperation for 2023–2027 is a key instrument for achieving the sustainable development of cooperatives. This program is designed to address a wide range of challenges related to the current activities of consumer societies and unions and preserve and develop consumer cooperation as a whole. It envisions active collaboration among all stakeholders in the creation and development of innovative projects, as well as the establishment of centers for economic growth.

The program also encourages collaboration with small and medium-sized enterprises and federal companies in implementing innovative projects. This contributes to creating a favorable economic environment and stimulates the development of consumer cooperation throughout the country.

It is important to note that the main goal of the program is the sustainable development of consumer cooperation as a unified and integral system of national significance. This means that the program aims to ensure the long-term successful operation of cooperatives and promote their development based on innovation and collaboration.

Project activities play a crucial role in achieving these goals. The projects implemented under the program are oriented towards specific goals and tasks set for consumer societies and unions. They contribute to the creation of new points of economic growth, the development of innovations, and the improvement of working conditions for cooperatives.

In conclusion, it can be stated that project activities are an integral part of the implementation of the Development Program for Consumer Cooperation for 2023–2027. They are directed toward achieving the program's goals, creating new opportunities for cooperatives, and promoting the sustainable development of consumer cooperation as a whole.

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Model of the Concept of Transition of Cooperation to a Green Economy

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Abstract

Today's consumer cooperation system in Russia has a well-developed network of stores, warehouses, supply points, and production facilities. Collaboration among Russian consumers is synonymous with a comfortable world featuring a stable economy founded on the conscious choices of each member of society and shared values (e.g., honesty, openness in business, respect, and care for people and the environment). Members of consumer cooperatives employ eco-friendly technologies in the production of cooperative food products. The Russian cooperative system is oriented towards the friendliness, humanity of society, creativity in work, justice, innovation, and social development. Consumer cooperation places significant emphasis on the development of the social infrastructure of rural areas and ensuring food security for the rural population. This research explores a model for the concept of transitioning cooperation to a green economy, which is relevant in the context of promoting the green growth strategy in Russia. Green growth entails stimulating economic growth and development while preserving natural resources and ensuring their continuous provision of resources and ecosystem services, upon which our well-being depends. To achieve this, green growth must stimulate investments and innovations that will form the basis for sustainable growth and lead to the emergence of new economic opportunities.

Keywords

Cooperation · Green economy · Sustainable development · Concept model · GRI indicator system

JEL Codes

B40 · O10 · Q01

1 Introduction

The global trend of contemporary economic development is shaped by the concepts of sustainable development and the green economy, which are expected to have a positive impact on the economy of individual countries and the entire planet.

The Declaration of Green Growth, signed in June 2009, reflects the commitment of 34 countries to strengthen efforts in implementing green growth strategies within their borders and beyond. These countries acknowledge that the concepts of "green" and "growth" can be inherently interconnected.

This initiative advances the understanding that economic growth and environmental protection are not incompatible, and actions aimed at maintaining ecological sustainability are key to achieving long-term prosperity.

The signatory countries recognize the need to integrate the principles of green growth into their strategies and measures to overcome crises and ensure sustainable development. This may include reducing greenhouse gas emissions, improving energy efficiency, developing renewable energy sources, preserving natural resources, and adopting other measures conducive to the planet's sustainable development.

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_44

The Declaration of Green Growth is a significant step towards a more sustainable and environmentally friendly global economic development. It underscores the importance of cooperation between countries and the efforts of each country in implementing green growth strategies (Macroeconomic Policy Department of the Eurasian Economic Commission 2023).

The past decades have been characterized by various crises, indicating the instability of the existing model of global economic development. Since the mid-1980s, new concepts and approaches have emerged, aimed at finding new paths for development and addressing the challenges faced by the global economy.

One of these conceptual approaches is the notion of sustainable development. Sustainable development is built on the following three interconnected fundamental components:

1. Economic sustainability. The concept of sustainable development implies the creation of economic systems capable of combining growth and prosperity while considering limited resources and protecting the environment. This includes the development of new economic models based on sustainability, such as the circular economy and the utilization of renewable energy sources.
2. Ecological sustainability. Sustainable development aims to preserve natural resources and biodiversity through efficient resource utilization, reduction of emissions and pollution, and the minimization of consumption and waste. It pays special attention to the principle of environmental conservation to ensure the long-term sustainability of the planet.
3. Social justice. The concept of sustainable development is oriented towards ensuring social justice, eliminating inequality, alleviating poverty, and providing equal opportunities for all people. It is based on the principles of respecting human rights and satisfying the basic needs of all members of society.

Sustainable development is not just a goal but rather a process that requires interaction and collaboration between countries, businesses, civil society, and all stakeholders. It calls for a change in our thinking and behavior to ensure a prosperous and sustainable planet for us and future generations.

Another conceptual approach is the development of human potential. This approach emphasizes the development and support of human resources (e.g., education, health, skills, and employment). The goal of this approach is to create conditions for the full development and realization of the potential of each individual, contributing to the sustainable socio-economic development of society.

Both of these conceptual approaches, sustainable development and the development of human potential, have had a significant impact on shaping new models of economic development. They underscore the need for integrating economic, social, and environmental aspects into development strategies, helping to address the challenges and crises faced by the global economy.

However, despite efforts and progress in implementing these concepts, numerous challenges and obstacles persist on the path to sustainable and equitable development. It is crucial to continue research, seek new approaches, and collaborate on an international level to achieve the goals of sustainable development and the development of human potential (Macroeconomic Policy Department of the Eurasian Economic Commission 2023).

The concept of a green economy takes precedence in the development strategy of various countries, enabling them to address the challenges of the twenty-first century (e.g., climate change, urbanization, and resource scarcity). In turn, this will positively impact the country's overall sustainable development.

The pursuit of green economic goals should be contextualized within the framework of enhancing the population's well-being and fostering social justice. Specific programs related to environmental protection with targeted parameters that contribute to reducing ecological risks must also be developed.

Consumer cooperation plays a crucial role in the green economy for several reasons.

First, it contributes to reducing the ecological footprint. Second, it fosters the development of the local economy and reduces dependence on distant supplies. Third, consumer cooperation enhances awareness and education in sustainability and environmental responsibility.

Based on the fundamental concepts and principles of the green economy, it is expedient to develop a model for the cooperative transition to a green economy. This model will help outline the points of green growth in the economic activities of cooperative societies.

The transition to a green economy is a significant global trend aimed at mitigating the negative impact of economic activities on the environment and ensuring the sustainable use of natural resources. Cooperative societies can become a crucial driver of this transition because they are founded on the principles of fairness, cooperation, and the participation of society members.

2 Materials and Method

The consumer cooperation system was established in Russia in 1831, representing a form of business organization where domestic producers, specialists, and consumers

joined forces in cooperatives. The purpose of such collaboration was to protect and promote their interests. In consumer cooperatives, the principles of democracy were applied in practice, as cooperative members had equal rights and could participate in making managerial decisions. Cooperatives also offer their members preferential or wholesale pricing on the goods and services they provide. In Russia, consumer cooperatives have a rich history and continue to function actively to this day (Centrosoyuz of Russia n.d.) (Table 1).

The essential mission of the Russian cooperative system is to care for its members through the lens of values such as respect, honesty, environmental stewardship, comfort, and, most importantly, the sustainable development of cooperation.

The Russian cooperative system places particular emphasis on the ecological aspects of food production.

Cooperatives within the framework of the Russian consumer cooperation system are socially oriented at the macro, micro, and meta levels of the economy.

New and innovative approaches are required for sustainable development. The accumulation of knowledge and the development of technologies play a crucial role in ensuring economic development and addressing environmental and national economic issues. Innovative solutions can help find more efficient and environmentally friendly methods of producing and consuming goods and services. Thus, the accumulation of knowledge and technological development are key factors in resolving risks and threats to the environment and national economies. The use of innovative solutions and education will enable us to move towards sustainable development, balanced growth, and the preservation of resources for future generations (Glinskaya 2011).

To achieve this, the authors recommend utilizing the Global Reporting Initiative (GRI) system of sustainability reporting indicators.

The GRI (Global Reporting Initiative) system of sustainability reporting indicators is one of the most widely adopted standards for reporting on sustainable development. GRI has developed a set of indicators that helps organizations measure and report on their economic, environmental, and social impacts.

The GRI indicator system comprises the following elements:

1. Scope: defines the context and coverage of reporting, including reporting principles and guidance on indicator selection;
2. Organization description: provides information about the structure, location, and activities of the organization;
3. Materiality: identifies key topics that significantly impact the organization and stakeholders;
4. Indicators: measure the organizational performance in production, finance, social, and environmental aspects;
5. Metrics: provide information on quantitative and qualitative aspects of the organization's significant impacts;
6. Assessment: additional indicators used for comparison and evaluating progress towards sustainable development goals;
7. Verification: affirms the reliability and accuracy of the information presented in the sustainability report.

The GRI indicator system (Global Reporting Initiative 2006) allows organizations to demonstrate their accountability to stakeholders and ensures transparency regarding their impact on the environment, economy, and society. GRI aims to create a standard that reflects the most crucial aspects of sustainable development and provides guidance on its application to facilitate better results in sustainability reporting.

It is advisable to incorporate the identified indicators into cooperative reporting, especially when forecasting financial and economic activities. Green economy and consumer cooperation can complement each other and contribute to sustainable and environmentally responsible practices.

Green economy and consumer cooperation can complement each other and contribute to sustainable and environmentally responsible practices.

The green economy essentially represents an economic system that aims for sustainability, minimal negative impact on the environment, and maximum utilization of renewable resources. This economic model emphasizes reducing carbon emissions, efficient energy use, waste elimination, and transitioning to a circular economy.

Table 1 Consumer cooperative system as of December 31, 2023

Cooperative performance indicators	Unit	Data
Number of cooperators	People	103,000
Production units	Objects, pcs	3500
Enterprises of procurement (purchase) from the population	Objects, pcs	8000
Trade organizations	Objects, pcs	29,000
Public catering	Objects, pcs	3500
Other (construction services to the population, household and agricultural services)	Objects, pcs	

Source Compiled by the authors based on the data from Centrosoyuz of Russia (n.d.)

On the other hand, consumer cooperation is oriented towards meeting the needs of consumers through collaboration and mutual support. Cooperatives are based on the principle of democratic governance, realizing the interests of their members rather than corporate profits. They contribute to fair trade, support the local economy, and provide access to high-quality, sustainable, and environmentally responsible goods and services.

In the context of the green economy, consumer cooperation can do the following:

1. Encourage environmentally responsible production: cooperatives can support and organize the production of goods and services that meet the requirements of the green economy (e.g., using renewable energy sources, reducing emissions, and recycling waste);
2. Promote consumption with environmental sustainability in mind: cooperatives can provide access to environmentally responsible goods and services, educate consumers about the importance of sustainable consumption, and popularize alternative lifestyles such as low-carbon consumption or public transportation;
3. Support the local economy: cooperatives can contribute to the development of local entrepreneurship, promote fair trade, and reduce dependence on global trade and supply chains;
4. Provide information and education: cooperatives can serve as a platform for knowledge and experience exchange in the field of the green economy, conduct educational programs, seminars, training, and local initiatives for environmental awareness.

Overall, consumer cooperation can contribute to the development of the green economy by providing alternative paths for consumption, production, and economic organization based on collaboration, sustainability, and meeting the needs of their members and the environment.

3 Results

The green economy is a sector of the economy that aims to develop strategies fostering peaceful relations among people and between humanity and the natural world. It encompasses a myriad of topics, including interactions with nature and production processes. Green economists study the economics of alternative energy sources, materials, food products, and industrial processes. Environmental and green economy are closely intertwined. However, the green economy employs a more comprehensive approach and advocates for politically viable sustainable solutions.

Building upon the trends in the development of the Russian cooperative system and drawing on the concepts of sustainable development in the context of the green economy, let us present the key components of the conceptual model for the transition to a green economy within the cooperative framework (Table 2).

The goal of transitioning to a green economy for cooperatives is to shape the development directions of the Russian cooperative system through the concept of the green economy. This implies the effective and environmentally sustainable development of all activities within the consumer cooperative system: production, trade, procurement, etc.

Table 2 Main components of the conceptual model of transition to a green economy of cooperation

Concept component	Component definition
Goals	Formation of directions for the development of the Russian cooperative system through the concept of green economy
Users	Members of cooperative societies, cooperative boards, and Centrosoyuz of the Russian Federation
Object	The financial and economic activity of the Russian cooperative system in all areas—production, trade, procurement, and agriculture
Principles	Sustainability Fairness and dignity Stewardship and flexibility Healthy habitat
Methods and procedures	Rational use of natural resources Environmentally safe production Lean production (recycling, billets) Improving environmental literacy

Source Developed by the authors

The primary users of this conceptual model are the cooperative members, whose well-being is the focus of all consumer cooperative activities in Russia.

The object of the conceptual model for transitioning to a green economy for cooperatives is the entire financial and economic activity of the cooperative system in Russia across all sectors—production, trade, procurement, agriculture, etc.

The fundamental principles of the conceptual model for transitioning to a green economy for cooperatives are sustainability, fairness, dignity, governance, flexibility, and a healthy living environment.

Based on these principles, the model will contribute to the development of environmentally sustainable businesses, the improvement of the quality of life for society members, and more sustainable development.

The methods and procedures of the conceptual model for transitioning to a green economy for cooperatives can be consolidated into the following directions:

- Rational use of natural resources. This principle is based on the work of various cooperative societies (trade, public catering, and procurement activities, which have recently experienced a revival).
- Environmentally safe production. All equipment and technological support for cooperative activities should be used with characteristics such as environmental friendliness, cost-effectiveness, and efficiency in mind.
- Lean production (processing, procurement). This is a crucial method. Specific methodologies are required to help consumer cooperatives occupy a niche in waste processing, recycling, etc. This area is insufficiently developed in Russia.
- Enhancement of ecological literacy. In this direction, the Russian University of Cooperation, with its network of branches and institutes, operates within the consumer cooperative system in Russia. However, it is also expedient to involve cooperatives in national projects and grants in the field of ecology to enhance and effectively develop sustainability within the context of sustainable development.

4 Conclusion

Summing up the research within the framework of the green economy and its alignment with the development concept of the Russian cooperative system, it should be noted that consumer cooperation inherently prioritizes ecological sustainability, a careful attitude towards nature, and concern for each cooperative member. These principles are embedded in the mission and legislation of consumer cooperation.

In general, consumer cooperation plays a significant role in the green economy by contributing to the reduction of the ecological footprint, the development of the local economy, and the enhancement of people's education in sustainability. It serves as a remarkable tool for achieving a more sustainable future.

Based on what has been discussed, it is worth emphasizing once again that cooperative communities cannot remain indifferent to the global trend of economic development in the context of the green economy. The proposed model of the conceptual transition to a green economy for cooperatives, highlighted in its key components, will contribute to the sustainable development of consumer cooperation for the benefit of Russia's overall development.

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Prospects for Attracting Local Resources to Develop Eco-Business in the Region

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Abstract

The research discusses local resources for investment in the business model of small entrepreneurship in the region. The research subject is the production of soap as a means of daily use necessities. The growing demand for handmade soap confirms the relevance of this research. Consumers of hypoallergenic soap based on low-lactose raw materials are people from all walks of life, regardless of age. The authors use comparative analysis to determine the nature of the consumer properties of hypoallergenic soap based on low-lactose raw materials from goat's milk. As a result of the conducted research, a cold processing method is recommended as a technology for producing soap based on goat's milk. The authors also studied the useful properties of the product (soap made based on low-lactose raw materials—goat's milk, which retains its nutritional components with a cold method of waste-free manual production). Moreover, the authors provided an organoleptic evaluation of the product and revealed the useful properties of soap based on low-lactose raw materials. The proposed business model of small entrepreneurship involves calculating the amount of financial support based on assessing the potential of the market capacity, payback period, and profitability of the proposed project.

Keywords

New quality · Economic growth · Smart economy · Advantages · Consumer cooperation · Social mission · Investments · Eco-business · Local resources · Low-lactose raw materials

JEL Codes

D91 · E01 · F42 · F43 · Q01 · Q15 · O31 · O32 · J54

1 Introduction

Business is currently oriented towards eco-friendliness and fostering an eco-culture, giving rise to green entrepreneurship that brings profit and benefits the environment, society, and the planet.

In the face of global strategic changes in the external environment, implementing a sustainable development strategy remains relevant for all regions of the country. Reducing the greenhouse effect and minimizing accumulated environmental harm leads to an improvement in the quality of life. These strategic priorities of state policy are noted in numerous research presentations at scientific conferences of the cooperative system (Grigorieva 2022; Fedorova et al. 2023).

Ecological businesses, particularly those that use local resources to develop small businesses in the region, hold a special interest in consumer cooperatives. For instance, producing organic products based on goat milk contributes to ecosystem improvement, preserves and enhances soil fertility, protects human health, and, considering local conditions and relying on ecological cycles, maintains biological diversity without using substances harmful to the environment. This becomes practically significant for cooperatives in the agricultural business (Tkach 2014).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_45

This research explores local resources for business investments—a model for small businesses in the region. The research is based on soap production as an essential daily commodity. Consumers of hypoallergenic soap made from low-lactose raw materials include people of all ages and social strata. The growing demand for handmade soap underscores the relevance of the conducted research.

2 Methodology

Since ancient times, humans have consumed natural milk and its processed products, which are affordable sources of essential nutrients such as proteins, fats, and minerals. Approximately 6000 types of milk from mammalian animals are known to humanity, each type with its unique chemical composition. In the context of this research, the authors conducted a comparative analysis between two of the most common types of milk—cow's milk and goat's milk, focusing on their consumer properties. According to the Food and Agriculture Organization of the United Nations, goat's milk ranks third in the world in terms of production volume, following cow's and buffalo's milk (Gavrilova and Schetinina 2019).

As is known, milk is a chemically complex liquid. Cow's and goat's milk have similar chemical compositions and contents of proteins, fats, and carbohydrates. However, goat's milk contains less lactose, more vitamins, and minerals and also includes bioactive substances absent in cow's milk, giving it bactericidal properties. Goat's milk differs from cow's milk in amino acid composition, containing more essential amino acids: valine, leucine, isoleucine, and cysteine (totaling 761 mg and 663 mg, respectively, per 100 g of milk). The first three amino acids contribute to rapid muscle recovery and increased muscle endurance during physical exertion, oncological diseases, AIDS, etc. Cysteine (30 mg and 26 mg, respectively, per 100 g of milk) is the most potent antioxidant; its antioxidant effect increases when combined with vitamin C and selenium, both present in goat's milk in sufficiently high amounts (Dimitriev et al. 2018).

Cysteine also provides protective effects against toxic chemicals (found in cigarette smoke), alcohol, and the influence of electromagnetic radiation from household devices, including mobile phones and computer equipment. Another valuable component of goat's milk is the antibacterial enzyme lysozyme, which possesses antibacterial action against pathogenic and opportunistic microorganisms. It also enhances the body's immunological and anti-inflammatory reactions, acting as an excellent whitening agent for the skin and providing soothing effects. Additionally, goat's milk contains an important antioxidant, coenzyme Q10, which participates in tissue respiration's redox reactions and slows down the skin aging process.

The differences in chemical composition form the basis for various practical applications of goat's milk, such as the food and cosmetic industries, healthy nutrition, therapy for allergic diseases, the consequences of harmful anthropogenic and natural factors, dietetics, sanitation and hygiene, and more (Egorova and Ilyina 2018).

This makes it possible to use goat's milk products as one of the means to combat the widespread occurrence of allergies—an epidemic of the twenty-first century. According to the opinions of Russian and international specialists in the field of allergic diseases, approximately one-third of the world's population experiences various allergic reactions and diseases (7).

3 Results

The goat milk production business offers opportunities to expand the assortment of organic eco-products. Goat milk is used for dairy products (e.g., fermented milk, cottage cheese, yogurt, cheese, and ice cream) and natural soap. The development of the cosmetic market has increased the popularity of hygiene products, leading to the emergence of new types of soap with medicinal effects—hypoallergenic products known for their cleansing and therapeutic properties. The popularization of environmentally friendly products has driven demand for natural handmade products. This trend has intensified with the rise of the handmade movement.

The following conclusions can be drawn based on the conducted experiment in producing hypoallergenic soap using low-lactose goat milk.

To address the issues faced by consumers with sensitive skin, hypoallergenic soap was proposed using low-lactose raw materials from goat milk using the cold process method. The consumers of such soap could include people with sensitive skin, children, and other segments of the population. The potential regional market among the 1,173,000 residents of the Chuvash Republic (as of the beginning of 2023), with 37,800 users and a market share of 3.2%, was evaluated. This potential was assessed based on the population in Chuvashia with skin conditions, skin problems, and allergic risks. The expanded group of potential product consumers encompasses all age groups, from children and youth to middle-aged and senior individuals. This market capacity could be increased by reaching other regions through distribution channels such as consumer cooperative enterprises and online platforms (e.g., Wildberries, Ozon, and others).

Furthermore, developing procurement productions within consumer cooperatives will ensure an increase in the volume of purchases, procurement, and processing of dairy raw materials. These contribute to the realization of this eco-business. In consumer cooperatives, the development of such eco-business models is implemented considering

cooperative uniqueness and trade, agro-production cooperation, and an expanded logistics supply chain (Fedorova and Barsukova 2019).

The proposed business model serves as the foundation for organizing entrepreneurial activities of small businesses. This business model will make it possible to attract government support, grant assistance, and various forms of innovation investment (Blau and Fedorova 2016).

The implemented business model will expand the market for the production of natural soap based on local resources. Rapid freezing of local raw materials allows for their procurement, and in soap production, it contributes to preserving all the nutritional properties of goat milk. Local farms and personal subsidiary farms in the Chuvash Republic are the source of raw materials, producing approximately 400 tons annually (Ivanov and Sorokina 2021).

To introduce this product to the market, the sales plan envisions reaching approximately 14–15 units of this product per day by the end of the second month of operation. The price of one soap bar is forecasted to be around 200–250 rubles each. The estimated financial support for the start of production is 586000 rubles. The project's payback period is projected to be two years, achieving profitability of 33.6%.

The biochemical ingredients of goat milk are maximally preserved with the proposed cold process of soap making since they have a protein nature that undergoes irreversible changes and loses its favorable native properties when soap is made using the hot process.

Almost any type of fat can be used to make soap; olive, coconut, or palm oils are the most popular options. Shea butter and cocoa bean oils are also suitable because they produce more lather. Extending the duration of the washing procedure with the developed soap will undoubtedly enhance its therapeutic and hygienic effects, which is particularly relevant for the food service industry.

When correctly using detergents, it is essential to consider the crucial concept of pH. In our case, the lowest pH value of handmade soap is 6.5. The soap is characterized by a homogeneous consistency, without foreign impurities, with an aroma characteristic of goat milk and the oils included in the soap composition, a uniform cream-beige color (brownish coloring indicates an improperly followed recipe), and a pH level within the normal range (pH 6.5). The organoleptic indicators of the manufactured goat milk soap indicate that the recipe is followed and that all stages are executed correctly.

4 Conclusion

During the research, the authors justified the process of soap production based on local sources of natural raw materials—goat milk. The production of hypoallergenic soap from low-lactose raw materials is oriented towards small-scale production using the cold process in the conditions of small businesses. The demand for handmade soap is constantly growing since consumers of this product come from all segments of society, regardless of age. Market capacity can be increased through personal sales and by reaching other regions through the distribution channels of the consumer cooperative system and online marketplace networks.

The next step is to trace the milk supply chain from the producer, the farm, to the retail store and the end consumer. Each organizational element in this chain can participate in grants and entrepreneurship support programs, starting from startups and self-employment forms, expanding farms and small businesses to retail chains and consumer cooperative enterprises.

During the research, the authors developed a business model based on a zero-waste project for producing hypoallergenic soap from low-lactose goat milk to attract investments and expand the use of local resources. During the research, the authors justified the methods of attracting resources for developing eco-business models. Further implementation of similar business models is planned within the framework of a business incubator, which is open at the Cheboksary Cooperative Institute (branch) of the Russian University of Cooperation to activate various forms of support for youth startups.

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Economic Security and Social Responsibility of Cooperatives

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Abstract

The research explores the relevant aspects of ensuring the economic security and social responsibility of cooperatives. In light of recent events, the issue of social responsibility is becoming increasingly relevant. Initially, this responsibility falls on large companies, bending under the pressure of the public and governmental structures. The foremost task is the clear understanding (by all parties involved) of the specific functions each entity should undertake. Many companies allocate significant attention to stimulating and satisfying the diverse needs of employees and leaders at various levels. To effectively address all challenges, it is essential to analyze the extent to which corporations are prepared to take on social responsibilities, support social projects, and minimize various risks. In the current environment of economic instability in any industry, risk is an integral part of managing any project. Given this, it is logical to assume that actions in market conditions cannot be predetermined because there is always a possibility of incurring losses or failing to meet obligations. A risk map for the corporation has been developed to stabilize the implementation of social projects, identify potential threats to business, and visualize the assessment of entrepreneurial risks. Measures have been proposed for developing social responsibility in cooperatives, as well as actions to identify and address issues from a management perspective.

Keywords

Economic security · Social responsibility · Globalization · Performance · Information technology · Digitalization · Modernization of innovation

JEL Code

F5

1 Introduction

The research examines issues related to the corporate social responsibility of enterprises towards society, primarily towards their employees. In the current stage of geopolitical developments worldwide, considering the peculiarities of the functioning of the Russian economy, various aspects of social responsibility are gaining increasing significance for enterprises. From the perspective of national enterprises (e.g., production and consumer cooperatives), the burden of corporate social responsibility may become overwhelming, feeling the influence of the state and public opinion.

2 Methodology

In the existing realities, when all sectors are in an unstable condition, issues of corporate social responsibility become particularly relevant. The area examined in this research fully encompasses all relevant aspects through which the goal set in this research is achieved.

The authors analyze the corporate social responsibility of cooperatives and its impact on their activities. Using graphical and tabular methods, the authors present the results of their research. For instance, the authors present

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the results of surveys on issues of social responsibility towards employees of enterprises.

Globalizing this topic, it would be desirable to initially consider corporate social responsibility from the country's perspective.

Achieving comprehensive attention to this issue requires paying due attention to the quality of life in the country. For this purpose, the authors believe it is necessary to take the measures presented in Fig. 1.

According to the Constitution of the Russian Federation, Russia is a social state whose policy aims to create conditions for a decent life and the free development of individuals. Therefore, citizens undoubtedly want guarantees from the state to be confident in the future. It is essential to conduct systemic work on developing the information environment, creating a unified information space for investment activities. The development of the information environment involves providing various services and information to assess the advantages and disadvantages of companies, the prospects for their development, and the advisability of government support (Russian Federation 1996).

It is important to analyze the experience of foreign countries in implementing corporate social responsibility policies. In many countries, these issues are not legislatively regulated but fall within the scope of society itself. However, this does not hinder ensuring a comparatively high level of social responsibility.

For instance, the concept of corporate citizenship is widespread in the USA, implying the social responsibility of corporations to society and the fulfillment of legal, economic, and ethical obligations defined by shareholders. The foundation of corporate citizenship is the understanding that a good reputation is the key to a stable and effective existence. The goal is to ensure high living standards for society while maintaining the company's profitability.

In the USA, corporations spend more on charity than businesses in any other country. Corporations with a turnover of over $100 million publish non-financial reports that specify the social actions taken and the impact of their implementation. However, the government monitors the objectivity of the reported data, even though it officially does not assume responsibility for it (Berdyshev 2017). We can note that social initiatives are monitored and implemented by large companies because they set the task of minimizing human rights violations, supporting democratic activists worldwide, opening up political space in emerging democracies and authoritarian regimes, and making positive transnational changes in society (Izvarina et al. 2018).

Next, let us consider how corporate social responsibility is represented in various cooperatives in Russia. The company devotes sufficient attention to stimulating and satisfying the various needs of employees and managers at different levels. The results are presented in Fig. 2.

Accordingly, analyzing the results of the study presented in Fig. 2, we can conclude that the company pays significant attention to ensuring safety and confidence in each employee's future.

Another important aspect is the combination of corporate resources. Corporate resources are a specific tool for achieving the goals and results of activities that are actively used by corporation owners (Kalemeneva 2020).

The authors believe it is necessary to explain some corporate resources and their significance for enterprises.

One of the primary resources is the legal resource, formed by the company based on and in accordance with the legislation of the Russian Federation. In the context of this research, cooperatives in the Russian Federation have a strong legal field that ensures their effective operation, serving as the foundation for safety and stability.

The company's personnel resource is at a sufficiently high and stable level. It is worth noting that increasing the number of employees in an organization is desirable because it is necessary to increase the production volume (Kodaneva 2019).

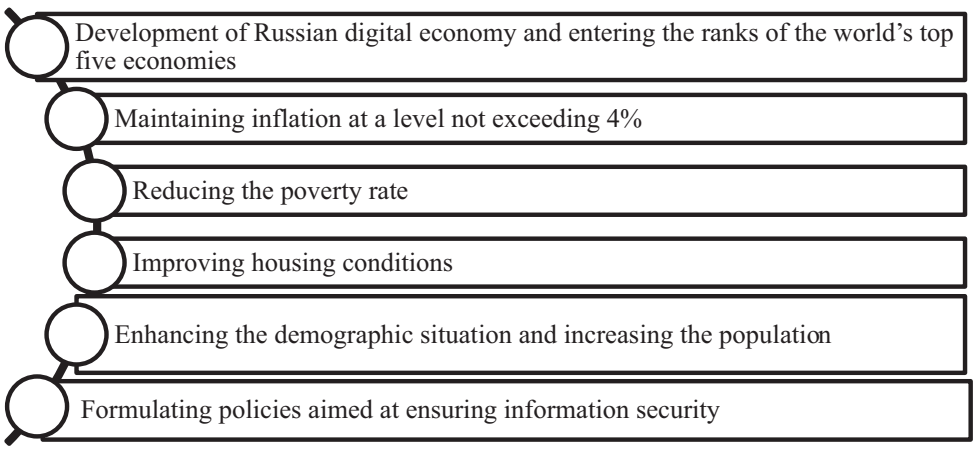

Fig. 1 Measures to enhance the level and quality of life in the country. *Source* Compiled by the authors

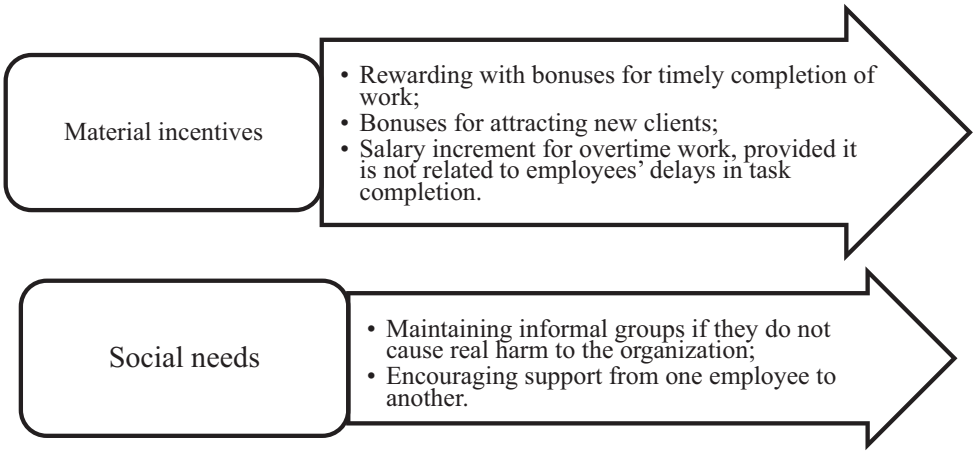

Fig. 2 A system for improving economic security through employee incentives in a company. *Source* Compiled by the authors

The primary task of any successful company should be the optimization of labor organization, which includes the following:

- Striving for 100% employee utilization;
- Providing conditions for improving the use of labor, namely rationalization;
- Emphasis on increasing the qualifications of all employees.

It is noteworthy that the company has all the necessary resources, technologies, machinery, and equipment to ensure the normal functioning of the company during financial and economic activities.

Minimizing risks through tools that support the stability and efficiency of the management mechanism is the company's top priority. To achieve the set tasks within the legislation of the Russian Federation at this point in time, the cooperative has all the necessary resources.

In the current economic conditions characterized by a high level of competition and uncertainty, each enterprise strives to develop a concept for further operation, influenced by various risks in the form of events hindering the achievement of set goals (Krutskikh 2007).

In light of the unstable situation in any economic sector, risk is an integral part of conducting any project. On this basis, it is logical to assume that any actions inherently carry the probability of incurring losses or failing to meet obligations (Kudryavtseva and Martynov 2017).

In accordance with Article 929 of the Civil Code of the Russian Federation, entrepreneurial risk is the risk of losses from entrepreneurial activities due to the violation of its obligations by the entrepreneur's counterparties or changes in the conditions of this activity due to circumstances beyond the entrepreneur's control, including the risk of not receiving expected income (Makarov 2018). Undoubtedly, any manager will take all possible actions to minimize their losses, namely try to calculate the company's risks in advance, identify the most probable and critical among them.

The company's risk map is a visual representation of the assessment of entrepreneurial risks, through which the classification of danger by criticality is carried out.

The company's risk map is necessary for any enterprise. It performs the following functions:

- To identify possible business hazards;
- To record risks;
- To divide internal and external risks;
- To classify significant and insignificant risks;
- To conduct risk analysis for further business development;
- To reduce the likelihood of their occurrence (Ignateva et al. 2019).

The presence of an up-to-date enterprise risk map indicates the presence of an active risk management system. It is also necessary when interacting with banks, credit institutions, founders, and shareholders. Based on the conducted research, the company's risk map is presented in Table 1.

Based on Table 1, where the company's risk map was considered, we can conclude that the company is in a stable position. Nevertheless, to improve its indicators, measures should be taken to minimize risks and maintain social responsibility.

The instrument used for comparing and classifying risks is understood as risk ranking. When ranking risks, possible sources of threats are determined. The most significant issues for company employees are identified through sociological research (Camilleri 2017).

Let us consider the specific example of the results of a survey conducted in the company based on questions asked to employees.

Table 1 Company risk map

Risk name	Probable/existing	Increasing/decreasing	External/internal	Degree probability	Degree of acceptability
Increase in competition	Existing	Increasing	External	Average	Acceptable
Shortage of the number of the organization's employees	Existing	Increasing	Internal	Average	Acceptable
Liquidity risk	Existing	Increasing	External	Average	Permissible
Interest rate risk of the banking portfolio	Probable	Increasing	External	Average	Permissible
Continuity risk	Probable	Increasing	External	Average	Permissible
Reputation risk	Existing	Increasing	External	Average	Permissible

Source Compiled by the authors

After processing the survey results, a weight coefficient is assigned to each answer option. The principle of distributing the weight coefficient is as follows:

(1) Often—4;
(2) Sometimes—3;
(3) Very rarely—2;
(4) Never—1.

The next step is to calculate the importance of each answer when compiling the final value.

Thus, based on the calculation of the importance of each answer when compiling the final value, we obtain a single numerical value (let us call it ʊ) for each of the presented questions.

The calculation of a magnitude that reflects the level of seriousness of the problem (let us call it €) is the last stage of the analysis.

For clarity, the obtained data will be presented in Table 2.

Based on the calculation presented in Table 2, we can rank risks by levels of importance, which is an essential part of the risk management system.

Let us present the assessment of acceptability and ranking of risks by the level of significance:

(1) Range of € 0–32—low level of deficiency;
(2) Range of € 33–67—medium level of deficiency;
(3) Range of € 68–89—high level of deficiency;
(4) Range of € 90–100—extremely high level of deficiency.

3 Results

Thus, based on Table 2, we can conclude that the considered risks are at a low and medium level of importance. This leads to considerations regarding the development and implementation of projects to neutralize these issues by the management, specifically the following:

- Competitor analysis;
- Enhancement of competitive advantages;
- The need to increase the number of organization employees because it is required for expanding the customer base;
- In connection with the presence of several integrated service directions, the company's management should strive to optimize work organization (implying a commitment to 100% employee workload, improvement of

Table 2 Results of employee questionnaire survey in the company

Questions asked to employees	Response options of employees				Evaluation of the response	Level of severity of problems
	Often	Sometimes	Very rarely	Never		
How often do you feel the organization is understaffed?	30	20	31	19	(0.3*4) + (0.2*3) + + (0.31*2) + (0.19*1) = = 1.2 + 0.6 + 0.62 + 0.19 = 2.61	54
How often do you think the company makes mistakes in making any decision?	10	17	33	40	(0.1*4) + (0.17*3) + + (0.33*2) + (0.4*1) = = 0.4 + 0.51 + 0.66 + 0.4 = 1.97	33
How often do you encounter negative feedback about the company?	5	19	15	61	(0.05*4) + (0.19*3) + + (0.15*2) + (0.61*1) = = 0.2 + 0.57 + 0.3 + 0.61 = 1.68	25

Source Compiled by the authors

labor force utilization, particularly through rationalization, and emphasis on increasing the qualifications of all employees);
- Delegating authority regarding liquidity management;
- Conducting activities in the field of management and control of liquidity status;
- Periodic assessment of potential losses;
- Monitoring and control of the current financial result;
- Continuous monitoring of information about the company;
- Studying the internal components using a methodology to assess the impact of each determining factor.

4 Conclusion

Therefore, based on the conducted research, the authors can conclude that the most significant issue is the shortage of qualified personnel, as indicated by most surveyed employees in the enterprise. To address this risk, it was proposed to enhance the qualifications of employees, effectively optimize their workload, and implement measures to improve workforce utilization.

In conclusion, applying the proposed risk calculation methodology in the real practice of a cooperative for monitoring the social responsibility of various organizations operating in the consumer cooperative sector will help identify problems and weak points qualitatively and continuously. This will provide the opportunity to adjust the direction and dynamics of the development of socially significant areas of activity, ultimately contributing to the growth of the level and quality of life for members and society.

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Consumer Cooperation as a Vector of Rural Revitalization in the Country

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Abstract

Today's direction of rural development involves implementing programs for public-private partnerships with consumer cooperatives in each federal district and region. The socio-economic development of rural areas depends primarily on innovative approaches to organizing entrepreneurial activities aimed at revitalizing and forming a market sector of the green economy with state support. The authors study the development of consumer cooperatives and assess the impact of sectoral activities on the total volume of regional gross product and development prospects. Moreover, the authors analyze the overall volume of consumer cooperative activities in specific federal districts based on absolute and relative indicators, using publicly available materials on the activities of consumer cooperative organizations. The basic indicators include the volumes of activities in various trade, manufacturing, catering, and procurement sectors. When summarizing the materials on the activities of consumer cooperative organizations in specific regions of the country as a component of the gross regional product structure, it is necessary to note the varying levels and impact on the green economy of rural areas. The implementation program of strategic tasks for 2023–2027 requires the development of the region's internal potential and trade and economic cooperation with other countries on a partnership basis. Based on the analysis and assessment of the total volume of consumer cooperative activities and its sectoral structure in specific federal districts, the authors reflected on the trends and advantages of developing the green economy in rural areas, including international relations of cooperative organizations.

Keywords

Federal district · Consumer cooperation · Public-private partnership · Industry structure · Trade · Catering · Entrepreneurship · Green economy · Basic indicators · Rural territories · International cooperation

JEL Codes

F22 · F63 · J15 · J61 · O15 · R01

1 Introduction

The contemporary development of rural territories in the constituent entities of the Russian Federation is characterized by the instability of socio-economic development, a deterioration of the investment climate, and a lack of innovative transformations in the economy and social sector. Consequently, searching for new public-private partnership models involving consumer cooperative organizations as a component of the gross regional product structure becomes relevant. This is based on the diagnosis of their quantitative and qualitative characteristics.

The program for the development of consumer cooperative organization "Cooperation: Time, Traditions, People" for 2023–2027 is aimed at implementing a strategy to improve the conditions of economic activity through the analysis of internal and external factors and identifying growth points for the regional economy. This necessitates

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the development of directions for the activities of consumer cooperative organizations in various constituent entities of the Russian Federation based on the region's potential development.

The research involves the analysis of statistical data and public materials on the activities of consumer cooperative organizations and quantitative and qualitative indicators influencing the green economy in specific regions of Russia.

The research presents the potential and trends of the economy in particular regions in the context of their functioning and development orientation in contemporary conditions.

2 Materials and Methods

The Russian Federation consists of administrative-territorial units—subjects of the Russian Federation. Their composition is diverse and significantly varies in terms of the level of socio-economic development. An important feature of the territorial zoning of the Russian Federation is the division into federal level (districts and subjects of the Russian Federation) and local level (administrative districts, urban districts, and urban and rural settlements). Different sources suggest various approaches to ranking territories based on various indicators of their socio-economic development. Consumer cooperative organizations traditionally base their activities in rural settlements. Over the past years, the competitiveness of consumer cooperative organizations has decreased due to a range of internal and external factors. The strategic approach to determining the direction of consumer cooperative development is primarily associated with public-private partnerships with state and municipal authorities.

As of January 1, 2022, a total of 1927 consumer societies and cooperatives were registered in the Russian Federation, engaged in various industry activities.

Summarizing the materials of the conducted research on contemporary trends in developing rural territories in different regions of Russia, the authors should note that the activities of consumer cooperative organizations in the market sector are not increasing. The structure of the total volume of consumer cooperative activities in the Russian Federation is presented in Fig. 1.

The largest share in the activities of consumer cooperatives is attributed to trade, procurement, production, and catering. Examining the impact of drivers of consumer cooperative activities on the development of rural areas, it is essential to note the peculiarities in forming consumer markets in rural territories (retail trade, catering, and production).

Analyzing the challenges of consumer cooperative development and its influence on the green economy within the structure of rural areas, specific federal subjects with the greatest potential for cooperation have been selected (Table 1).

The share of consumer cooperatives' activities in the market sector of the regions of the Russian Federation in 2021 is ambiguous. The largest share of their activities is in the Volga Federal District at 39.1%, in the Central District—16.1%, and in the Far Eastern District—11.0%.

Federal districts consist of republics, territories, and regions where consumer cooperatives operate. Their results are differentiated based on natural and ecological conditions, the level of economic and social development, and management mechanisms.

Consumer cooperative organizations in various regions associated with districts are oriented toward traditional sectors. The revival and establishment of new manufacturing

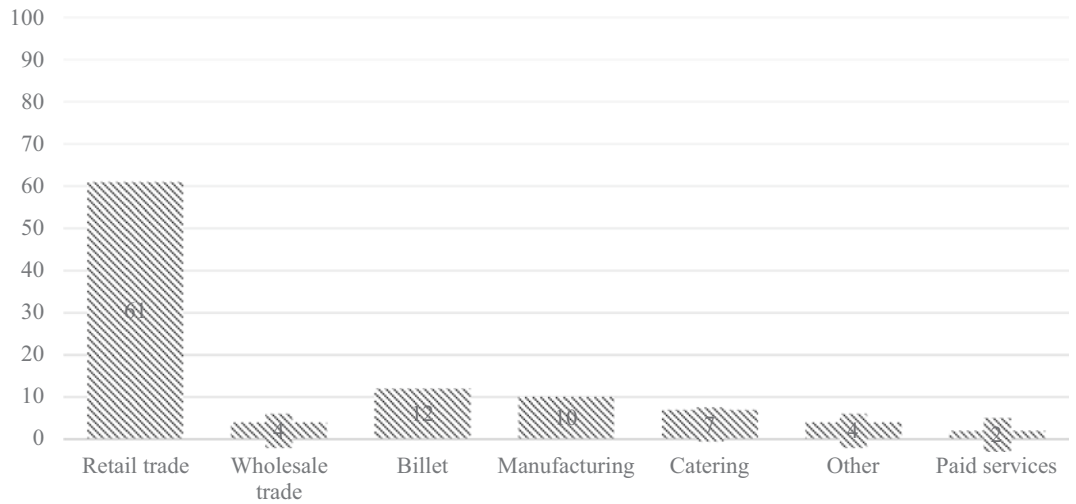

Fig. 1 Structure of the total volume of consumer cooperative activities in the Russian Federation. *Source* Compiled by the authors

Table 1 Share of consumer cooperative organizations in the market sector of the economy in Russian regions

Federal district	Share of consumer cooperative activities in the region, %
Central	16.9
Southern	13.2
Volga	39.1
Ural	11.2
Siberian	10,6
Far Eastern	11.0

Source Compiled by the authors

Table 2 Share of consumer cooperative organizations in the market sector of the economy in Russian regions

Federal district	Share of consumer cooperative activities in the region, %
Central	16.9
Southern	13.2
Volga	39.1
Ural	11.2
Siberian	10.6
Far Eastern	11.0

Source Compiled by the authors

enterprises for processing agricultural products and producing bread, bakery products, semi-finished products, sausage products, and a wide range of non-alcoholic beverages contribute to the growth of the socio-economic status of rural areas (Maksaev et al. 2022).

The accumulated experience, special recipes, and the quality of cooperative products ensure competitiveness in the market environment of the regions.

Public catering is a significant factor in the revival of rural areas, which addresses economic and social challenges. Cooperative organizations in the Volga and Siberian Federal Districts are leaders in the development of public catering. One of the significant factors ensuring the results of their activities is the effective level of interaction with government authorities and rural territories. Public catering is a distinctive sphere of activity that influences the development of the region's green economy and provides nutrition for preschool educational institutions and secondary schools (Matraeva et al. 2022) (Table 2).

Studying the peculiarities of the activities of consumer cooperative organizations in different Federal Districts, it should be noted that Krasnoyarsk Kraypotrebsoyuz has built the largest network of procurement outlets in the Siberian Federal District: more than 49 production enterprises engaged in the production of a wide range of marketable products are successfully operating. The planned development projects aim to provide Russian consumers with high-quality and affordable food products. The cooperative industry produces bakery products, confectionery, canned meat, vegetables and fruit, sausages, soft drinks, semi-finished products, and other food products. The total volume of industrial production in the consumer cooperation of the Krasnoyarsk Territory for five years amounted to 97.8 billion rubles.

The Volga Federal District is represented by republics, a territory, and regions. The Novgorod Region is the leader in developing a green economy and revitalizing rural areas. On the one hand, the innovative development of consumer societies is based on the multi-sectoral system of managing consumer cooperatives. On the other hand, it is based on creating agricultural consumer cooperatives.

The entrepreneurial activities of the Nizhny Novgorod Regional Union of Consumer Societies are oriented towards public-private partnerships with the Government of the Novgorod Region. A distinctive feature of implementing state programs for interaction between executive authorities and small and medium businesses is the development of agricultural production to meet the domestic market's demand for domestic agricultural products and create new jobs (Maksaev et al. 2019).

State support for consumer cooperatives and agricultural cooperatives is primarily aimed at forming resources in the form of grants, preferential lending, and subsidies, as well as developing the material and technical base for acquiring agricultural machinery and constructing and repairing livestock and poultry farms.

In the Saratov Region, consumer cooperative organizations are more focused on traditional sectors of activity: trade, public catering, and the processing of agricultural products. Small and medium agricultural enterprises are engaged in the production of agricultural products.

State programs implemented by the Government of the Saratov Region and consumer cooperative organizations in recent years indicate effectiveness in reviving rural areas. Within the frameworks of rural cooperative development programs, the targeted use of subsidies and grants for purchasing machinery and equipment is noted. Special attention is given to the training and qualification improvement of specialists in agricultural cooperatives.

More than 150 agricultural consumer cooperatives operate in the Volgograd Region. Their development is aimed at a constructive interaction with the bodies of state and municipal administration to ensure the implementation of programs to revive rural areas.

In the Perm Territory, there is a projected growth of 8.3% in all types of agricultural products in the first half of 2023 compared to the first half of 2022, making it a leader in the Volga Federal District and 10th in the Russian Federation.

These results are primarily associated with the growth of peasant (farm) enterprises by 9.8% compared to the first half of 2022. The volume of manufactured agricultural products accounted for 86.2% of the total.

Research into the entrepreneurial activities of consumer cooperatives in recent years reflects the establishment and development of agricultural cooperatives (Fig. 2).

The assessment of the development of agricultural cooperatives, based on the analysis of their presence in the regions, demonstrates an uneven character in their establishment and growth.

The development of rural areas in the country's regions takes on an individual character, primarily reflecting the peculiarities of implementing programs for public-private interaction between the executive authorities and small and medium businesses. The current entrepreneurial activity of consumer cooperative organizations in the regions is focused on creating and developing agricultural cooperatives. On the one hand, this sectoral development requires additional investment. On the other hand, it aims to create new jobs and fill the domestic market sector with local agricultural products (Maksaev et al. 2019).

In each region of the country, the development of agricultural cooperation is determined by climatic conditions and the specifics of state support for rural cooperatives (Chupina et al. 2023a).

For instance, in the Republic of Sakha (Yakutia), where more than thirty consumer cooperatives operate, state support is directed towards obtaining loans for the purchase of agricultural machinery, construction, and the repair of livestock farms at low-interest rates. In this region, consumer cooperation has experience in the rational support of the state. For example, the procurement, processing, sale, and distribution of agricultural and industrial products involve setting the procurement price for the products of personal subsidiary farms and farmers' households, which are the main suppliers of these products (Tkachev and Vinogradova 2023).

The experience of the Tyumen Region is based on the successful interaction between municipal authorities and consumer cooperative organizations, which united 26,000 shareholders by the end of 2022, ensuring the creation of 149 agricultural cooperatives.

In the Republic of Bashkortostan and the Republic of Tatarstan, the development of rural cooperation follows a specific concept, with over 50 models designed to identify suitable farms for cooperative development, considering local peculiarities. Each region has a tailored model.

The experience of the Rostov Region, with 8000 registered farmers and individual entrepreneurs, contributes 35% of grain crops, 21% of vegetables, and 9% of milk to the domestic market. The interaction between the development of consumer cooperative organizations and the regional executive authorities operates in a three-tier system, ensuring the competitive viability of cooperative products under the regional brand "Made in Don Land."

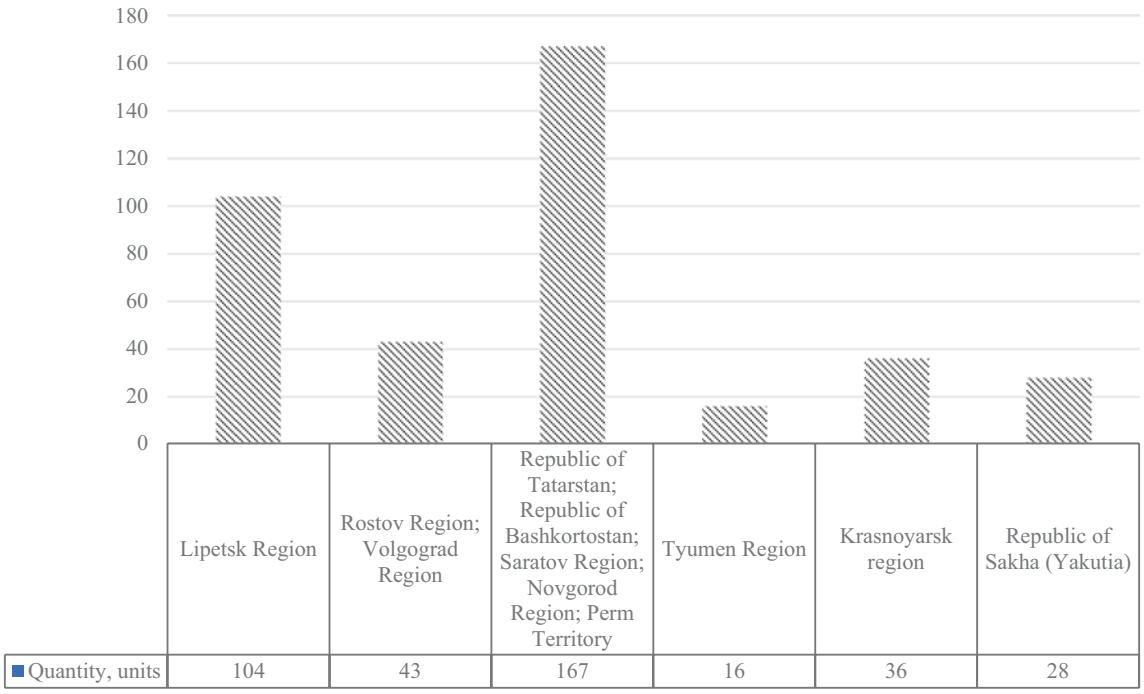

Fig. 2 Regions leading in the establishment of agricultural cooperatives. *Source* Compiled by the authors

Analyzing the development of agricultural cooperation in the Central Federal District reflects the slow pace of the farmer's movement because large agro-complexes dominate the territory, and the production of grain crops, vegetables, and berries requires a specialized project to implement green economy initiatives. One crucial direction in the Kursk Region is the integration of small and medium businesses through cooperative interaction among all small forms of management and integrated cooperation in the long-term perspective with government authorities.

In the Central Federal District, the contribution of small forms of management to the green economy in the Smolensk, Lipetsk, and Tambov Regions holds a significant share in the overall volume of agricultural production. For example, 75% of vegetables come from farmer's households in the Lipetsk Region, about 90% of vegetables and 40% of milk in the Smolensk Region, and 25% of milk and over 70% of vegetables in the Tambov Region (Chupina et al. 2023b).

A significant challenge in promoting agricultural products from producers to the retail network is constituted by the expenses and profits of processors and retailers, accounting for up to 60%. Therefore, the creation of a model of agricultural consumer cooperation in the processing and marketing of products will contribute to price regulation and cooperation in the green economy.

Strategic planning for the social and economic development of rural areas is focused on cooperative collaboration, creating new conditions for the movement of goods in the international space. This year, Centrosouz actively participated in the St. Petersburg International Economic Forum, outlining a joint business partnership with the Ministry of Economic Development of Russia. This agreement holds great significance for developing consumer cooperative organizations within the Russian Federation and internationally. A key aspect of trade and economic relations in consumer cooperation is the integration of export-import operations aimed at implementing innovative technologies in various industries, as well as international cooperation in the educational sphere for the further development of Russian cooperative education.

3 Results

The development trajectory of consumer cooperative organizations in the face of intense competition is shaped by implementing government programs aimed at the economic revitalization of rural areas. Determining key indicators reflecting the interconnection of the development of multi-sectoral activities of consumer cooperative organizations with the bodies of state and municipal administration is crucial for sustainable and dynamic development. The ranking of the subjects of the Russian Federation based on the share of the volume of consumer cooperative activity in the region has been conducted. The prospects for forming agricultural cooperatives are explored as a vector for developing consumer cooperation and enhancing the region's green economy potential.

4 Conclusion

The contemporary conditions of rural development cannot be thoroughly examined without formulating a roadmap for consumer cooperative organizations in the green economy. The implementation program of the strategic objectives of consumer cooperation for the years 2023–2027 requires the development of the internal potential of each region and effective collaboration with government authorities on a partnership basis. The trends in the development of consumer cooperation in contemporary geopolitical conditions depend on various internal and external factors, with public-private partnerships being crucial with large organizations and with the state for the development of the green economy in rural areas. Research in this direction necessitates the use of methodologies for monitoring and assessing the level of government policy impact on supporting small and medium businesses in regions, including the following:

- The interaction between consumer cooperative organizations and agricultural cooperatives based on the implementation of state programs for developing agriculture and the regulation of agricultural products, raw materials, and food markets;
- The establishment of infrastructure and logistics in rural areas (information and communication support);
- Providing grants and easing the conditions for their acquisition;
- Defining indicators reflecting the support for cooperation in the subprogram "Sustainable development of rural areas."

The trajectory of consumer cooperation development, as a result of exploring internal reserves and implementing government programs, will be aimed at promoting the green economy and revitalizing the rural territories of the country.

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Effectiveness of State Support for Cooperation in the Framework of Investment Projects on the Example of the Krasnodar Territory

Tatyana L. Ishchenko, Pavel V. Gorlachev, Alyona V. Kharseeva, Alla B. Meshcheryakova, and Natalia A. Asanova

Abstract

Business consolidation is impossible without resource increment, considering that the resource potential is limited. Cooperations are essential for businesses, making it possible to pool resource potential and ensure progressive growth. Budgetary deficits necessitate the reallocation of state resources towards more efficient investment directions to facilitate economic growth within the existing volume of budgetary funds, enabling the coverage of the state's current needs. Cooperation is widespread in various economic sectors, primarily in light and heavy industries, agriculture, education, healthcare, and transportation. Government support provided to cooperatives under various state programs and national projects requires a detailed analysis to identify its impact on cooperative efficiency. Analyzing the existing support for cooperatives will enable adjustments to its level when planning budgets for new periods. This research examines the instruments of government support for cooperatives used in the Krasnodar Territory, revealing the correlation between net profit and the level of government support. The amounts of government support per cooperative are determined based on average indicators. A correlation is established between the researched indicators of cooperatives. Additionally, a graphical and mathematical analysis of the level of government support is conducted.

Keywords

State support · Cooperation · Targeted programs · National projects · Efficiency · Economic growth · Net profit · Investment projects

JEL Codes

O11 · O13 · O18 · O22 · O38 · P13

1 Introduction

The Krasnodar Territory belongs to a group of Russian regions with favorable economic and legislative foundations for the effective establishment of cooperatives. The region has developed and implemented a program "Development of Agriculture and Regulation of Markets for Agricultural Products, Raw Materials, and Food," under which various National Projects operate, forming comprehensive and multi-level support using various instruments (Fig. 1).

Support for cooperative movement in the region occurs in key sectors such as light and heavy industries, agriculture and the processing of agricultural products, transportation, communication, education, healthcare, etc. Cooperatives predominantly thrive among small and medium-sized entities. In 2020–2022, the economic situation was complicated by extensive sanctions imposed on the Russian economy by several countries. Nevertheless, during this period, the number of small and medium-sized businesses (SMEs) registered in the Krasnodar Territory increased. As of the beginning of 2020, the region had 266,541 registered SMEs. By 2022, the number had risen to 267,524, representing a 0.4% increase. The turnover of businesses of these sizes in 2022 amounted to 912.1 billion rubles.

This indicator exceeded pre-sanction levels by approximately 9%. The consolidation of small businesses has been

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occurring in recent years through cooperatives. Medium-sized businesses should follow this example because resource levels are limited, and enhancing efficiency from their utilization is possible only through increased intensity. In turn, to boost intensity, resources are also required for the implementation of digitization and its modernization in the production process. The National project "Small and medium-sized entrepreneurship and support for individual entrepreneurial initiative" consolidates efforts to scale up businesses and increase their efficiency. In 2022, the funds allocated for this direction amounted to 2878.0 million rubles. Of this, 1603.3 million rubles (55.7%) were allocated from the federal budget and 995.3 million rubles (34.6%) from the regional budget. The program also envisages non-budget financing by attracting the interest of external investors—279.4 million rubles (9.7%).

Given the current geopolitical factors, the Russian government pays significant attention to food security. To address this, support for agriculture and its cooperatives has been allocated (Kunakovskaya et al. 2021). The existing agricultural program in the region provides support for cooperation under a separate subprogram called "Creating a support system for farmers and developing rural cooperation." In 2022, substantial funding amounting to 2.4% of the total allocated funds for the program was provided. In this research, the authors analyzed state support for agricultural cooperatives on the example of the Krasnodar Territory to identify the positive effects of the state support provided. It is also deemed necessary to identify the optimal level of state support for the government and businesses, making it possible to make adjustments in state support planning for the subsequent years (Kunakovskaya et al. 2021).

2 Methodology

The question of the effectiveness of state support has been considered by many Russian scholars. However, given the significance of budget financing and the redistribution of funds in recent years, this issue requires a more in-depth analysis. Figure 1 visually presents the levels of state support within the framework of agricultural development. Priority is given to the agricultural direction, serving as the basis for the region's and the country's food security. An agricultural subprogram to support cooperation is envisaged in the agricultural direction (Kunakovskaya et al. 2021). However, the provided level of support is much lower than the projected one.

From a practical standpoint, the authors conducted an analysis to assess the effectiveness of using state support tools for cooperatives and to what extent the volumes of state support influence performance indicators. The authors conducted research on the impact of state support on the example of agricultural cooperatives in the Krasnodar Territory (Table 1).

For the research, the authors used data from the Association of Peasant (Farm) Enterprises and Agricultural Cooperatives (AKKOR) of the Krasnodar Territory,

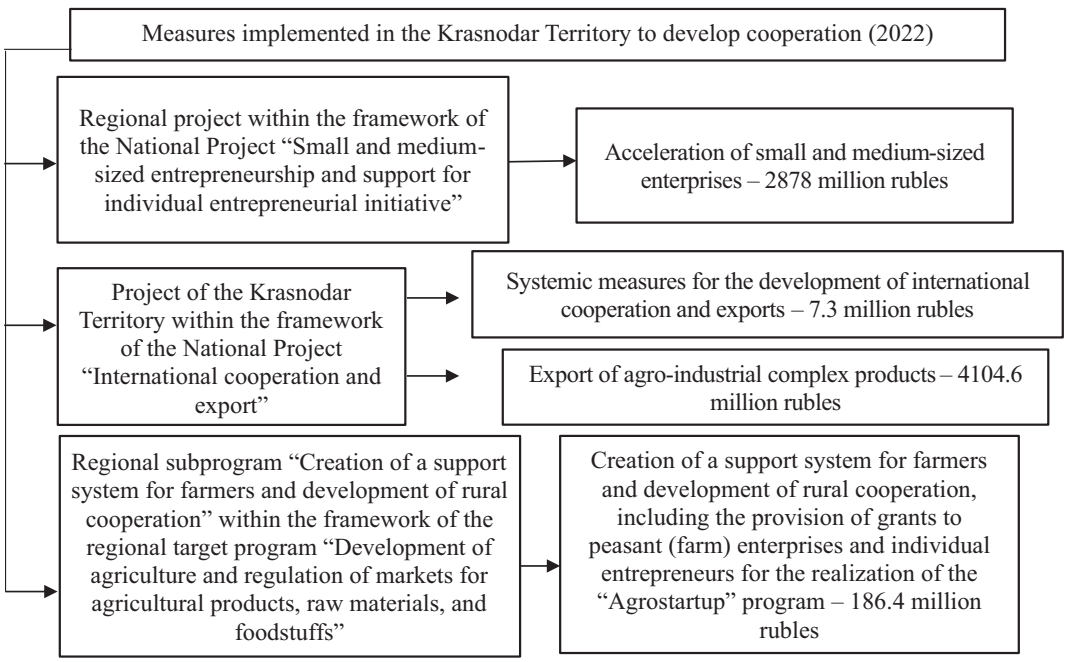

Fig. 1 Subprograms and regional projects to support cooperation in 2022. Ministry of Agriculture and Processing Industry of the Krasnodar Territory *Source* Compiled by the authors according to the Ministry of Agriculture and Processing Industry of the Krasnodar Territory (https://msh.krasnodar.ru)

encompassing production and consumer agricultural cooperatives.

Among the cooperatives that received state investment support, its distribution was not uniform. The highest number of cooperatives received state support in 2020—195 units, accounting for 91% of all investigated agricultural cooperatives for that period.

The main indicator of the effect is net profit. Considering the limited data for each cooperative, we took the average indicator of cooperative net profit in the agricultural sector.

As seen from the calculated indicators in Table 1, the highest level of the effect from government support was achieved in 2019—17.5 rubles of profit per 1 ruble of state support. Subsequently, the level of the effect significantly decreased in 2021 to 2.3 rubles of net profit per 1 ruble of state support. It is also worth noting that the highest number of cooperatives was covered by government support in 2020—91%. In 2019, the number of cooperatives receiving state support was the lowest, constituting only 63% of all investigated agricultural cooperatives, indicating the heterogeneity of government support in terms of its level.

With the enlargement of cooperatives and the increase in indicators of effect and efficiency, the level of government support increased (Kundius and Streltsova 2020). This fact allows us to conclude that the state is more willing to support large cooperatives because they make the most significant contribution to the foundation of food security and have assets to secure possible risks. An array of analytical data confirms that the concentration of government support increases in approximately the same proportion as the size of the farms increases. As a result, the authors identified a tendency for the characteristics of increased efficiency in the productivity of government support in relation to the increase in its volumes in large cooperatives.

When studying the closeness of the relationship between the level of government support and the level of the effect obtained from it based on the correlation analysis, the authors came to duplicating conclusions, as in the mathematical analysis. For a more accurate and visual representation of the regression results, the authors logarithmically transformed the variables of the x category (government support, thousand rubles) and the y category (net profit, thousand rubles). The clarity of the calculations is graphically presented in Fig. 2. The graph and the level of the coefficient of determination make it possible to assert that the level of influence of government support on the effect indicator (net profit) is directly dependent on the sizes of economic entities—the larger the enterprise, the more significant the support.

Figure 2 shows that with the increase in the level of government support, net profit grows, as indicated by the correlation coefficient. The correlation coefficient (R) showed a high degree of correlation—0.949315, which allows the authors to conclude the influence of government support on efficiency. The conducted factor analysis allowed the authors to determine that the size of the dependency of the effect indicator on government support is approximately 11%. Simultaneously, the concentration of support also depends on the entity's size; larger enterprises demonstrate greater concentration.

It is also graphically evident that the concentration of government support for cooperatives intensifies with an increase in size indicators, starting approximately from the profit level of 7.5 million rubles. This also confirms the conclusions derived from the analysis of calculated indicators that larger cooperatives are more willingly supported by the government.

The insignificant level of government support for cooperatives with net profit indicators up to 6 million rubles in 2022 did not allow them to enter the logarithmically transformed graphical dependence. Therefore, the low level of support provided to them did not affect the effect indicators.

Table 1 Indicators of agricultural cooperatives in the Krasnodar Territory for 2020–2022

Indicators	Year (fiscal)			
	2019	2020	2021	2022
Number of cooperatives, units	187	192	194	208
Number of cooperatives that received state support, units	118	175	167	164
Share of cooperatives with state support, %	63	91	86	79
Average annual turnover of one cooperative, million rubles	22.8	24.6	18.7	19.8
Average revenue of one cooperative, million rubles	6.2	7.4	5.8	7.2
Average profit of one cooperative, million rubles	2.8	3.2	1.4	2.2
Average state support for one cooperative, thousand rubles	159.8	440.5	612.3	429.6
Net profit per one ruble of state support, rubles	17.5	7.3	2.3	5.1

Source Compiled by the authors based on data from the Association of Peasant (Farm) Enterprises (AKKOR) of the Krasnodar Territory (Kuban Association of Peasant (Farm) Enterprises and Agricultural Cooperatives (AKKOR) of the Krasnodar Territory, https://www.akkor.ru/regionalnoe-otdelenie-akkor/215-associaciya-krestyanskih-fermerskih-hozyaystv-kooperativov-i-drugih)

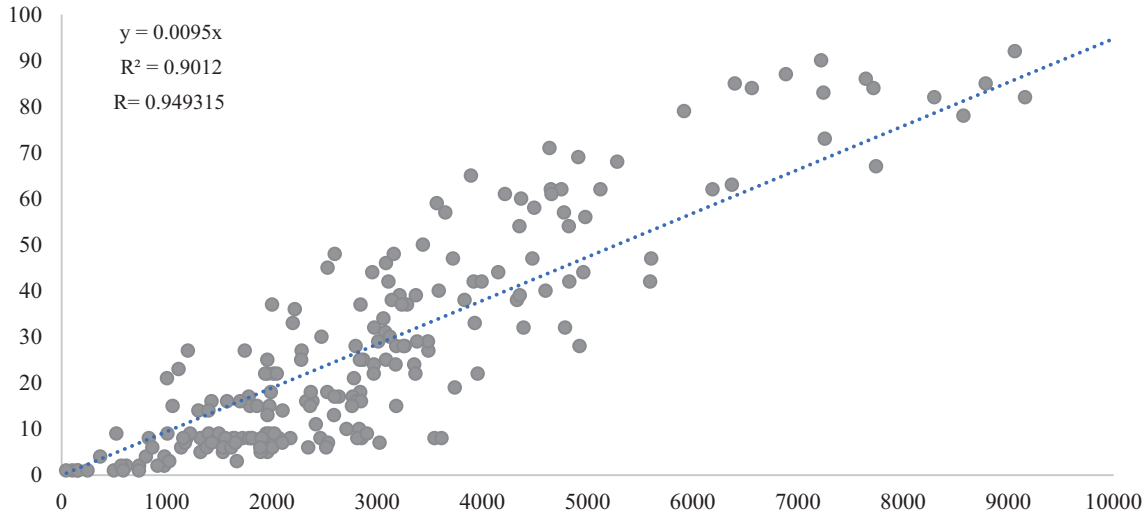

Fig. 2 Relationship between the level of net profit and state support provided to cooperatives in the Krasnodar Territory in 2022. *Source* Calculated and compiled by the authors

This conclusion also gives reason to assert that the level of government support for them is insufficient in size and concentration.

Considering that the entire economic sector is actively trying to participate in digitalization, smaller entities without sufficient resource potential that lack the proper level of government support will lag behind larger entities in implementing and adopting digitalization (Kunakovskaya et al. 2021). Therefore, the cooperative process is relevant and requires special attention and support from the government (Tkach and Maloletko 2020).

3 Results

Evaluating the use of the cooperative subsidization mechanism in the Krasnodar Territory, the authors reached the following conclusions:

- Government assistance demonstrates a tendency to increase with the growth of cooperative size characteristics;
- The results of the correlation analysis substantiate the authors' analytical and mathematical conclusions that the increasing level of correlation between the size and effectiveness of government support is directly related to the growth of cooperative size characteristics. The correlation coefficient of these factors is 0.8975, with the highest correlation level observed in cooperatives with profits exceeding 7.5 million rubles;
- Overall, the authors determined that the low level of government support for small cooperatives practically does not have a stimulating impact on their effectiveness. In this regard, it is necessary to enhance the accessibility of government support for small cooperatives across different instruments, increase its volumes to the required level, and increase support for the consolidation of cooperatives to promote their enlargement.

4 Conclusion

Based on the example of agricultural cooperatives in the Krasnodar Territory, the authors examined the impact of government support on the net profit indicator. The results demonstrate the inefficiency of government support for small cooperatives. Therefore, in the context of budget deficits, the authors propose to exclude support for small cooperatives in the future in the volumes in which it is currently provided under support programs.

Small cooperatives require the development of a separate product for government support within state programs and national projects. This product should consider the maximum size of cooperatives and their efficiency to avoid the possibility of larger cooperatives attaching themselves to it, thereby gaining access to the government support instruments discussed above.

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Features of the Development of Agricultural Cooperation in the Conditions of Ecologization of Entrepreneurial Activity

Inna V. Kuznetsova, Olga V. Beliaeva, Larisa A. Olkhova, Olga N. Kozyreva and Lyudmila N. Shumilova

Abstract

Agricultural cooperation stands as one of the organizational forms of rural labor. It serves as the foundation for supporting small-scale agricultural producers amidst competition with large agricultural holdings. Society needs to fill agricultural and food markets with environmentally clean products and foster the development and stability of rural territories. Practice demonstrates that labor productivity in small farms is often higher than in agricultural holdings, especially when utilizing advanced eco-friendly agricultural technologies. Simultaneously, compared to other economic processes, agricultural production emerges as the most active interface between society and nature, transforming all natural systems. Consequently, this results in the most pronounced manifestation of environmental issues. The necessity to find qualitatively new approaches to production activities arises due to the conflicts between agricultural producers and the surrounding environment. In this regard, the research justifies the significance of environmentally sustainable development for agricultural cooperatives in the Russian economy. The authors highlight that this process has its peculiarities and is complex and multifaceted. Furthermore, the authors reveal that agricultural environmental entrepreneurship is an integral part of entrepreneurship; its management is a component of state policy. Therefore, every agricultural entity must operate in accordance with the existing environmental legislation, meaning it should be environmentally oriented, leading to its sustainability.

Keywords

Cooperation · Agricultural production · Ecologization · Entrepreneurial activity · Factors · Features of development · State support

JEL Codes

O13 · P28 · Q20

1 Introduction

The production activities of agricultural cooperatives are directly linked to the rational use of natural resources and environmental conservation because animal husbandry and crop cultivation are impossible without impacting the soil, atmospheric air, and water sources. These economic entities contribute to environmental pollution with harmful substances during their entrepreneurial activities. However, they simultaneously focus on ecological aspects related to preserving and restoring the environment. This goal is achieved through waste processing, the application of resource-saving technologies, the implementation of measures to prevent land degradation and restore fertility, etc.

According to the UN classification, agriculture ranks among the top five sectors of the economy in terms of the level of damage inflicted on the environment. Erosion, rapid land degradation, soil fertility decline, and the pollution of water bodies and atmosphere are among the significant challenges.

According to the Food and Agriculture Organization (FAO) assessment, the agricultural sector contributes to nearly 20% of the total global greenhouse gas emissions (Kulistikova 2021), with a projected 7.6% increase in carbon dioxide emissions from 2023 to 2032 in the global agricultural sector. Notably, 80% of all harmful substances are attributed to livestock (Akulov 2023).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_49

These factors inevitably contribute to the deepening ecological crisis, manifesting in critically high levels of environmental pollution and the depletion of organic and inorganic natural resources (Hamzin and Emelyanov 2014). Hence, it is evident that any agricultural entity must conduct its operations in accordance with existing environmental legislation, meaning it should be environmentally oriented. The management of agricultural cooperative environmental entrepreneurship is an integral part of the national agricultural policy, focused on the preservation and reproduction of natural resources crucial for the needs of agricultural production (Demchenko 2018).

2 Methodology

In the applied aspect, the term ecologization of agriculture implies the combination of methods and practices of agricultural producers, the foundation of which is the environmentally safe principles of rational nature management. This combination primarily entails achieving an optimal balance among several indicators, including the growth of production efficiency, the enhancement of the quality of agricultural products, and the well-being of rural territories. Extended reproduction is the focal point of the ecologization of agricultural production. The agricultural techniques within this process, along with ensuring soil fertility, also encompass maintaining the necessary resources for producing agricultural products and raw materials, including non-renewable and conditionally renewable resources (Popova et al. 2017).

Several scholars (Bannova 2004; Ermolenko et al. 2019; Nikitina 2008) view this term as a structural process that requires considering multiple alternative complementary directions. A strategy for adaptive intensification of agriculture, incorporating key directions for the ecologization of agro-production, was proposed by Zhuchenko (1995). T. N. Fedorova, A. N. Skuratov, E. K. Saranin, N. S. Bannova, I. G. Platonov, I. S. Shatilov, and others significantly contributed to the foundations of ecologization.

The factorial conditions for the balanced operational functioning of agricultural consumer cooperatives, considering the negative environmental impact, include the following (Table 1).

Considerable attention has been devoted to the issues of ecologization of agricultural production in Russian regulatory legislation. The Constitution of the Russian Federation serves as the foundation for this process in ecology-related provisions. The key regulatory ecological document is the Federal law "On environmental protection" (January 10, 2002, No. 7-FZ) (Russian Federation 2002). The regulation of the consumption of individual natural components from a legal perspective is also presented in several fundamental natural resource laws, including the Land, Forest, and Water Codes. An important goal of national agricultural policy, the maintenance and reproduction of natural resources necessary for agricultural production, is reflected, for example, in Article 5 of the Federal law "On the development

Table 1 Factors of sustainable development of agricultural consumer cooperatives under the conditions of production ecologization

Factor	Foundation
Closed cycle of production activities	• Creation of a seed sub-branch • Organization of stable provision of animals with high-quality fodder • Seasonal and year-round production of organic nutrients • Processing of animal and plant products and their realization • Environmentally acceptable utilization of plant and animal wastes
Systemic and efficient management of agricultural land	• Organization of the most efficient use of land • Formation of the most preferable circumstances for progressive and innovative agricultural practices and optimal crop rotations • Regular improvement of soil fertility • Prevention of erosion processes • Formation of an environment favorable for specialization and concentration of production, etc.
Biologization of crop cultivation technologies	• Utilization of natural technologies to increase the productivity of plants and animals • Application of methods to improve the quality of products, their environmental friendliness, and safety for the environment • Simultaneous cyclization of organic and mineral substances turnover
Improving the quality characteristics of products against the background of economic growth of their production	• Expanded reproduction of soil fertility • Maximizing the use of the cooperative's resources • Preservation of fertility of natural soil formation process • Growth of economically efficient fertility

Source Compiled by the authors based on Nikitina (2008) and Zhuchenko (1995)

of agriculture" (December 29, 2006, No. 264-FZ) (Russian Federation 2006). In December 2022, the Government of the Russian Federation approved the Passport of the sectoral program "Utilization of secondary resources and secondary raw materials from waste in agriculture for 2022–2030." The program is developed as part of implementing the federal project "Closed-loop economy." The program covers agricultural waste with the potential for involvement in economic circulation. The issues of environmental safety and rational nature management are addressed in the new "National security strategy," approved by the President of the Russian Federation in early July. In the current State program for the development of agriculture and regulation of agricultural products, raw materials, and food markets, approved on July 14, 2012, financial resources for ensuring or reimbursing basic costs are provided to all producers of agricultural products, except individuals related to personal subsidiary farms and agricultural credit consumer cooperatives (Government of the Russian Federation 2012). The structure of costs is quite substantial. The most representative of them include expenses for implementing activities related to agrotechnical activities, expenditures to prevent the negative impact of agricultural production on the environment, financial investments in improving soil fertility and quality, and others. The resolution of these issues cannot and should not occur without improving the legal regulation of cooperative relations. This is explained by the fact that the latter is an essential component of market relations.

Russia developed standards for green products with improved characteristics. The production of these products will be associated with increased requirements for their quality and compliance with environmental standards (Federal Technical Regulation and Metrology Agency (Rosstandart) 2022). The need to develop this standard is due to the necessity of forming an effective and accessible apparatus for assessing the impact of the production of green products and the use of green technologies on reducing greenhouse gas emissions.

3 Results

Nowadays, 1867 agricultural consumer cooperatives are operating in the Russian Federation, a decrease of 54 units (3%) compared to 2021. Despite the overall negative trend nationwide, the Northwestern and Siberian Federal Districts show growth in newly established economic entities by 17.9% and 18.5%, respectively (Table 2).

According to the Federal State Statistics Service of the Russian Federation (Rosstat), the total number of members in agricultural cooperatives in the Russian Federation in 2022 was 52,603. The highest number of participants was observed in the Volga Federal District (21,398 people or more than 40% of the total) and the Central Federal District (16,436 people or 31.2%).

The majority of participants in agricultural cooperatives are represented by individuals leading personal subsidiary plots (42,391 people or 80%) and heads of peasant (farm) enterprises (2453 people or 5%). In 2022, 380 new cooperatives were registered in Russia. The number of new members among individuals leading personal subsidiary plots was 4201. Among subjects of small and medium businesses in the agro-industrial complex, including peasant (farm) enterprises, it was 1185 people (Fig. 1).

The productivity of agricultural production and its dynamics are directly linked to the state of soil resources and the development of optimal measures associated with their preservation. In 2022, agricultural consumer

Table 2 The dynamics and structure of the number of agricultural cooperatives (excluding processing, supply and marketing, and credit cooperatives)

Territory	Agricultural cooperatives—total, units		Deviation		Structure by districts in 2022 (%)
	By the end of 2021	By the end of 2022	Absolute (+/−)	Relative (%)	
Russia	1921	1867	−54	−2.81	100.00
Central Federal District	419	398	−21	−5.01	21.32
Northwestern Federal District	67	79	12	17.91	4.23
Southern Federal District	162	171	9	5.56	9.16
North Caucasus Federal District	191	176	−15	−7.85	9.43
Volga Federal District	492	502	10	2.03	26.89
Ural Federal District	83	79	−4	−4.82	4.23
Siberian Federal District	173	205	32	18.49	10.98
Far Eastern Federal District	334	257	−77	−23.05	13.76

Source Compiled by the authors based on Federal State Statistics Service of the Russian Federation (Rosstat) (2022)

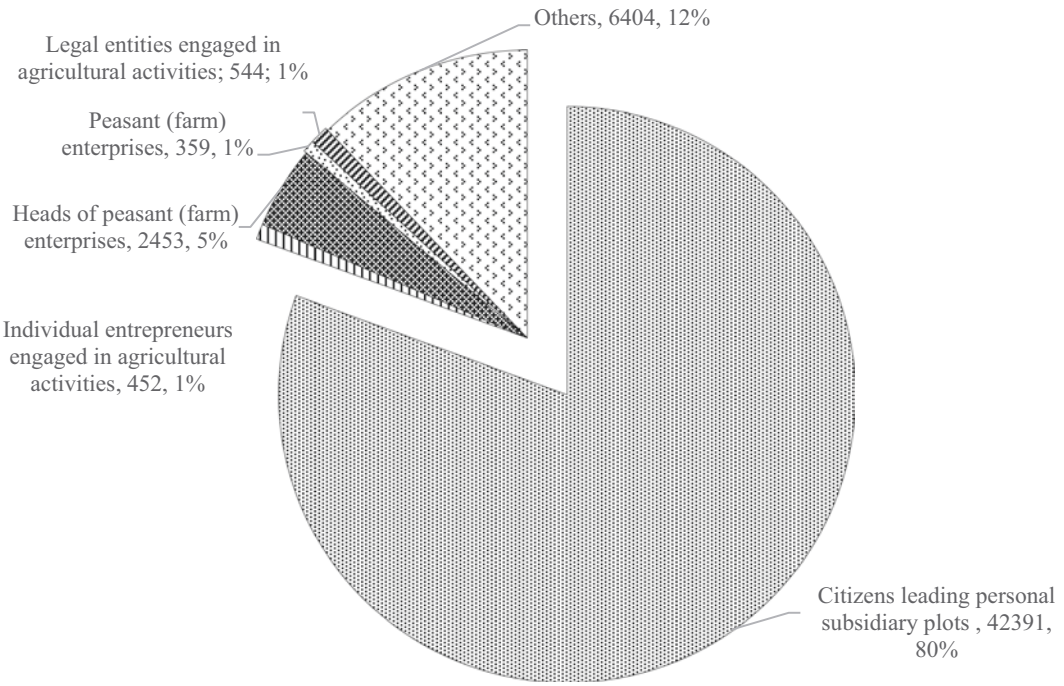

Fig. 1 Distribution of the number of participants of agricultural cooperatives by organizational-legal forms in 2022. *Source* Compiled by the authors based on Federal State Statistics Service of the Russian Federation (Rosstat) (2022)

cooperatives produced agricultural products for processing or sale amounting to 7,784,516.44 thousand rubles, almost three times higher than the comparable figure in 2019. However, there has been a slight decrease in this indicator over the past three years. It is possible that this negative trend will continue, which is quite understandable. Increasing the pace of agricultural production leads to more intensive land use, resulting primarily in reduced production volumes. Additionally, relentlessly exploited agricultural lands become unsuitable for further cultivation over time. Serious mistakes in land cultivation lead to erosion and soil depletion. Excessive use of fertilizers, insecticides, and fungicides in agricultural activities disrupts air quality and contaminates natural sources. The non-compliance of the use of land resources by agricultural cooperatives with the requirements of rational nature management is primarily explained by producers' orientation towards obtaining larger product volumes in the shortest time possible, seeking immediate benefits, and satisfying their economic interests at the expense of ecological and social considerations. In turn, extensive land use withdraws land from agricultural turnover, contributing to large-scale desertification, the mass destruction of animals, and global climate transformations. According to K. Yakovenko, an analyst at the "ALOR" Investment Company, Russian agriculture annually loses about 3.9 million tons of agricultural products that could be grown on 1.5 million hectares of degraded soils. Such a negative process as soil erosion can cause annual colossal losses, reaching 25 billion rubles.

Existing agricultural legislation is generally not violated by farmers. However, the rapid pace of agricultural development and the high speed of changing technologies make it challenging for regulatory authorities to track all negative environmental impacts and take appropriate punitive measures. Agricultural producers often find it easier to pay the fine stipulated by the Administrative Code of the Russian Federation than to address the root of the problem. According to statistics, only 15% of the total number of small and medium enterprises (112.5 thousand) perform environmental functions (Filicheva 2018). Thus, the agricultural activities of production cooperatives and their results in terms of compliance with environmental aspects and improving the environmental situation are more explained by the composition of their participants and territorial location and are currently ineffective. They mainly concern the organizational and legal sectors and still occur selectively.

Uncontrolled development of the agricultural sector leads to negative consequences. This process has contributed to the disappearance of almost 3% of representatives of fauna and flora. The loss of some species of animals, birds, insects, fish, and plants resulted from destroying forests for pasture and fields, expanding existing plots, implementing necessary infrastructure, etc. (Troshina and Kaznovskaya 2017).

One of the reasons for the improper treatment of land resources by agricultural consumer cooperatives is the lack of land ownership. Lands leased by cooperators are used without proper crop rotation and fertilizer application. The state does not remain aside; it constantly tries to introduce new legislative initiatives. Despite this, no initiative has led to significant changes related to improving and preserving soil fertility. Existing federal laws on land use protection do not work effectively.

Chemicals used in agricultural production to increase yields and protect plants accumulate not only in the soil but also in fruits; they are transmitted through the food chain. The excessive use of such harmful substances ultimately leads to negative consequences and adversely affects the health of living organisms. Chemical elements also adversely affect the crop.

There is a well-established social demand for the consumption of environmentally friendly products. Food products based on organic technological processes are becoming popular and in demand among the population. According to independent experts, the acceptable volume of the market for ecological and organic products has increased almost twofold over the past five years. A sustainable growth of this ecological direction is predicted in the near future (Melikhov and Liu 2016).

The study of individual aspects of the functioning of agricultural cooperatives within the framework of their environmental activities related to environmentally friendly and organic technologies makes it possible to assert that such agricultural associations have every opportunity to transition to alternative production.

This fact is evidenced by the growing economic interest of small agricultural producers (private farms, peasant (farm) enterprises, etc.) in the ecologization of their economic structure. This is quite understandable because there is a healthy desire among the population and an increased demand for the acquisition of high-quality eco-products. The existing solvent demand for goods at higher prices also plays a significant role.

In terms of the functioning of small agricultural formations, the production model of such an ecological type can be effectively implemented. Its actualization will not require additional financial sources. It is sufficient to optimize and rationalize the already available production resources: production areas, capital, and personnel. Moreover, there is no need to introduce leguminous crops into crop rotation as feed and organic fertilizers, etc.

The measures of state support for agricultural consumer cooperatives include subsidies for reimbursing expenses for purchasing property. There are also separate subsidies for the acquisition of agricultural animals and property, which is planned to be transferred to cooperative members in the future, subsidies for property purchases to include it in the indivisible fund of the cooperative, etc. These subsidies operate within the framework of the federal project "Acceleration of subjects of SMEs." They will continue to be in force in 2024 as well. Among the listed expenses, no costs are associated with the ecologization of activities. In this regard, it would be possible to consider providing subjects of environmental production with all possible financial, consulting, and legal assistance as priority state measures aimed at environmental aspects (Popova et al. 2017). Thus, the main priority of the ecologization of the effective functioning of agricultural consumer cooperatives should be well-founded and effective government support. This process should be carried out in close connection with the actualization of relevant regulatory initiatives. Simultaneously, control mechanisms for their observance should be in place. In this context, the economic interests of cooperative agriculture and public environmental needs should harmoniously interact.

Currently, innovative activities in agricultural production are at a low level. This is confirmed by official statistics: the share of investments in fixed capital aimed at rational nature management decreased in 2022 by more than 40% compared to 2021 (Federal State Statistics Service of the Russian Federation (Rosstat), n.d.).

State support for agricultural consumer cooperatives under the project "Development of agricultural industries" is mainly focused on developing the material and technical base of farms and is provided in insufficient amounts. For example, only 136 cooperatives became recipients of grant support within the stimulating subsidy directions in 2021 (Government of the Russian Federation 2023).

The shortage of financial and material resources for the ecologization of agricultural cooperative enterprises prevents the widespread implementation of new nature conservation and resource-saving technologies. Such a deficit should primarily be compensated by maximizing the use of scientific information and agro-climatic resources. Geographical, biological, and ecological factors also play a significant role in this compensatory process. For instance, cultivating perennial grasses and herbal ecosystems can fully ensure the stability of agricultural production. The results of these technologies manifest in protecting crops from drought, erosion, and deflation. Moreover, they enhance soil fertility. Simultaneously, such progressive approaches serve as the foundation for developing quality fodder production. Moreover, they traditionally represent some of the most effective factors in soil formation, soil improvement, and soil protection in managing agricultural landscapes (Kosolapov et al. 2014).

4 Conclusions

The activities of agricultural consumer cooperatives and their results in terms of the ecologization of production and improvement of the ecological situation are largely

explained by the composition of their participants and have several directions.

Current practice demonstrates that the existing composition is ineffective, resulting in the deepening of the ecological crisis. This is evidenced by exceeding the permissible concentration of pollutants in the environment and the depletion of natural organic and inorganic resources. Therefore, the environmentally sustainable development of agricultural cooperatives is relevant to the Russian economy. However, this process has its peculiarities and is complex and multifaceted. Nevertheless, agricultural associations currently have all the possibilities to transition to alternative production.

The production-economic model of such an ecological type can be effectively implemented. This is entirely achievable through optimizing and rationalizing the already available production resources. The actualization of this process will not require additional financial sources from the outside.

These formations can establish waste management systems and conduct recycling in the process of producing agricultural goods (e.g., composting organic waste to obtain natural fertilizers or utilizing biogas from farm waste for energy generation). They can also develop alternative sources of income for farmers and rural communities associated with green products and services (e.g., organizing farmers' markets with organic produce, promoting agricultural tourism, or manufacturing and selling environmentally friendly food and beverages).

Additionally, agricultural cooperatives play a crucial role in educating farmers and providing them with technical support to implement green practices in their operations. This may include training on environmentally sustainable farming, energy conservation, efficient resource utilization, and other aspects of green agriculture. The production activities of agricultural consumer cooperatives should adhere to environmental legislation. Unfortunately, existing environmental regulatory initiatives at the legislative level do not adequately guarantee the resolution of numerous essential issues. This primarily pertains to ensuring the rational use, reproduction of natural resources, and protection of the surrounding natural environment specifically by these agricultural associations.

The primary focus of the ecologization of cooperative activities should be thoughtful and effective government support. This process should be closely tied to the actualization of corresponding legislative initiatives. Simultaneously, control mechanisms ensuring compliance should be in place. In this context, the economic interests of cooperative agriculture and the societal ecological needs should harmoniously interact.

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Prospects of Utilizing Healthy Lifestyle Trends for the Development of Cooperatives in the Republic of Tatarstan

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Abstract

The actively growing trend towards a healthy lifestyle has sparked interest in products that help maintain overall health. Striving to meet the demands of 21st-century consumers, food manufacturers respond to the escalating interest by expanding the range of healthy lifestyle products. An increasing number of food producers seek to develop and introduce products into the market that align with contemporary consumer demands. Currently, Russian legislation lacks a clear classification of healthy lifestyle products. Companies offer their classifications for the current assortment of new product types, which often include categories such as functional, natural, organic, 'free-from" products, and enhanced items. One of the most crucial tasks in developing consumer cooperation is the growth of production volumes and the sale of proprietary products. In the Republic of Tatarstan, active efforts are underway in various directions to develop the production of organic products in the region successfully. The research explores the possibilities of utilizing popular healthy eating trends in the area of food production and distribution as a promising direction for the development of consumer cooperatives in the Republic of Tatarstan.

Keywords

Healthy products · Functional products · Consumer cooperatives · Consumer cooperatives · Organic products

JEL Codes

I12 · Q13 · P13

1 Introduction

The assortment of food products with various orientations on the global market is rapidly evolving. The 21st-century consumer is increasingly interested in a new category of healthy products. These products often bear exotic names: ready-made porridge with cloudberries and flaxseed, Probiomilk chocolates with probiotics, chaga juice, and chia super drink orange-pomegranate.

For the consumer, it is no longer sufficient for a food product to simply satisfy a specific caloric need. The consumer seeks benefits for health. The global trend towards food products with beneficial additives has reached Russia. By 2024, the market volume of such products is expected to exceed one billion rubles. Analytical data indicates that the "Health and Wellness" products market in Russia has been growing at 8.5% annually for the past five years (Eryshev 2020).

Simultaneously, according to expert estimates, the cooperative sector of the economy constitutes about a third of the global economy. Projections suggest that its share will increase to 60% by 2050 due to rising consumption levels in developed countries. The production of agricultural goods is a leading direction for economic growth, which cannot sustainably develop without implementing advanced production technologies.

The Republic of Tatarstan stands as a leader in the activities of consumer cooperatives in Russia. The Tatarstan Consumer Union (Tatpotrebsoyuz) includes 79 consumer societies and cooperatives, uniting 35,087 shareholders. The main activities of the organizations within Tatpotrebsoyuz include the production of agricultural products and raw materials, procurement, public catering, and retail trade (Centrosoyuz of Russia 2021).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_50

According to the Concept of Consumer Cooperative Development in the Republic of Tatarstan for 2021–2025, the main goals of consumer cooperative development include increasing the volumes of procurement, production, and sale of agricultural products and raw materials, as well as improving the quality of life for rural residents. Additionally, the document directs attention to crucial tasks aimed at the growth of production and sale volumes of proprietary products.

In achieving this task, producing functional products aligned with healthy lifestyle trends may play a key role in the perspective.

2 Methodology

The fundamental methodological principles underpinning this research are based on the perspectives of Russian and international experts in the fields of economics and healthcare. The theoretical investigations of the research are dedicated to analyzing the prospects of utilizing contemporary trends in healthy nutrition for the development of agricultural cooperatives in the Republic of Tatarstan.

In conducting the analysis of the contemporary classification of healthy products, reference was made to GOST R 52,349-2005 "Food products. Functional food products. Terms and definitions" (Federal Agency on Technical Regulating and Metrology 2005).

The research extensively presents data on the potential development of the production and distribution of organic products by agricultural cooperatives in the Tatarstan Republic. These findings rely on official information from the website of the Ministry of Agriculture of the Tatarstan Republic (Ministry of Agriculture and Food of the Republic of Tatarstan, n.d.-a, b).

3 Results

Let us define what constitutes healthy products. A precise answer to this question is currently lacking. The likely reasons include the absence of a regulatory framework and the annual increase in the production of many new food products with modified nutritional characteristics. In Russian legislation, there is GOST R 52,349-2005 "Food products. Functional food products. Terms and definitions" (Federal Agency on Technical Regulating and Metrology 2005). According to this state standard, a functional product is a special food product intended for regular consumption in various age groups, possessing scientifically substantiated properties, reducing the risk of various nutrition-related diseases, and preserving and improving health through the presence of functional food ingredients.

The company "Euromonitor International" proposed the following classification of healthy products, according to which such goods are divided into the following five groups:

1. Functional. This group includes products enriched with health-promoting ingredients such as vitamins (water- and fat-soluble), minerals (macro- and microelements), soluble and insoluble fibers (cellulose, psyllium), fats and substances associated with fats (structured lipids, MCT oil, etc.), polysaccharides, prebiotics, probiotics, and synbiotics.
2. Enhanced. Manufacturers of these modified products intentionally reduce the content of certain substances during production. For example, the amount of sugar or salt may be reduced.
3. "Free-from" products. Certain ingredients are excluded in the production of such products (e.g., gluten or lactose).
4. Natural. This group includes products that inherently contain a significant concentration of beneficial substances in a small volume. The natural origin of these products deems them safe for the human body, as the composition of health-promoting substances is balanced by nature. Examples include sea buckthorn berries, blueberries, and cranberries. These products possess beneficial properties not due to specific technological enhancements but thanks to natural compounds.
5. Organic. This category encompasses food products produced from raw materials of plant and animal origin, forest, beekeeping, and fishery products, produced and marketed in accordance with organic production rules (Eryshev 2020).

Consumer cooperation can actively develop by producing all five groups of health-promoting food products. However, the most promising could be the production of organic food products and natural products.

From 2000 to 2019, the organic goods market grew more than sevenfold. The maximum growth (16% annually) was recorded in 2018–2019.

Companies forecast that the market volume of these products could reach 3%–5% of the global agricultural product market by 2025. According to the analysis conducted by Grand View Research, the market is expected to reach approximately $230 billion by 2025.

Countries with the highest share of organic agricultural land include Sao Tome and Principe, Liechtenstein, and Austria. In Russia, the share of organic agricultural land is only 0.1% of all agricultural lands. European countries acknowledge that the market for organic product consumption is growing faster than production. Over the last

15 years, the number of people regularly consuming organic products has increased about fivefold, reaching approximately 700 million.

In Russia, the Law "On organic production" was adopted in 2018 and came into effect on January 1, 2020. In the Republic of Tatarstan, the Law "On the development of organic production" was adopted on May 5, 2021.

Obtaining the status of organic farming is a complex and costly process that requires the involvement of independent accredited certification bodies. In this regard, government support and the availability of qualified personnel are essential for the successful development of cooperatives.

The Ministry of Agriculture and Food of the Republic of Tatarstan and the Center for Organic Agriculture (UMC "Organika") are actively engaged in extensive explanatory and consulting work to prepare commodity producers for organic production certification. The activities of UMC "Organika" are aimed at fulfilling the requirements of the Federal law "On organic production and amendments to certain legislative acts of the Russian Federation" and the law of the Republic of Tatarstan "On the development of organic production in the Republic of Tatarstan."

UMC "Organika" is a member of the "Technical Committee" (TC-040) "Organic production." The center actively works on developing and adopting standard projects, making amendments to existing standards related to the organization of organic production. The work of the TC-040 committee is organized and conducted by the Autonomous Non-profit Organization "Russian quality system" (Roskachestvo) in collaboration with the Federal Accreditation Service of the Russian Federation (Rosaccreditation) and the Federal Agency for Technical Regulation and Metrology of the Russian Federation (Rosstandart).

The center regularly conducts practical work on preparing farms to transition from traditional to organic production. Extensive consulting and advisory work are carried out to prepare commodity producers for organic production certification. Currently, in collaboration with the methodological center "Test-Tatarstan," five agricultural commodity producers have successfully passed certification and are included in the state register; six farms are in the transitional period.

UMC "Organika" is part of the working group to develop the state program for the development of organic agricultural production in the Republic of Tatarstan for the period 2023–2030.

By the end of 2022, three agricultural commodity producers received green certificates. Individual entrepreneurs R. Sh. Iskhakova from Laishevsky district of the Republic of Tatarstan and R. N. Gafiyullin from Baltasinsky district of the Republic of Tatarstan underwent certification in the second half of 2022. They were included in the state register of organic product producers in Russia. The individual entrepreneur D. G. Maslakov from Menzelinsky district is also completing the certification process in 2022. The rest, such as G. M. Khusnullina from the Tukaevsky district, F. F. Kiyamov from the Bavly district, R. R. Aksakov from the Arsky district, and "Luch" LLC from the Chistopol district, are in the conversion process and have yellow certificates. Completion of the certification procedure and obtaining green certificates is planned for 2023. Farms operating on an organic production basis and those in the transitional period to organic production are listed in Tables 1 and 2.

Thus, the accumulated experience of the educational and methodological center can assist in implementing the practice of training in organic agricultural production, processing, and marketing of organic products. It can also provide assistance in obtaining relevant certificates for consumer cooperatives in Tatarstan Republic.

The category of natural products is already familiar to consumer cooperatives. The complex of beneficial substances in this group is balanced by nature. This category includes wild plants, various berries, and mushrooms. Effective marketing, branding, and access to marketplaces are necessary to increase consumer demand for natural products produced by cooperatives.

In addition to the above, so-called eco-settlements created by urban residents are gaining popularity. Ecologically grown produce is consumed within the settlement. Besides

Table 1 Organic farms (have certificates of conformity of organic production of the first (highest) level)

No.	Agricultural producer	Certificate No.	Area of activity
1	LLC P(F)E "Andryushkino," Mamadysh district	ORG.TAT.AYa54.001.R00-0001	Berry
2	Individual entrepreneur R. Sh. Iskhakova, Head of a private farm, Laishevsky district	ORG.TAT.AYa54.001.R00-0002	Crop production
3	Individual entrepreneur R. N. Gafiullin, Head of a private farm, Baltasinskiy district	ORG. TAT.AYa54.001.R00-0003	Berry
4	Individual entrepreneur F. F. Kiyamov, Bavlinsky district	ORG. TAT.AYa54.001.R00-0004	Natural hayfields
5	Individual entrepreneur D. G. Maslakov, Head of a private farm, Menzelinsky district	ORG. TAT.AYa54.001.R00-0005	Crop production

Source Compiled by the authors based on Ministry of Agriculture and Food of the Republic of Tatarstan (n.d.-b)

Table 2 Farms in transition to organic production (have certificates of conformity of organic production of the second level (yellow))

No.	Agricultural producer	Certificate No.	Areas, ha
1	LLC Agroindustrial Holding "Andryushkino," Mamadysh district	ORG.TAT.001.R00-0003	Fruit and berry
2	Individual entrepreneur G. M. Husnullina, Head of a private farm, Tukayevsky district	ORG.TAT.001.R00-0006	Fruit and berry
3	Individual entrepreneur F. F. Kiyamov, Bavlinsky district	ORG.TAT.001.R00-0007	Vegetable
4	Individual entrepreneur R. R. Aksakov, Head of a private farm, Arsky district	ORG.TAT.001.R00-0008	Crop production
5	LLC "Luch," Chistopolsky district	ORG.TAT.001.R00-0009	Crop/livestock farming
6	LLC "Organic biosystems," Laishevsky district	In progress	Crop production

Source Compiled by the authors based on Ministry of Agriculture and Food of the Republic of Tatarstan (n.d.-b)

eco-farms, spa hotels, and entertainment venues for incoming tourists may be located on the territory. This trend can also be utilized for future development.

Currently, new trends in healthy eating are growing more prominent. Often, there is insufficient scientific research confirming a specific proven link between ingredients and health benefits. It can be concluded that consumer perceptions and beliefs play a significant role in the growth of the assortment and sales of health-oriented products. The increase in new viral infections has influenced consumer behavior; they think more about health and pay more attention to the composition of products when deciding to make a purchase. Particularly, consumers are more likely to choose products that help support immunity. Food products containing beneficial probiotics and vitamins are in high demand.

In this context, the role of cooperatives in the production of health-oriented products has significant potential. To realize this potential, it is necessary to modernize and strengthen the material and technical base, implement innovative projects, involve highly qualified personnel, and explore distribution channels with major retail chains.

Operating worldwide in various sectors of the economy, cooperative organizations have proven to be sufficiently resilient to various crisis situations. They contribute to economic growth, combat adverse environmental consequences, create jobs, promote food security, form ethical value chains, and improve people's material conditions and safety.

4 Conclusion

Thus, the development of cooperation significantly contributes to providing rural populations with employment, promotes income growth, and satisfies the needs of rural residents for services.

New trends in the direction of healthy nutrition will open up opportunities for growth and development, as they will consider the needs of the consumers of the twenty-first century.

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"Third Place" in the Contemporary Economy for New Garage-Construction Cooperatives

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Abstract

One of the goals of the principles of the green economy is the priority development of individuals and ensuring their well-being. In this context, the research explores the problem of garage-construction cooperatives (GCCs), which, as remnants of the past, have certain drawbacks for the city (e.g., aesthetically unpleasing views, vast unused garage areas, a deficit of social facilities, parking along the garages, etc.). Furthermore, GCCs occupy significant spaces—213 ha of urban land, equivalent to 14 territories of the Kremlin, which could be designated for recreational purposes (e.g., cafes, restaurants, gyms, and parks). Additionally, a large portion of garage cooperatives is utilized not for their intended purpose but rather as spaces for self-employed individuals and small businesses, adopting a format of production-storage facilities with a customer service office and workplaces for workers in the "gray" market. Therefore, the research topic is highly relevant nationally and in the Republic of Tatarstan. Thus, the concept is presented—it is not about demolition plans but an attempt to understand what to do with the garage spaces in a large city, a kind of invitation to dialogue.

Keywords

Green economy · Garage building cooperatives · Third place · Garages · Garage owners

JEL Classification

R1 · R2 · R3

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1 Introduction

When examining the economy of any district, region, or country, significant attention is given to the principles and goals of the green economy, one of which is the prioritized development of individuals and ensuring their well-being (Alinov et al. 2016). In this regard, the study of the presence of garage-construction cooperatives, contradicting the goals of the green economy, is highly relevant.

The exploration of this issue clearly reflects the city's need for additional spaces for social facilities and providing a more aesthetically pleasing appearance to the city.

The research aims to investigate the peculiarities of providing a "third place" for garage-construction cooperatives.

The research tasks are to examine and analyze the problems of placing garage-construction cooperatives and resolve them by implementing "third place."

2 Methodology

The transformation of the economy based on the principles of the green economy pursues specific long-term goals, along with expected outcomes expressed through particular indicators. The first goal concerns the preservation and sustainable use of ecosystems, ecosystem services, and natural resources (natural capital). The second goal involves ensuring stable and sustainable economic development and a sustainable structure of production and consumption to increase the share of green GDP in the economy. The third goal is the prioritized development of individuals and ensuring their well-being. Currently, international organizations and UN institutions have developed strategic guidelines for the green economy, which are acceptable and important as objectives for all countries. These objectives are harmonized with the Sustainable Development Goals.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_51

For the model of Russia's green economy, 11 out of the 17 sustainable development goals can be adapted, namely the following (Alinov et al. 2016):

1. Good health and well-being;
2. Quality education;
3. Clean water and sanitation;
4. Affordable and clean energy;
5. Decent work and economic growth;
6. Industry, innovation, and infrastructure;
7. Sustainable cities and communities;
8. Responsible consumption and production;
9. Climate action;
10. Life on land;
11. Peace, justice, and strong institutions.

Considering the presented goals, we can assert that our issue relates to one of the objectives of the green economy model.

3 Results

Addressing this issue in the capital of Tatarstan, the problem of garage cooperatives stands out prominently, resembling a relic of the past that still evokes memories of the Soviet Union.

"It is not advantageous for cities to support vast hectares of car pastures," warns urban planning guru Mikhail Blinkin, highlighting the impending "garage" renovation in Kazan. Moscow and other cities worldwide are already moving in a similar direction. In the capital of the Republic of Tatarstan, they are seeking their own path: developing 213 ha of urban land, equivalent to 14 territories of the Kremlin, solely for housing is deemed impractical. Fortunately, there is a trend—the concept of the "third place," where people gather beyond their homes and workplaces. As of now, it remains a topic for discussion rather than a clear action plan, emphasizing Kazan's Chief Architect Ilsiyaar Tukhvatullina. The development concept of garage cooperatives and expert opinions are explored in the material by "BUSINESS Online" (Skryabin et al. 2023).

The concept of renovating territories of garage-construction cooperatives was discussed at the summer architectural and urban planning conference "Dialogues." Earlier, the City Development Institute presented these plans to the Mayor of Kazan, Ilsur Metshin. The concept was showcased at the All-Russian forum "Arch Moscow." The discussion revolves around rethinking the territories of Kazan's garage cooperatives, with a total area of 213 ha. For comparison, this space could accommodate 14 Kazan Kremlins or 300 football fields. The impetus for action comes from the city's general plan for 2040, where all garage-construction complexes (GCCs) fall under the comprehensive territory renovation zone. This implies that existing garages can continue to be used as usual, but developing them without territorial planning projects is impossible. Urbanization dictates the logic of GCCs' interest. The garage spaces created in Soviet times were originally designated for car storage. "Garage cooperatives created in Soviet times served specific purposes: the car was placed in the garage for five working days, and on weekends, one came, started it, and went on," reminds Managing Partner of BMP Brands Group Maxim Nikolaev (Skryabin et al. 2023).

However, in the present era, a car is no longer a luxury but a means of transportation. Thus, everyone tries to park a car as close to their place of residence as possible. Ideally, after parking, one should find oneself steps away from one's doorstep. Moreover, the value of urban land has increased tenfold. The contemporary economy has relegated garage cooperatives to the past. There are no new garage-construction cooperatives or garage "self-builders" lovingly constructing boxes for their cars. They are nonexistent because it is unprofitable on Kazan's "golden land."

Nevertheless, the old garage legacy remains and does not always prosper. The city grows and develops, inhabiting unexplored spaces and beautifying territories. In their current form, garages are, quite literally, a story fading into the past.

"In the first place, the format of garage-construction cooperatives (GCCs) has outlived itself," explains Elena Stryukova, the representative of the Russian Guild of Managers and Developers (RGUD) in Tatarstan, the reasons behind the city's reconsideration of these spaces. "Second, there is a need for areas for development within the city limits. An efficient city is a compact territory. Allocating space for development is always a complex process, primarily associated with temporary costs" (Skryabin et al. 2023).

Garage spaces also represent a story of safety and a normal life in a big city. Some GCCs are left to their own devices. The City Development Institute identified the following drawbacks of GCCs for the city:

1. Vast unused garage areas;
2. Deficit of social facilities despite the availability of extensive GCC spaces;
3. Parking along the garages;
4. Storage of garbage in the garages.

"This is lobbying for the interests of the construction sector, facilitated by the scarcity of lands with utilities within the city boundaries and the high cost of housing in neighboring areas," believes Nikolay Vasiliev, an advisor to the Minister of Construction of Tatarstan and a

distinguished architect of Tatarstan. According to Vasiliev, the city's appearance will also change, as the space occupied by garage cooperatives can be used for the construction of infrastructure, social facilities, and residential complexes (Skryabin et al. 2023).

When assessing land plots for development, the first consideration is the location of the land, the permitted use zone, height limits, and building density. This logic also applies to the acquisition of garages. The mechanism of comprehensive territorial development imposed on garage societies facilitates these processes.

Currently, the average price for purchasing garages in Kazan ranges from 200,000 to 300,000 rubles on the outskirts and reaches up to 1.5 million rubles closer to the city center.

If the costs for land fit within 20,000 rubles per square meter of sellable area, it is deemed acceptable by the economic model of developers. However, it may vary depending on the location.

In the absence of the Comprehensive Territorial Development (CTD) mechanism, the free market operates. Some are willing to part with garage ruins at their market price. For others, a garage is a true sanctuary, the sole joy in life, and persuading such owners is much more challenging. Therefore, the approach is individual. If the majority in the garage cooperative resists, it becomes a problem. If the plots are under the CTD mechanism, it is simply about the market price of acquisition, resolved through legal means. Typically, social facilities are planned on garage territories. The developer will have to purchase the land for them and then transfer the plot to the city. The developers can build here at their own expense, depending on the planning projects.

Urban planners advocate for a sensible compromise: garages as the "third place."

The goal of city authorities is a reasonable compromise. On one hand, the city benefits from the emergence of life and order in any territory. On the other hand, for the garage owners, numbering in the tens of thousands, it is crucial that the garage brings moral and financial dividends.

"The task is not to offend anyone, find a compromise between owners, developers, and residents. There must be an optimal solution that satisfies everyone. A person should not feel aggrieved," said Angela Belova, the chief architect of projects at the City Development Institute, at a recent presentation (Skryabin et al. 2023). Therefore, ways must be found to make everyone happy. In the future, the institute envisions, on the territories of Kazan's garage cooperatives, a kind of "third place" where car storage coexists with cafes, parks, and other public areas. The mayor of Kazan Ilsur Metshin has endorsed such a vision.

The first, second, and "third places" in urban planning represent a new urban space in the location of a standard garage cooperative, which looks as follows:

- Recreation area: cafes, restaurants, gyms, and parks;
- Space for self-employed individuals and small businesses;
- Format of production-storage facilities with a customer service office;
- A space where everyone can find a place for self-expression;
- A place where work is driven by passion, not just societal requirements.

"In each specific case, it is necessary to work on the concept of territorial development. Somewhere, labor application spaces will be in demand by the market, somewhere—infrastructural facilities, and somewhere—both," evaluates the concept, Elena Stryukova, the representative of the Russian Guild of Managers and Developers (RGUD) in Tatarstan (Skryabin et al. 2023).

The choice of the "third place" concept is also driven by what Kazan residents see in a garage:

- A buffer between home and the street;
- Refuge from societal demands;
- A place free from family pressure;
- An alternative field for experiments;
- A place free from sterile order.

"Garages are part of a system that influences the process of urban development," notes the Kazan study by the City Development Institute. Proposals for changing the functions of existing GCCs have already been prepared for the following cooperatives:

- GCC "Shchit" in the Privolzhsky district on the banks of the Kaban River near the Tank School;
- GCC-3 in the Sovetsky district near the metro station "Gorki," "Maksidoma," and the residential complex "Rodina";
- GCCs "Zodiac," "Privolzhsky-3," "Bars," "Rassvet-1," and "Mechta" in the Sovetsky district;
- GCCs "Chaika," "Sokol 77," "Sokol 88," "Sokol 98," and "Avtozavodets-82" in the Aviastroitelny district near KAZ named after Gorbunov.

However, the City Development Institute has not specified the specific functionality of the "third place" that will appear on the mentioned territories.

Not only garage construction cooperatives (GCCs) but also former industrial facilities, active urban markets, former central heating plant buildings, courtyards, and the banks of the Volga with the Kazanka River are being prepared for the role of the "third place."

"The task is to create as many "third places" as possible," Tukhvatullina mentioned at the "Dialogues," adding that such points drive the development of creative industries. "It is the engine of progress, a place for self-realization. This will make it possible to involve remote areas in the city's life."

Kazan's informal economy employs 80,000 people, which is 12% of the city's 643,000 working-age residents. Kazan's garages employ 20,000 people.

However, a garage can be a second place—for work, even a primary place where a person lives. The "garage economy" thrives in Kazan's GCCs. Auto repair shops, cafes, bars, gyms, stores, rental services, warehouses, and art studios operate there.

Therefore, actions will be based on analytics, which should be considered when planning spaces for investment projects. For example, an analysis of life in one of Kazan's GCCs is presented in Table 1, from which we can see that only 45% of the population stores cars in garages.

Table 1 Analysis of the life of the GCC

Analysis of the life of the GCC	Respondents (%)
The garage is used to store cars	45
The garage is used as a storage area	35
The garage is used for commercial activities	15
Abandoned	5

Source Developed by the authors

Therefore, the garage revitalization project will contribute to enhancing the aesthetics of urban spaces and bringing garage owners into the "bright" economic zone. Perhaps many will register as self-employed.

Figure 1 shows the number of workers in the informal economy in the Volga Federal District in 2023.

Hence, it can be seen that the highest percentage belongs to the Republic of Tatarstan.

The capital of Tatarstan is following in the footsteps of other cities worldwide. For instance, a creative industries incubator was established in the place of garages in Lisbon, and a theater hall emerged in Korea. Both facilities are constructed from maritime containers.

Territories of single-story garage cooperatives are also being developed in Moscow. Sergei Kuznetsov, the Chief Architect of Moscow, commented on the research by the Institute for Urban Development during the "Arch Moscow" forum, stating that garages are a "super interesting topic" for architects and urban planners. He also reminded that "great startups" like Microsoft and Apple began in garages.

"It is not advantageous for the city to maintain extensive pastures of private cars," continues the expert. "This is a matter of dealing with garage owners. In this regard, neither Moscow nor Kazan has any advantages over each other or other cities in Russia. If it is possible to buy out these plots under the garages, carry out alienation, and reach any agreement with the owners of this territory (who are usually not owners but tenants), then the usual logic of urban development comes into play. What will appear there? Jobs

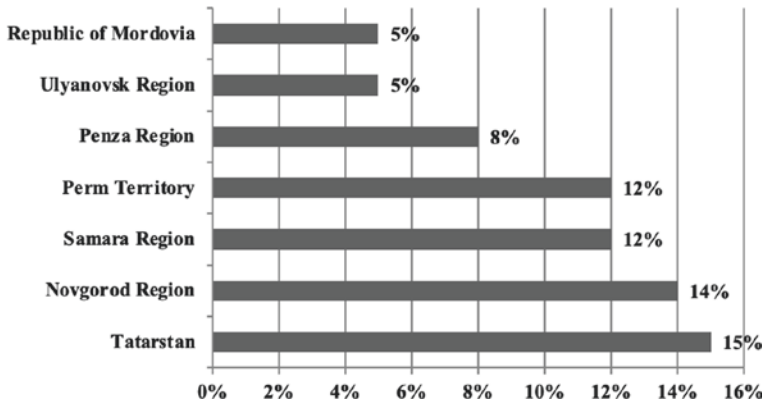

Fig. 1 Number of gray market employees in 2023. *Source* Developed by the authors

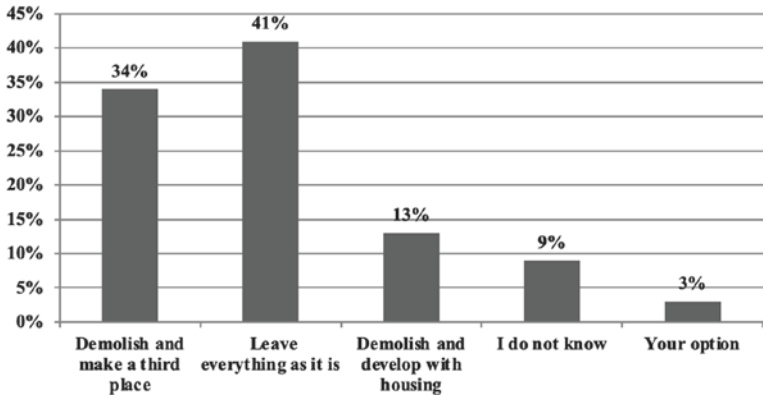

Fig. 2 Survey of respondents.
Source Developed by the authors

or urban spaces for recreation or entertainment. Regarding this, each time a specific urban planning study is conducted" (Skryabin et al. 2023).

In Kazan, a survey was conducted among garage owners (100 respondents), with the main question being "What should be done with the garages?" (Fig. 2).

Figure 2 shows that more than half of the respondents do not resist the upcoming innovations, which means that the abandoned urban areas will be used for social facilities and will bring the city to a more aesthetic appearance, as befits the third city of Russia.

4 Conclusion

Summarizing the above, we can draw the following conclusions:

1. The problem of GCCs contradicting the goals and principles of the green economy is considered and studied;
2. A solution to this problem is proposed by providing the GCCs with "third places," namely territories for social facilities and additional workplaces for the workers of the "gray" market, which will bring these territories into aesthetic spaces and satisfy the needs of citizens and authorities.

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Features of Sustainable Development and Green Growth of Cooperative Business in the Conditions of Economic Transformation

Natalya M. Sharnina, Vladimir G. Ignatyev, Natalia V. Khvalyova, Irina V. Galantseva, and Yana Yu. Pavlova

Abstract

The research aims to show the features of sustainable development and green growth of cooperative businesses in the conditions of economic transformation. The authors set the following research tasks: (1) to clarify the essence of the concepts of sustainable development and green growth; (2) to identify the features inherent in sustainable development and green growth; (3) to consider the cooperative practice of sustainable development and green growth; and (4) to analyze data on the development of cooperative organizations. During the research, the authors used the methods of systematization and analysis of secondary sources, calculation of indicators of dynamics, structure, and variation, and the "3V" analysis developed by N. M. Sharnina to interpret the calculated data. The market model of the economy, along with its efficiency, has brought a consumerist attitude to capital, labor, and nature, forgetting the need to preserve and multiply their potential for the future. In the market conditions, collective forms of ownership demonstrate greater efficiency in economic management and proximity to societal and environmental issues. Sustainable development is the concern for the well-being of the entire society and nature, a balance between consumption and responsibility for the utilized resources, a resource-saving policy, and a shift from growth goals to objectives focused on qualitative improvement of the system. The peculiarity of implementing the concept of sustainable development by the Central Union of Consumer Cooperatives of the Russian Federation (Centrosoyuz) lies in (1) the fundamental agreement of cooperators with the principles of sustainable development and green growth since its inception, (2) the union's ability, despite the transformation of the economic system, to maintain the profitability of its activities, albeit with a noticeable decline in recent years, and (3) the adaptation of cooperative business to the transformation of the economic system by seeking alternative sources of income beyond its core activities. The research involved the systematization of materials on the research topic, analysis of data on the activities of Centrosoyuz from 2011 to 2022, and the formulation of quantitative and qualitative conclusions.

Keywords

Cooperative organizations · Sustainable development · Green growth · Features · Central Union of Consumer Cooperation

JEL Classification

Q01

1 Introduction

Russia is still grappling with the consequences of transitioning from a planned administrative to a market economy. Ambiguous outcomes of this transformation (modest economic growth compared to the 1970s) and the grievances of members of the unified community about the consequences of market relations have underscored the need for implementing concepts of sustainable economic development and green growth. Cooperative business represents a promising

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_52

form of economic activity due to its goals, collective ownership, and responsibility. The utilization of the concepts of sustainable development and green growth by cooperative organizations is inherent in the very nature of their formation and existence.

The research problem is to verify the hypothesis that cooperative businesses lack signs of sustainable development and green growth. The research objective is to present the features of sustainable development and green growth of cooperative business in the conditions of economic transformation. The research tasks are as follows:

- To clarify the essence of the concepts of sustainable development and green growth;
- To identify the features inherent in sustainable development and green growth;
- To examine cooperative practices of sustainable development and green growth;
- To analyze data on the development of cooperative organizations.

2 Methodology

The methodological foundation of this research is based on techniques for systematizing and analyzing secondary sources, calculating statistical indicators of dynamics, structure, and variations, and the analytical tool of N. M. Sharnina's three-step inference and conclusion ("3V" analysis by N. M. Sharnina) for interpreting the calculated data.

While working on the theoretical framework of the study, the authors analyzed and used the materials by V. Andrianov, E. N. Babin, G. V. Bondarenko, O. V. Borisova, N. V. Bryukhanova, E. E. Bydtaeva, D. R. Vakhitov, S. G. Golovina, P. A. Glik, N. S. Grigoryeva, I. N. Degtyareva, D. S. Ermakov, A. S. Ermakov, K. N. Ermolaev, M. S. Egorova, R. Kh. Dodov, D. I. Dynnik, L. G. Kirillova, Kh. A. Konstantinidi, E. A. Korsakova, V. N. Kruglov, V. M. Kruchinina, L. A. Kuznetsova, S. A. Lipina, E. S. Makarova, S. E. Martynova, Ya. F. Nashirvanova, A. A. Osmonova, Yu. A. Pavlova, I. N. Platonova, S. V. Podolskykh, I. A. Rodionova, P. A. Romanov, A. V. Ruchkin, N. A. Rykhtikova, A. G. Rubin, T. G. Sobolevskaya, V. V. Sorokozherdyev, M. V. Tereshina, M. V. Uryadnikova, N. M. Sharnina, A. D. Sheremet, J. H. Spangenberg, V. A. Shterenzon, K. S. Khvalev, N. V. Khvaleva, R. K. Chung, A. E. Emirova, E. A. Yashchenko, S. Liu, E. Suárez-Serranoa, P. L. González-Torreb, and E. Covián-Regalesc. The authors also used public materials and financial statements of the Central Union of Consumer Societies of the Russian Federation (Centrosoyuz).

According to Andrianov (2016), sustainable development can be interpreted broadly—as the need, realized by the end of the 1960s, for an economy to evolve while preserving and optimally using the environment and replenishing the resources—and narrowly—as the dynamic equilibrium development of an object with sustainable growth rates. Spangenberg (2008) suggests understanding sustainable development as the preservation and development of the viability of human, social, economic, and natural capital, considering the long-term future. According to Babina and co-authors (2021), the term "sustainable development" should be understood as "joint development," meaning a balanced and harmonious development aligned with common goals and aspirations. Vakhitov and co-authors (2022) emphasize the negative impact of contemporary economic activity goals on environmental pollution and depletion. Platonova (2014) describes the sustainability of global economic development through the dynamics of gross domestic product, exports, and imports. Khvalyov and Khvalyova (2021) suggest technologies that reduce resource consumption and harm to the environment as measures for sustainable growth and improving natural potential.

Tereshina and Degtyareva (2012) note that the concept of green growth encompasses the enhancement of well-being and the reduction of risks for humans and the natural environment, supporting an eco-friendly economy. Rodionova and Lipina (2015) list goals such as environmental safety, poverty eradication, eco-friendly production, energy conservation and efficiency, and optimal use of natural resources. According to the creator of the concept, Chung (Television and Radio Company "Mir24" 2023), the ideas have long-term prospects for improving the natural environment. However, in the short term, economically challenged countries may struggle to implement the concept.

Summarizing the research results on the outcomes of the transformational changes in the political system of the Russian Federation from a planned-administrative to a market-oriented one, Konstantinidi and co-authors (2023) highlighted the following specific assertions:

- The current model of managing society and the economy is not sufficiently effective (poverty; low educational, cultural, and healthcare potential) (A. V. Buzgalin);
- The liberal model of politics requires scientific, competitive, and defense capabilities activation (S. A. Markov);
- Digitalization needs revision due to negative consequences (M. L. Alpidovskaya) and others.

The nature of cooperation is directly related to the principles of the concepts of sustainable development and green growth (Sharnina 2021). According to Sharnina, cooperative organizations care about the well-being of rural residents, create jobs, support clean technologies, and implement green energy. Golovina and Ruchkin (2023) note that during crises, rural areas are among the least prepared

to overcome the situation smoothly. Additionally, the level of organization of agricultural production affects the maintenance of climate and ecosystems. As highlighted by Ermakov and Ermakov (2012), Nobel laureate E. Ostrom proved the effectiveness of collective property management, considering collective commons, cooperatives, and similar forms as a panacea for the global economy.

Let us highlight the features of sustainable development and green growth.

According to Spangenberg (2008), these features include the following:

- Long-term viable existence of the system;
- The well-being of society members and a healthy environment;
- Coevolutionary development of all system elements;
- Balance of societal solidarity responsibility and satisfaction of private, societal, and future generations' needs;
- Resource conservation;
- Shift from vague goals to objectives for qualitative improvement of the system.

According to Ermakov and Ermakov (2012), it is a focus on the common good and the improvement of each individual's quality of life. According to Sheremet (2014), these features include stability of the economy or financial, environmental, and social sustainability, priority of tasks for preserving the environment for the sake of the future, and moderate resource consumption. According to Tereshina and Degtyareva (2012), the feature lies in the low environmental impact of the economy and the balance between resource-extracting (nature-exploiting) and processing industries, focusing on the final (not intermediate) result. Egorova and Glik (2014) state that it is an active implementation of eco-friendliness in the economy (resource conservation, eco-control of environmental damage and risks, and environmental protection).

The examples of cooperative sustainable development and green growth are as follows: Danish-Swedish dairy cooperative Arla Foods ("working for a better future" by preventing negative climate impact); Finnish cooperative Metsäliitto (managing forest use based on sustainable development principles) (Golovina and Ruchkin 2023); Cooperatives of organic production such as Agricultural Consumer Cooperative "Minor" SCPoK in the Altai Territory (wild plants); Agricultural production cooperative (APC) "Terroir" in Sevastopol (organic wine); APC "Success" in the Tomsk Region (organic grains); Agricultural consumer production marketing cooperative "Union of Organic Farmers of Kuban" in the Krasnodar Region; Cooperative Organic Valley in the USA (supports family-owned organic farms); "Ecocitrus" organic cooperative in Brazil (citrus and ecotourism); Moroccan women's cooperative "Akkain Ouargane" (organic argan oil and rural tourism); the largest cooperative "Indian Farmers Fertilizer Cooperative Limited" (fertilizers, assistance in implementing innovative agricultural solutions, and information and communication technologies) (Kruchinina 2022).

The following is suggested to assess sustainable development and green growth:

- Using economic (resource optimization), ecological (long-term nature regeneration), social, and institutional criteria (Spangenberg 2008);
- Variation of investments in fixed capital, gross domestic and regional product, and their ratio index, comparing their growth and decline rates (Korsakova 2022);
- Energy intensity of regional gross product (Tereshina and Degtyareva 2012);
- Comprehensive analysis of enterprise economics and socio-environmental indicators (Sheremet 2014);
- The proportion of areas occupied by sustainable production (Liu 2023);
- Expenditures on education and occupational health;
- Combating gender discrimination;
- Using renewable energy sources;
- Optimization of energy consumption;
- Waste recycling, wastewater treatment, and reuse of materials (Suárez-Serranoa et al. 2023).

3 Results

According to Borisova (2013), the Central Union of Consumer Cooperatives of the Russian Federation, as a socially oriented system, aims to strengthen the economic and social foundation of the organization and promote the development of the residing territory. With more than 3.8 million members, the union has established its education system (higher and secondary vocational schools) and research institutes while implementing the principles of sustainable development and green growth of the International Cooperative Alliance.

Let us assess the sustainability of the development of the Central Union in Tables 1 and 2.

Using the analytical tool of three-step inference and conclusion ("3V"—analysis of N. M. Sharnina), let us consider the results.

3.1 Quantitative Analysis

The organization experienced a decline in self-owned fixed assets (a decrease of 7.7% in 2011–2022; and 25.8% annually for the last five years) and the amount of fixed assets (the 12-year average is higher than the average for the last

Table 1 Sustainability indicators of the Central Union of Consumer Cooperation of the Russian Federation for 2011–2022

Name of indicator	Average level (thousand rubles)		Variation coefficient (%)		Average growth rate (%)	
	2011–2022	2018–2022	2011–2022	2018–2022	2011–2022	2018–2022
Fixed assets	861,227.3	819,282.0	21.8	32.4	− 7.7	− 25.8
Fund of immovable and especially valuable property	947,509.8	1,004,883.4	27.8	35.4	− 7.3	− 29.6
Revenue	352,384.8	319,917.4	11.8	3.9	− 0.2	− 1.5
Profit on sales	83,003.0	12,699.4	119.4	69.9	− 38.7	− 56.4
Net profit	178,738.4	228,591.8	39.8	18.7	1.7	− 13.4

Source Compiled by the authors based on Counterparty Verification Portal "Checko" (2021) and Electronic Ecologist "E-Ecolog" (2011–2020)

Table 2 Effectiveness of sustainable development of the Central Union of Consumer Cooperation of the Russian Federation for 2011–2022

Indicators	Years					Average (%)	
	2018	2019	2020	2021	2022	2011–2022	2018–2022
Return on sales (%)	6.59	2.35	7.90	2.84	0.25	23.55	3.97
Profitability of operations (%)	7.06	2.41	8.57	2.92	0.25	30.81	4.13
Revenue per 1 ruble of fixed assets (rubles)	0.35	0.33	0.31	0.36	1.07	0.41	0.39
Revenue per 1 ruble of immovable and especially valuable property (rubles)	0.28	0.27	0.25	0.29	1.05	0.37	0.32
Profit from sales per 1 ruble of fixed assets (rubles)	0.02	0.01	0.02	0.01	0.00	0.10	0.02
Net profit per 1 ruble of the fund of immovable and especially valuable property (rubles)	0.23	0.19	0.22	0.19	0.53	0.19	0.23

Source Compiled by the authors based on Counterparty Verification Portal "Checko" (2021) and Electronic Ecologist "E-Ecolog" (2011–2020)

five years by 42 billion rubles; the variation coefficient increased from 22 to 32%). Moreover, there is a reduction in the fund of immovable and particularly valuable property, exhibiting an average decline of 7.3% over the entire period and a substantial decrease of 29.6% annually over the last five years. The excess of the average fund level over five years compared to the average over 11 years amounts to 57.4 billion rubles; the increased variation coefficient indicates heterogeneity in funds over the years. Revenue experienced a decrease of 0.2% annually over the period and a more substantial decline of 1.5% annually over the last five years. The low coefficient of variation indicates stability in turnover volumes, amounting to 352.4 billion rubles over 11 years and 319.9 billion rubles over the last five years. Profit from sales declines, averaging 38.7% over 11 years and a sharper drop of 56.4% annually over the last five years. Due to a high variation coefficient (69.9% and 119.4%, respectively), the profit volume is not stable year by year, falling below the average for the period by 70.3 billion rubles over the last five years. Net profit increased by an average of 1.7% annually from 2011 to 2022 but declined by 13.4% annually over the last five years, exhibiting significant fluctuations year by year (variation coefficient of 39.8%). However, over the last five years, the level of net profit remained stable, averaging 228.6 billion rubles.

The profitability of sales for the Central Union of Consumer Cooperatives of the Russian Federation over the last five years has decreased from 23.55 to 3.97% compared to the average for 2011–2022 (0.25% in 2022). The average profitability of operations over the last five years is 26.68% lower than the overall average for the period (0.25% in 2022). The average revenue per ruble of fixed assets over the last five years (0.39 rubles) is less than the overall period average (0.41 rubles) by 0.02 rubles (1.07 rubles in 2022). The average revenue per ruble of the fund of immovable and particularly valuable property over the last five years (0.32 rubles) is 0.05 rubles less than the overall period average (0.37 rubles) (1.05 rubles in 2022). The average profit from sales per ruble of fixed assets over the last five years (0.02 rubles) is 0.08 rubles lower than the overall period average (0.19 rubles) (0.00 rubles in 2022). The average net profit per ruble of the fund of immovable and particularly valuable property (target investments for replenishing fixed assets) for the years 2018–2022 (0.23 rubles) is higher than the average for 2011–2022 (0.19 rubles).

3.2 Qualitative Analysis

The volume of fixed assets of the Central Union of Consumer Cooperatives of the Russian Federation for 2011–2022 is decreasing, especially in the last five years. There has been an accelerated decline in the volume of targeted investments for replenishing fixed assets. Over the last five years, the volume has varied significantly from year to year, indicating the instability of funding flows. The revenue from sales during the period remains stable, especially in the last five years. However, there is a declining trend, which reflects an even greater reduction in the union's turnover in the conditions of inflation. The level of profit from sales over the years is unstable and is decreasing rapidly, especially in recent years, indicating a decline in the effectiveness of the union's core activities. The level of net profit increases on average by 1.7% per year; in the last five years, its stable volumes had high rates of decline. The growth in the amount of net profit indicates the adaptation of the union to the transformational changes in the country's economic system, the transition to alternative sources of income, and their effective application. Given inflation, the rate of decline in activity is exacerbated.

The calculated indicators also speak of a decrease in the efficiency of the union's core activities: the proportion of profit in the price of goods and the return on investment per ruble of total costs have decreased. The turnover of the union per ruble of fixed assets and per ruble of targeted investments for their replenishment has decreased. The level of profit from sales per ruble of fixed assets has fallen. The increase in the adaptation of the Central Union to the conditions of economic transformation is indicated by the growth of a comparable indicator of the volume of net profit per ruble of real estate and particularly valuable assets.

3.3 Conclusion on the Existence of a Problem

Considering the activities of the Central Union of Consumer Cooperatives of the Russian Federation from 2011 to 2022 based on the sustainable development principles, several observations can be made. First, there is a consistent maintenance of overall profitability in its operations. Second, there is a decline in the efficiency of activities in its core directions. Third, the Central Union has demonstrated adaptation to the transformation of the economic system, resulting in the growth of its net profit through other operations. From 2011 to 2022, the cooperative organization, represented by the Central Union of Consumer Cooperatives of the Russian Federation, exhibited signs of sustainable development according to expert assessments (Borisova 2013) of its activities, considering profitability. However, the presence of green growth in the union is contradicted by the declining trends in its core activities (the hypothesis of the absence of sustainable development and green growth is partially refuted). Further detailed research into the reasons and directions of cost growth and the effectiveness of utilizing economic, social, and environmental potential by cooperative businesses is required for a more accurate assessment of the organization's compliance with sustainable development principles.

4 Conclusion

The principles of sustainable development of the economic system entail evaluating its activities simultaneously along three dimensions: the efficiency of economic operations, the growth of the well-being of the population (including workers), and the preservation and improvement of the state of the environment (or the achievement of green growth). Replacing the planned-administrative model, the market model of the economy brought efficiency and introduced a consumer attitude toward capital, labor, and nature, forgetting the necessity of preserving and multiplying their potential for future generations. In the context of market relations, collective forms of ownership demonstrate greater economic efficiency and a closer connection to societal and environmental concerns.

Sustainable development involves caring for the well-being of the entire society and nature, maintaining a balance between consumption and responsibility for the use of resources, implementing resource-saving policies, and shifting from the goals of economic growth to specific objectives for qualitatively improving the system. Cooperatives worldwide actively participate in implementing the principles of sustainable development and green growth. The Central Union of Consumer Cooperatives of the Russian Federation stands out in implementing the sustainable development concept. First, there has been fundamental agreement among cooperators with the principles of sustainable development and green growth since its inception. Second, despite the transformation of the economic system, the union has managed to maintain the profitability of its activities, albeit with a noticeable decline in recent years. Third, the cooperative business has adapted to the transformation of the economic system by diversifying into alternative sources of revenue, demonstrating resilience and flexibility.

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Digital Transformation of Consumer Cooperative Business in Focus of Green Growth

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Abstract

The research considers the impact of digital transformation on the business of consumer cooperatives with a focus on green growth. It delves into the contemporary digital possibilities for developing green projects, discussing the business models of consumer cooperative enterprises that produce environmentally friendly products. Consumer cooperative enterprises are creating digital business models to implement controlled value chains and network systems, making them competitive in the green product market. Digital business models enable consumer cooperatives to better understand current consumer demands for environmentally friendly products, leading to closer connections with consumers. Digitization allows consumers and consumer cooperatives to acquire more knowledge about environmentally friendly products and derive more benefits from collaboration. In this context, consumer cooperatives with an ecosystem driver model stand out. The ecosystem business model is examined for consumer cooperative enterprises in comparison with enterprises from other sectors of the economy in terms of product and customer experience. This business model serves as a development generator for consumer cooperative enterprises. Green technologies act as drivers for the development and adaptation of enterprises in the green economy; the enterprises serve as examples of ecosystem models. These enterprises experience faster revenue growth compared to those employing other models of digital business.

Keywords

Consumer cooperation · Green economy · Digital transformation · Business models · Green growth

JEL Classification

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1 Introduction

A relevant trend in food production is the creation and development of advanced technologies, along with an increasing demand from the population for environmentally friendly products. This has led consumer cooperative enterprises to shift towards producing and selling environmentally clean products. In contemporary society, there is a prevailing tendency towards healthy eating, resulting in an increased demand for environmentally friendly products.

In 2012, the President of the Russian Federation approved the "Fundamentals of state policy in the field of environmental development of Russia until 2030" (Presidential Executive Office 2012). Section IV "Basic mechanisms for the implementation of state policy in the field of environmental development" is particularly important to the consumer cooperative system, precisely point 17. The following mechanisms are utilized in addressing the task of developing economic regulation and market instruments for environmental protection:

- Formation of the market for environmentally friendly products, technologies, and equipment, and environmental services;
- Stimulating the attraction of investments to ensure the rational and efficient use of natural resources, reduce negative impacts on the environment, produce environmentally clean products, and implement resource-saving

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_53

technologies in compliance with the legislation of the Russian Federation on environmental protection;
- Enhancing the environmental and social responsibility of businesses.

To address these challenges, it is necessary to establish mechanisms within consumer cooperatives that assist these enterprises in enhancing the efficiency of natural resource utilization, transitioning to organic farming, minimizing the use of chemical fertilizers, creating a harmless regulated atmosphere conducive to the extended storage of fresh vegetables and fruits, and ensuring environmentally friendly storage conditions for the entire spectrum of agricultural products. The basis of the ecological platform of consumer cooperatives is formed by implementing technological processes that minimize environmental pollution, complete biological purification of all production discharges, and are fully compliant with international and Russian requirements. Within the focus of green growth, the primary marketing strategy is a pricing policy that entails setting prices that do not exceed those of competitors. Adhering to this condition, price calculations are based on the "cost plus profit" principle.

The prioritization of production and sales activities by consumer cooperative enterprises engaged in green business, considering competitive pressures and the chosen marketing concept, is directed towards refining green technologies aimed at achieving maximum efficiency over an extended period. It is essential to note that the country's cooperative policy, within the framework of programs supporting agricultural cooperation, persistently seeks to support large and small farmer cooperatives in accordance with the Federal law "On agricultural cooperation" (December 8, 1995 No. 193-FZ) (Russian Federation 1995), fostering innovative projects to improve the quality of life for Russian citizens. Green growth is the subject of innovative activities by consumer cooperative enterprises operating in various climatic conditions, possessing a sufficiently qualified workforce often performing unique tasks, ensuring the resource efficiency of enterprises, and stimulating projects aimed at developing the market for ecological products, enhancing public health, and reducing environmental pollution.

2 Methodology

The essence of the digital transformation of consumer cooperative business, focusing on green growth, lies in changes in the mindset of its employees, an increase in ecological and social responsibility, innovative technologies, and the abandonment of traditional management methods. In the era of the digital economy, consumer cooperatives refine management methods in economic activities and in business as a whole, which allows them to achieve significant results that ensure their success. For successful operation in the digital environment of consumer cooperatives, it is necessary to transform business processes practiced by enterprises. In some cases, it is necessary to change outdated business models. It is essential to introduce new green technologies, making it possible to transition to environmentally oriented economic activities. Changes in land use and crop production, considering minimal negative impacts on public health, are aimed at improving the quality of life for people.

Simultaneously, digitization claims to be the most effective tool for bringing about significant changes in green growth, including changing the business models of consumer cooperative enterprises engaged in contemporary green economic activities. This transformation aims to make them more investment-attractive and expand their market share. Not every enterprise can transition to a new, higher level of producing environmentally friendly products and ensure a significant increase in income from new green products. To initiate the production of green products, an enterprise must first transform its existing business processes, adopt new green technologies, and embark on the implementation of innovative projects, positioning it in the market for environmentally clean products. Simultaneously, the enterprise's management must actively work on building a customer base. The production of green products assumes the availability of constructive offerings to satisfy a wide range of customers interested in purchasing environmentally clean products. Many consumer cooperatives continue to generate profits through traditional methods and engage in previous directions of agricultural production. However, green growth based on contemporary digital possibilities serves as a generator of investment and innovative projects in consumer cooperatives. On the one hand, it introduces modern technologies and methods for environmentally safe and society-demanded production. On the other hand, it presents resource-efficient investment-attractive projects, creating the foundation for sustainable growth in the green production of consumer cooperatives and the emergence of new economic opportunities.

Closely collaborating with customers interested in acquiring environmentally friendly products and engaging in online interactions (i.e., conducting online engagement with interested customers using advanced information and communication technologies), customer-oriented consumer cooperatives gain a competitive advantage over companies lacking such interactions. Customer experience incorporates the characteristics of the digital customer. Practically all companies now are presented on the Internet via websites to advertise their products and develop communications in

the market environment, thereby positioning themselves as active participants. To achieve this goal, well-thought-out content is created, including company ratings, detailed information on the technological green processes of producing environmentally friendly products, and consumer reviews with a detailed purchase history and targeted recommendations. Moreover, in the digital economy, consumer cooperatives without innovative ideas and the production of high-quality and environmentally friendly products demanded by domestic consumers will lose communication with their customers due to the lack of attractive products and digitization in customer relations.

Customer relations involve a comprehensive set of digital business processes, data arrays directed to the customer, an analysis of the green product consumer market, expert opinions, and forecast indicators. The goal is to make it easier for the customer to navigate the choice of a manufacturer of green products and the products themselves. Information about the availability of phones, tablets, and computers used by the customer plays a crucial role. It enables maintaining communication and promptly informing the customer about the availability of fresh products, as well as coordinating the time and place of the declared product delivery. This allows consumer cooperatives to operate practically on par with large agro-industrial complexes and even surpass them due to greater flexibility in customer interactions in the conditions of the digital economy. It is essential to understand that green growth, besides a comprehensive program to stimulate economic growth, implies the improvement of the business activities of consumer cooperatives towards the development of a green economy with a focus on ecology and the implementation of social practices, ensuring the emergence of new jobs and creating a favorable social environment in consumer cooperative workplaces. For consumer cooperatives, it is advantageous that their produced goods possess competitive advantages and dominate in the niche of environmentally friendly products. For this purpose, consumer cooperatives pay close attention to the quality of the goods they produce, especially those produced by their manufacturing units. They also equip their enterprises with advanced equipment to control the green products supplied to the market. These measures lead to the fact that the products of consumer cooperatives are not inferior to large agro-industrial complexes and, in many respects, even surpass them.

The essence of the cooperative organization of agricultural product processing is organized in such a way that the enterprise is provided with raw materials produced by cooperative members only for their processing structures. Cooperators are obliged to sell their agricultural products only to their processing facilities. Payment is made not only according to the volume and quality of products supplied by the agricultural producer, which is controlled at the entrance of products with the use of advanced metrological means, but also, according to the adopted by the board of the cooperative, rewarded for the supply of ecologically clean products. Thus, it is valued more expensive in the market, which provides additional income to the processing enterprise of the cooperative with environmentally friendly products.

Currently, in Russia, there is a trend driven by the interest of citizens with various income levels in consuming environmentally friendly food products. This has significantly altered customers' attitudes toward green products. Simultaneously, the production of environmentally friendly food products is driven by the growth of the population's income, leading to an increase in green investments in projects for producing healthy and environmentally friendly food products. In turn, this contributes to reducing energy consumption, increasing energy efficiency, and developing environmental responsibility for the produced food products.

To address these issues, consumer cooperatives need ways to create new value propositions that will lead to a breakthrough in the customer experience. In this regard, the most successful are consumer cooperative enterprises that transform their business processes toward the green economy. Contemporary green technologies contribute to massive changes in consumer cooperative enterprises and form the basis of many innovative projects implemented in numerous consumer cooperative enterprises. While implementing innovative green technologies, enterprises actively enter the green product market. Consequently, according to the requirements of the digital economy, consumer cooperatives can utilize digital technologies, although these technologies do not always create a competitive advantage. A crucial aspect of the activities of consumer cooperatives is its ability to implement green projects focused on green growth to transition to high-quality and environmentally friendly production, the demand for which continuously grows. This will satisfy the market's need for environmentally friendly products, retaining customers who prefer traditional green products and attracting new consumers.

From an economic perspective, this will increase the margin on environmentally friendly products. The attractiveness of producing environmentally friendly products is primarily due to consumers' concern for their health (Khutorova 2013). Investing in its production contributes to optimizing supply chain logistics, using energy-efficient technologies, reducing overhead costs, differentiating the assortment of environmentally safe products, supporting sustainable financing, and implementing accessible environmental pricing. Thanks to digital technologies, consumer cooperative enterprises create digital business models for implementing controlled value-added chains and advanced network systems, making them competitive in the green product market.

It is important to note that digital business models allow consumer cooperatives to better understand contemporary customer demands regarding environmentally friendly products, leading to closer connections with consumers. Digitization allows consumers and consumer cooperatives to acquire more knowledge about environmentally friendly products and derive more benefits from their collaboration. In this context, the authors highlight consumer cooperative enterprises with an ecosystem driver model. The ecosystem business model is examined for consumer cooperative enterprises in comparison with businesses from other sectors of the economy in terms of product and customer experience. It is known that this business model serves as a development generator for consumer cooperative enterprises. Green technologies act as drivers for the development and adaptation of enterprises in the green economy, with the enterprise becoming an example of an ecosystem model. These enterprises experience faster revenue growth than those employing other digital business models.

The ecosystem driver model provides customers with a broader selection, offers the best prices, and contributes to accelerating innovation. With the development of green business in consumer cooperative enterprises, the speed of response to customer actions has become a key success factor. In the past, enterprises competed using technologies. In the focus on green growth, enterprises compete using advanced digital models. The process of uniting consumer cooperative enterprises engaged in environmentally friendly production through information and communication technologies practically creates a unified electronic microenvironment. The concept of "Ecosystem" unites these specialized business models. The experience of applying the ecosystem demonstrates its effectiveness in retail. When choosing one or two powerful ecosystem drivers, consumer cooperation will contribute to industry consolidation in the market for environmentally friendly products. This consolidation will undoubtedly facilitate the selection of the most suitable digital business model for successful operation with a focus on green growth. Accordingly, some consumer cooperative enterprises are transforming their activities and developing their strategies for the long term. Many of them are working on envisioning how they will interact with customers. By considering the transformation of consumer cooperative business with a focus on green growth, enterprises are learning to make the most of these opportunities.

Many consumer cooperative enterprises face challenges in gathering comprehensive information about customers, green technologies, and the current state of the market for environmentally friendly products without an effective organizational structure. Nowadays, there is an abundance of data, and it is challenging to discern which data to focus on and which issues to prioritize without a structure. The model used by consumer cooperatives serves as a good solution to this problem. However, it lags behind the best models. Certainly, there are other ways to organize data, including customer preferences, market indicators, and the emergence of new green technologies.

According to the authors, success in the green product market depends on consumer cooperative enterprises working towards producing environmentally friendly products using innovative technologies and implementing the digital transformation of existing businesses to achieve success. Unfortunately, the analysis of big data is not always feasible. Nevertheless, the information obtained assists consumer cooperative enterprises, despite the existing challenges, in achieving results in the market for environmentally friendly products.

3 Results

In the contemporary digital economy, primary importance lies in the development of online e-commerce platforms and the utilization of artificial intelligence for implementing green economy projects by consumer cooperatives employing contemporary business models. Considering that the role of consumer cooperatives in the digital economy is significant, particularly in the realm of green growth, it contributes to the advancement of the production of environmentally friendly food products and the protection of the health of Russian citizens. Furthermore, it fosters an innovative approach and investment attractiveness in the green economy.

4 Conclusion

In the digital economy, advanced information technologies and artificial intelligence were integrated into the practical operations of consumer cooperatives engaged in the production and sale of environmentally friendly products. Contemporary business models make it possible to meticulously monitor their activities and evaluate their effectiveness in terms of corporate responsibility. Corporate social responsibility is a concept according to which business cooperatives consider the interests of society, assuming responsibility for their impact on all stakeholders in the public sector, regardless of their geographical location. This circumstance makes it imperative to explore contemporary development technologies for the entire structure of consumer cooperation in the context of green growth, which is necessary for the effective improvement of the natural environment, the health of citizens and their families, local communities, and society.

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Management of Innovative Development in the Context of Digitalization

Anna S. Obukhova, Irina G. Ershova, and Elizaveta Yu. Ershova

Abstract

The research aims to identify the relationship between human resources and the country's technological development. The authors use the dialectical method, a systemic approach, expert assessments, statistical regression, and trend analysis. The research object is the countries of the former Soviet Union. The research objectives are to analyze the quantitative and qualitative costs of households and organizations on the creation and use of digital technologies in different countries. As the result of the research, the authors identified that the economic success of any country is inextricably linked with the development of education, science, and innovative technologies based on them, which contribute to the growth and development of the country as a whole, as well as the creation of conditions for further human development. Since every achievement in any activity is related to human resources, it is important that the government pays continuous attention to increasing the number and quality of human resources. During the research, the authors analyzed the influence of human capital on the technological development of regions and countries. Based on the research results, the authors conclude that human and innovative resources are recognized as an integral factor in technological development and economic growth.

Keywords

Digitalization · Digital transformation · Digital technologies · Innovative economy · Innovative development

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JEL Classification

O1 · O3 · P5 · R1

1 Introduction

With the expansion of science and technology, industrialization began, leading to more advanced machines and methods of management and production. Under the pressure of globalization, the focus is placed on reducing costs, shortening production time, and improving the quality of products and services. Many people face difficulties when working with new technologies. If a person does not have the necessary qualifications, the quality and quantity of work cannot be improved, even if the organization has high-tech machines and equipment. Therefore, when determining the level of innovative development and the role of human resources in technological development, it is necessary to pay special attention to education, which is a powerful engine of economic growth that increases the efficiency and competitiveness of national economies. Thanks to the latest technology, people can work remotely or from home.

In general, the occurring changes will require countries to develop fundamentally new skills and competencies necessary to participate in the creation and dissemination of digital technologies.

2 Methodology

The problems of innovative development management in the conditions of digitalization are the object of interdisciplinary research and the intersection of scientific interests of economic, managerial, and social concepts and theories.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_54

The theoretical foundations of the development of digitalization are studied in the works of famous Russian scientists, including Bekizheva et al. (2021), Deulina et al. (2019), Fomina et al. (2022) and Zoidov et al. (2020).

The problems of assessing innovative development and innovation activity are analyzed in the studies of Balashova et al. (2020), Inshakov et al. (2009), Kharchenko et al. (2021) and Rudenko and Bessonova (2022).

The issues of the effectiveness of digitalization are presented in the works of Aseev et al. (2023), Astaduryan et al. (2018), Kolmykova et al. (2020), and Margolin and Vyakina (2022). According to the data of the short statistical collection "Digital Economy 2023," developed by the National Research University "HSE University," according to the data from the Federal State Statistics Service of the Russian Federation (Rosstat), 4848 billion rubles were spent on the development of digitalization in 2021 (Abdrakhmanova et al. 2023).

3 Results

Digital technologies are constantly evolving and improving. The idea of the digital economy includes the creation and use of various products and services based on digital technologies. This can cover a wide range from household services to serious business innovations (Shinkevich et al. 2023).

Figure 1 shows that household spending on digital products and services significantly exceeds the costs of organizations (Accounts Chamber of the Russian Federation 2022). This suggests that the population is striving to maximize the use of digital technologies.

The maximum share of costs was in 2020, with a value of 3.8%. The minimum was observed in 2017 and 2018, with a value of 3.6%.

Compared to 2017, the costs of developing the digital economy increased by 1.524 billion rubles in 2021.

During the reviewed period, there is a positive dynamic of changes in the structure of gross domestic expenditures on the development of the digital economy. The year 2020 has brought significant changes in this aspect. The main event of 2020 was restrictions related to COVID-19, which led to the transition to remote operation.

This led to a decrease in the share of organizations, including their volume in the costs of developing the digital economy, which decreased from 59.9% in 2019 to 4.2% in 2020. Simultaneously, the reduction was more than offset by an increase in the share of households in these costs, which increased by more than 4% (from 40.1 to 44.3%) (Abdrakhmanova et al. 2023).

Data analysis showed that organizations spent 2.3 trillion rubles on the digital economy in 2020, which is 2.1% of GDP. Digital costs decreased by 7.8% compared to the previous year.

In 2020, the population additionally spent their funds on goods and services related to digital technologies. In this regard, the total cost of using digital technologies and related products and services has increased significantly and reached the level of 1.8 trillion rubles.

The study of these data allows us to more accurately determine trends in the development of the digital economy in Russia and identify potential opportunities to strengthen

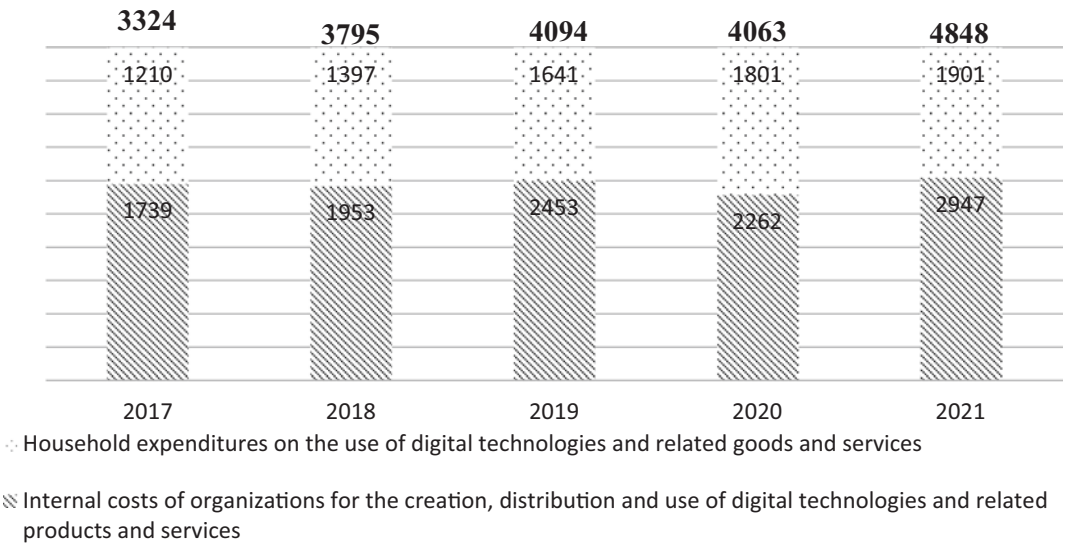

Fig. 1 Costs for the development of digitalization, billion rubles. *Source* Compiled by the author based on Accounts Chamber of the Russian Federation (2022)

its position in the world ranking. For an effective strategy, it is necessary to consider not only the costs of organizations but also the behavior and needs of the population in relation to digital technologies.

At the current stage, there is an increase in the volume of financing of digitalization in a number of areas of activity. This year, about 46% of organizations' digitalization costs are for equipment purchases, and about 20% of costs are for communication services and software. There is an increase in the costs of creating, distributing, and using digital technologies. Thus, the cost of purchasing production machines and equipment related to digital technologies has increased by 1.5 times. A similar increase is observed in the case of digital content (3 times) and staff training costs (4 times).

Organizations are increasingly resorting to the introduction of digital technologies in their activities, which, in turn, causes an increase in the costs of their creation, distribution, and use. In 2021, more than half (52.6%) of all expenses of companies fall into this category of expenses. Simultaneously, most funds are allocated to the field of computer science and communications (29.4%), the financial sector (12.9%), and professional, scientific, and technical activities (10.3%). The data are given in Table 1 and obtained as a result of research (Abdrakhmanova et al. 2023, p. 14).

The transformation of an innovative economy encompasses a wide range of elements and factors that interact with each other and ensure the effective functioning of markets and spheres of activity. An important element in this process is the creation of optimal conditions for interaction between the listed elements, as well as the development of technologies and platforms that can contribute to improving the innovation economy.

Let us consider the relationship between the technological development of countries and the available human resources on a national scale. Despite the common features, each country and each region develops individually, depending on climatic, political, economic, and other conditions.

To conduct further research, we will consider the level of innovative development and the quality of labor resources in the Central Federal District (Table 2).

These tables indicate a general decrease in labor resources in the Central Federal District over five years, despite the fact that from 2018 to 2021, the workforce decreased by 1.11%; this trend may further lead to a decrease in labor productivity and a slowdown in economic growth. The most significant decrease, more than 5% of the labor force, occurred in the Tver, Ryazan, and Smolensk Regions; a slight increase was observed in the Belgorod, Voronezh, and Moscow Regions. It is noteworthy that more than half of the labor resources are concentrated in Moscow and the Moscow Region. It should be noted that the COVID-19 pandemic has had an impact on the development of forms of work, such as remote or digital employment. About 40% of employed people work fully or partially remotely; the highest percentage of employment is observed in large cities.

If we compare these indicators with the output of innovative goods and services, we can note an approximate correspondence between the share of the labor force in the region and the volume of output of innovative goods and services. Consequently, the analysis proves the relationship between human resources and innovative development.

Table 1 The structure of organizations' costs for the creation and use of digital technologies by type of economic activity (%)

Type of activity	2019	2020	2021	Abs. deviation	
				2020–2019	2021–2020
Agriculture	0.6	0.4	0.4	− 0.2	0
Mining	1.1	1.4	1.9	0.3	0.5
Manufacturing industry	7.2	8.2	8.7	1	0.5
Energy supply	1.6	2.2	1.8	0.6	− 0.4
Hotels and catering	0	0.4	0.5	0.4	0.1
Information and communication	21.6	26.8	29.4	5.2	2.6
Information technology	0	7.4	12.7	7.4	5.3
Financial sector	15.5	13.2	12.9	− 2.3	− 0.3
Real estate transactions	2.4	2.4	2.7	0	0.3
Professional, scientific, and technical activities	19.7	9.1	10.3	− 10.6	1.2
Education	12	9.6	4.1	− 2.3	− 5.5
Health and social services	1.6	2.2	2.6	0.6	0.4
Culture and sports	0.6	0.7	2	0.1	1.3
State support	3.6	6.4	4.2	2.8	− 2.2

Source Compiled by the authors based on Abdrakhmanova et al. (2023, p. 14)

Table 2 The number of labor resources in the Central Federal District in 2018–2022

Regions	2018	2019	2020	2021	2022	Growth rate (%)
Central Federal District	21,390	21,336	21,332	21,294	21,152	98.89
Belgorod Region	825.3	826.7	833.9	829.4	825.7	100.01
Bryansk Region	610.7	595.4	583.7	589.1	581.1	95.10
Vladimir Region	722.5	721.5	710.6	707.2	715.2	98.97
Voronezh Region	1185.3	1182.4	1172.4	1183.1	1187.3	100.13
Ivanovo Region	525.3	516.9	514.2	527.1	516.9	98.57
Kaluga Region	550.5	537.5	539.5	544.0	537.5	97.68
Kostroma Region	317.9	309.9	309.8	308.5	307.2	96.54
Kursk Region	574.1	569.8	556.7	667.1	555.1	96.59
Lipetsk Region	602.0	595.8	596.4	599.0	598.2	99.02
Moscow Region	4150.7	4189.7	4153.9	4141.1	4161.1	100.02
Orel Region	369.9	347.3	350.1	350.4	344.9	92.96
Ryazan Region	529.7	535.8	517.1	521.1	525.8	99.53
Smolensk Region	510.3	482.7	477.1	481.0	482.2	94.33

Source Compiled by the authors based on Abdrakhmanova et al. (2023)

It was obvious to the country's leadership that e-commerce and the digital economy in Russia should receive financial and managerial support in the future. Conducting such research and stimulating innovation should become one of the government's priorities. This will help maintain competitiveness on the world stage and ensure stable economic growth in the country.

Participatory budgeting can improve the efficiency of public service delivery and strengthen compliance with tax laws. Openness of budget data is a fundamental policy reform for any anti-corruption efforts and open response, recovery, and renewal.

In the field of public administration, digital technologies (e.g., cloud services) are most widely used: 19.9% in 2020 and 21.2% in 2021. The most common types of cloud software among organizations are electronic document management systems, data storage services, mail, and accounting. It is also worth noting an increase of 2.1% (from 17.4 to 19.5%) in the use of technologies for collecting, processing, and analyzing big data.

Russia took 13th place in the rating of the International Budget Partnership (2021), which assesses the openness of the federal budgets of the countries. Experts from the field of public finance provide data on the transparency of the Russian budget system, comparing them with official legislative acts and positions of competent state bodies, and submit their reviews every two years.

According to experts, the openness of the Russian federal budget was 73 points out of 100 possible. This result differs only slightly from the previous review, where Russia scored 74 points. Nevertheless, the audit work was rated highly—89 points out of 100 possible.

The key blocks of each IBP review include the analysis of budget processes, the availability of information, and the participation of citizens in making decisions about budget expenditures. As a result, expert opinion is presented on the budget system of each country in the global context (Fig. 2).

The indicator of citizens' participation in budget formation evaluates formal opportunities for citizens' involvement in the budget process. This is the most difficult question to implement, which is rated low worldwide—the global average score is only 14 points. Simultaneously, Russia has increased the participation of citizens and received 28 points out of 100 in 2021 (22 points in 2019).

"The main advantages of the openness of the state are realized when all participants in the budget process and supervision use the available information to ensure accountability. In order for this to happen, civil society should be more involved in budget processes, have technical and strategic capabilities to influence budget decisions," IBP Executive Director Warren Krafcik writes in the report (International Budget Partnership 2021).

According to the IBP Open Budget Survey, the results of which have been published every two years since 2006, the level of budget control in Russia in 2021 decreased to 78 points compared to 85 points two years ago. Experts assessed the role of the Federal Assembly and the Accounts Chamber in the budget process. As a result, the work of the parliament was estimated at 72 points in 2021. In 2019, the score was 83 points.

A questionnaire of 145 questions filled out by an independent budget expert in each country was used to compile the report. The draft questionnaire is also reviewed by an anonymous independent expert in each country.

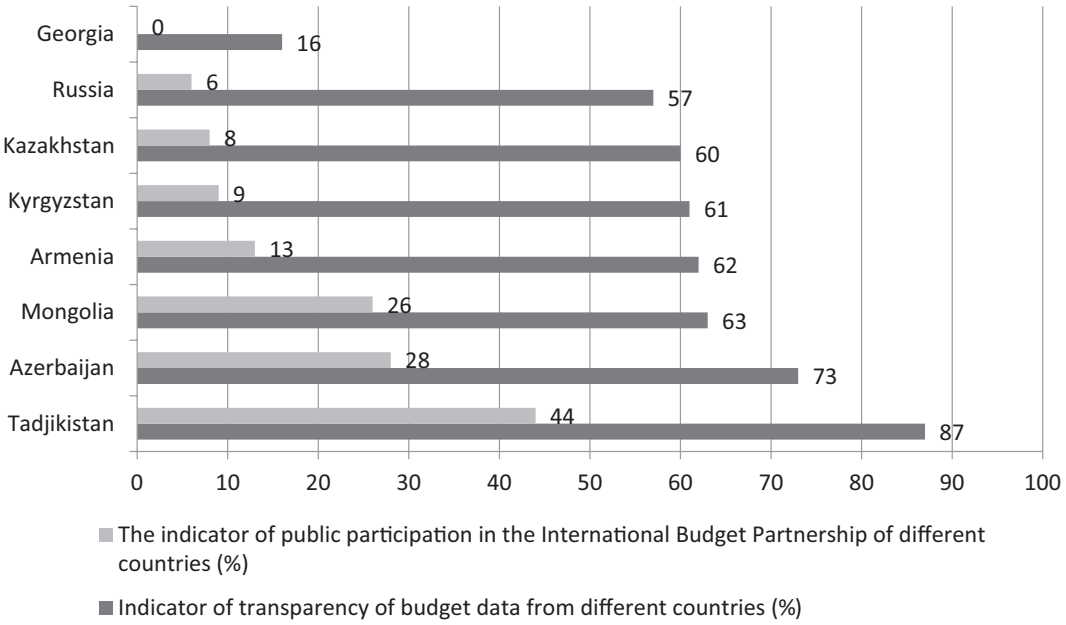

Fig. 2 Rating of Russia and other regions on the transparency of budget data in the International Budget Partnership in 2021 (points). *Source* Compiled by the author based on International Budget Partnership (2021)

4 Conclusion

A problem has also appeared—technological transformations will inevitably cause changes in society and the proportionality of the workforce in terms of competencies. The solution to such problems is also achieved through transformations in the education system:

- Creation of an interconnected set of definitions of new professions and a system of target competencies;
- Revision of the system of qualifications and professional standards;
- Establishing new educational standards within modernized educational programs;
- Integration of new teaching methods and technologies that contribute to the acquisition and development of transprofessional competencies (also called "soft skills");
- The introduction of digital technologies into the educational process is not only for practical convenience but also for forming a system of smart adaptive (inclusive, in other words) education.

The global dominance of the idea of "Industry 4.0" (Astaduryan et al. 2018) is already visible to the naked eye, as evidenced by the rapid development of neural networks—such as ChatGPT. Fundamental changes will be, in one way or another, connected with the explosive development and growing popularity of new technologies of a convergent type, which include robotization, autonomation of artificial intelligence, additive manufacturing, the Internet of Things, virtual markets, etc. (Margolin and Vyakina 2022). In any case, in such economic conditions, a person, as an economic resource, will have to adapt, changing their qualities as a labor force, considering the influence of the following factors (International Budget Partnership 2021):

- Production of a unit of value using much smaller amounts of labor than before;
- Growth of polarization processes in the labor market: employment in high-income professions requiring specific cognitive and creative skills will grow, and in low-income manual labor and average-income standard professions—will fall;
- The emergence of new categories of jobs and employment functions—the strengthening and development of the so-called "gig economy," in which the relationship between employer and employee is characterized by the immediate need of the employing company for the employee to use the mentioned specific skill as long as its application is relevant for companies.

Professions of the digital economic future will be associated with interactive cybernetic systems. The main task of a person within such a system will be to manage them. This is a key factor in the "resource intensity" of a person as an element of this system, namely, the extent to which his or

her professional skills will allow a person to cope with the ever-increasing degree of automation and cybernization of production and management systems. For this reason, the main direction of human resource development can be called continuous education as a method of constant professional self-improvement within the framework of self-improving economic and technological systems.

Acknowledgements The research was carried out as part of the implementation of the development program of the federal state budgetary educational institution of higher education "Southwest State University" of the project "Priority-2030."

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Cooperation in the Production of Ecological Agricultural (Organic) Products

Vener Z. Ilyasov, Svetlana U. Shagapova, Tatyana E. Rakhmatullina, and Mikhail A. Smirkin

Abstract

The authors consider the importance and demand for the production of organic products, which are beneficial and employ environmentally friendly production techniques. Examples of successful cooperatives are provided. The issues and prospects of cooperative activities in ecological agriculture are explored. The research aims to justify the need to establish cooperative agricultural associations in the Republic of Bashkortostan. The authors analyzed the structure of agricultural enterprises in the Russian Federation, with two-thirds of them being small. The Unified State Register of Organic Producers of the Russian Federation currently lists 165 organizations. Over the last three years, there has been an annual growth rate of 8–10% in producing such Russian products. The study examines the legal framework, the experience of other regions, particularly the creation of the "Export accelerator of the Central Union of Consumer Societies of the Russian Federation," established at the federal level to involve small and medium-sized businesses in export activities, especially those without access to foreign markets. The research results indicate the necessity of creating similar associations in the Republic of Bashkortostan.

Keywords

Organic products · Unified State Register of Organic Producers · Agricultural cooperative · Marketing cooperation · Export cooperative

JEL Classification

P13 · Q13 · Q15 · Q17 · Q18 · Q57 · Z33

1 Introduction

Nowadays, increasing attention is being given to environmental issues and a healthy lifestyle. One crucial component of creating an environmentally friendly space is producing and consuming natural, organic products.

As demand grows, large enterprises seek to occupy this niche, hindering the development of niche product manufacturers, who, despite lower competitiveness, ensure the preservation of natural resources.

According to the data from the Research Institute of Organic Farming (FiBL) and IFOAM—Organics International, the global retail market for organic products will grow by 4 billion euros by 2023, reaching nearly 125 billion euros (or $135 billion). An analysis of the organic product market development indicators showed that the highest growth rate was in 2018–2019, reaching 16% yearly. In 2023, this indicator stands at 3%; the decrease is likely associated with rising prices and reduced demand (Union of Organic Farming of Russia 2023).

The task of organic farming is to develop the agricultural sector, considering the natural characteristics of the territories, reducing negative environmental impact, preventing soil and water pollution by pesticides and fertilizers, preserving biodiversity, and meeting the needs of the current generation without compromising the needs of future generations.

As the most effective organizational and legal form, cooperatives unite more than 80% of agricultural product producers in most European countries and Japan.

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2 Methodology

The research focuses on producers of organic agricultural products in all regions of the Russian Federation. Statistical authorities responsible for publishing statistical data do not engage in compiling information on the production volumes of such products. The primary source of information is the Unified State Register of Organic Producers, published on the website of the Ministry of Agriculture of the Russian Federation.

The list of producers with a certificate of conformity for producing organic products was initially compiled based on an open dataset. The research examines international and Russian experiences in creating and operating cooperatives in producing organic products.

The fundamental research methods include dialectical, systemic, statistical, monographic, and logical approaches.

3 Results

The production of organic agricultural products is practiced in 179 countries worldwide, involving 2.4 million producers.

The development of the agricultural cooperative system is one of the directions for implementing the national project "Development of agriculture" and a state program of the Russian Federation called "Comprehensive development of rural territories." One of the crucial tasks outlined in these strategic documents is the modernization of procurement, agricultural supply and marketing, consumer, and credit cooperatives.

The analysis of the structure of agricultural enterprises in Russia has shown that two-thirds of the total number of enterprises are small, including micro-enterprises. However, this ratio varies across federal districts. In the Northwestern and Ural Federal Districts, there is currently the smallest number of enterprises in this industry.

In the Volga Federal District, 29.3% of enterprises are large and medium-sized. In the Central Federal District, 50.4% of organizations fall into this category.

Among the subjects of the Volga Federal District, the Republic of Bashkortostan has the highest number of agricultural organizations—880. Of these, 70% are small enterprises, including micro-enterprises. The lowest number of agricultural organizations is observed in the Republic of Mari El. The highest share of small enterprises, including micro-enterprises, is in the Ulyanovsk Region—84.8%.

The overwhelming majority of organic producers in Russia are certified.

Limited liability companies constitute the largest share of organic producers (60%). The number of cooperatives is currently not significant.

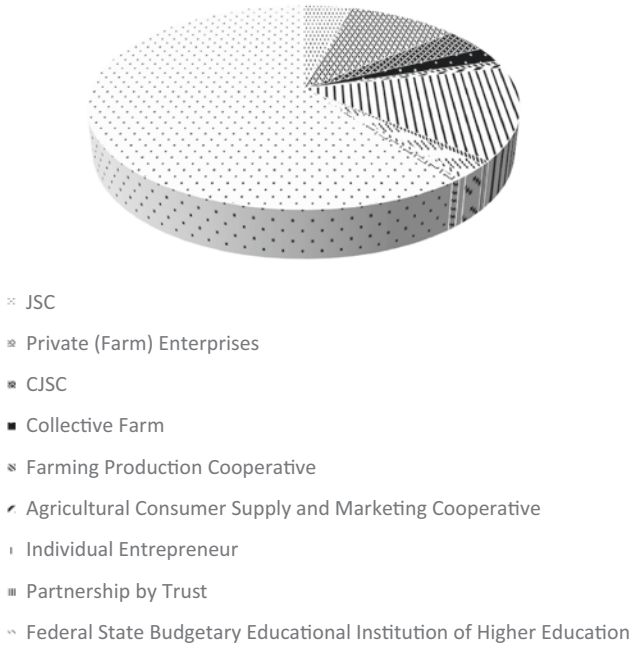

Fig. 1 Organizational and legal forms of organic producers. *Source* Compiled by the authors

Figure 1 shows the distribution of producers of these products in the Russian Federation according to organizational and legal forms.

Among the producers listed, 20 companies have certificates of compliance in Russian and foreign languages; 62 of the producers listed only possess certificates for imported products and can produce them in countries where they are recognized as organic. Fifty organizations have not yet obtained a certificate for the production of organic products but plan to do so in the future.

International experience indicates the willingness of product manufacturers to develop cooperation and integration. In 1978, a decision was made to create the International Organization for Organic Farming. In 1984, the Guidelines for Organic Farming were formulated as the fundamental principles of ecological farming.

The benefits of using and producing organic products include improving the quality of life, increasing life expectancy, and gaining additional income through higher prices, among other factors (Fig. 2).

Due to the urgent necessity for the long-term development of the industry, the Government of the Russian Federation developed and approved the "Strategy for the development of organic production in the territory of the Russian Federation until 2030" (July 4, 2023 No. 1788-r) (Government of the Russian Federation 2023).

The key strategic goals by 2030 include the following indicators:

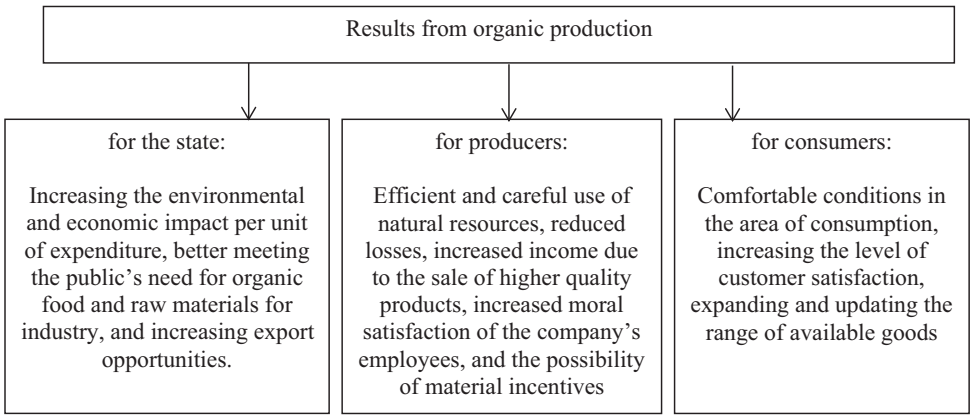

Fig. 2 Results of the development of organic production. *Source* Compiled by the authors

1. Increase in the volume of organic production for the domestic market from 9.1 billion rubles in 2021 to 114.5 billion rubles;
2. Ensure a 20.7% growth in the production of domestic organic products for the domestic market;
3. A sixfold increase in the consumption of organic products compared to 2021;
4. Growth in the volume of organic product exports by 7.5 times more than in 2021, etc. (Government of the Russian Federation 2023).

At least two-thirds of organic products in the Russian market are imported. However, over the past three years, the production rates of Russian products have shown a growing trend, approximately 8–10% annually.

The analysis of the structure of organic production in Russia revealed the following:

- 10.8% consists of canned products, juices, and processed products from cereals, legumes, vegetables, and fruits;
- 19.6% comprises cereals, flakes, and flour;
- 11.9% is related to baby food;
- 15.2% is dairy products;
- 14.1% is drinking milk;
- 10.8% is meat products;
- 6.5% is alcoholic products;
- 6.5% is vegetables and fruits;
- 4.6% comprises other food products.

The role of cooperatives in such production lies in uniting labor, material, and financial resources; the ability to flexibly respond to changing demand; the possibility of planning income and accurate sales deadlines, etc.

A successful example of an agricultural cooperative is "EcoNiva," a group of companies operating in the agricultural production sector and one of the largest milk producers in Russia. The consolidation of small family farms under a single cooperative brand allows them to benefit from the marketing services of the cooperative.

Russian producers face challenges similar to those of their foreign counterparts: the absence of organic infrastructure and logistics, the need for certification, etc. Consultative support from the government and credit cooperatives in many countries has significantly influenced the development of the considered sector abroad.

A second, no less critical issue is the development of socially oriented marketing in regions overall and at individual enterprises. It includes the formation of programs for the careful use of natural resources, the fight against counterfeit and low-quality products, the development of unified ecological requirements for products to counteract greenwashing, and the imposition of legal responsibility for inaccurate or distorted environmental information about products or companies.

Considering that organic production is associated with increased costs, producers are interested in ensuring a guaranteed sales system. The cost of agriculture will increase due to the purchase of seeds from certified seed organizations, biological protection means, organic fertilizers, increased manual labor, and marketing expenses. Simultaneously, selling prices increase to compensate for the rising costs.

Analyzing the experience of other countries, it is noteworthy that, in implementing support measures from the government, additional expenses for environmental protection and soil fertility restoration should be considered.

Thus, the regulation of the environmental sector in public relations should be reflected in the development of imperative rules and responsibility for their violation regarding the unethical exploitation of the environment in commerce (Vytopil 2019).

By purchasing a non-ecological product and overpaying for it, a buyer supports an unscrupulous producer.

The Federal law "On organic production" outlines requirements for such products, imposing a ban on the use of packaging and containers leading to pollution, as well as on the mixing of organic and non-organic products (Russian Federation 2018).

In the region, amendments to the law "On the development of agriculture" have come into force, providing state support to producers of environmentally friendly products: preferential loans and subsidizing the purchase of equipment and increasing soil fertility.

The development of this direction will help create a regional brand based on the high quality of the produced goods and promote local products to external markets.

To attract small and medium-sized businesses to export activities, the "Export accelerator of the Central Union of the Russian Federation" has been created at the federal level—a special program of the Russian Export Center.

The program consists of five stages (Table 1).

In the Republic of Bashkortostan, 382 agricultural consumer cooperatives have been established, including 103 processing cooperatives, 83 supply and marketing cooperatives, 14 service cooperatives, 11 credit cooperatives, and one horticultural cooperative. The primary type of activity for 170 cooperatives is mixed agriculture.

A significant challenge for most agricultural cooperatives is the marketing and promotion of their high-quality products. In the Republic of Bashkortostan, the Organic Farming Union has been established to provide advisory support to producers.

Establishing a marketing cooperative is considered appropriate to facilitate the promotion of organic farm products. Global experience indicates that the development of marketing cooperation in developed countries is based on utilizing the competitive environment and creating cooperatives that unite producers with economic goals to access various services.

In Russia, such cooperatives are often established after transforming organizational and legal forms based on privatized service and processing enterprises in the agro-industrial complex.

To enhance the operations of agricultural organizations, considering a marketing cooperative as a tool for sales policy at the regional level makes sense. This project will assist local producers in product certification, reduce the role of intermediaries in food distribution, and contribute to improving the overall certification process for agricultural products in the region.

4 Conclusion

Thus, cooperation in producing organic agricultural products is a crucial factor in developing this industry. The collaboration of farmers and producers makes it possible to achieve better production results, reduce environmental impact, and meet the growing demand for organic products. The utilization of innovative approaches contributes to more efficient resource utilization and attracts investments. The development and support of cooperation are key tasks to ensure the sustainability and prosperity of ecological agriculture.

Table 1 The main stages of the export accelerator

Program stages	Content of the program stages
1. Determining market prospects	1. Market information analysis 2. Market research for advertising development 3. Selection of the intended product and market for distribution
2. Preparing for export	1. Preparation for exporting products 2. Attraction of specialists engaged in foreign economic activity 3. Attraction of specialists proficient in foreign languages 4. Examination of regulatory conditions in the importing country 5. Confirmation of product quality 6. Customs control 7. Transportation logistics 8. Protection of copyright 9. Document translation 10. Website localization 11. Compilation of a commercial proposal
3. Finding a buyer	1. Participation in exhibitions and business missions 2. Promotion on foreign trade platforms
4. Conclusion of an export contract	1. Drafting an export contract 2. Signing the export contract
5. Financial support for exports	1. Providing credit guarantees 2. Obtaining insurance policies for export operations 3. Monitoring currency transactions 4. VAT refund

Source Compiled by the authors based on Russian Export Center (n.d.)

Examining the experiences of other regions in Russia regarding establishing export cooperatives underscores the necessity of considering similar associations in the Republic of Bashkortostan.

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Effective Management of Material Flows of an Industrial Enterprise in a New Economic Reality

Igor E. Mizikovsky, Victor A. Matveev, Victoria A. Polyanskaya, Elena A. Chelnokova, and Lyubov Yu. Shobonova

Abstract

At the present stage, the issue of effective and rational management of material flows of industrial enterprises is particularly relevant due to the new economic reality that has been envisaged in recent years. In this case, material flows act as a systemic process of the influence of various mechanisms on individual supply chains in logistics. This aspect is of particular importance every year. Therefore, many scientific works are devoted to this topic. Solving this problem requires significant updating and inclusion of a set of tools into the complex fabric of the information and tool space, including those used to keep the information base of the normalized material costs in a current state. During the research, the authors theoretically substantiated and practically argued proposals for changing the form of presentation of information on standardized costs aimed at improving the quality of professional awareness of management decision-makers. During the research, the authors used observation, systematization, formalization, decomposition, and aggregation of data.

Keywords

Costs · Material resources · Rationing · Specific standards · Consolidated standards · Calculation and analytical model of rationing · Empirical model of rationing

JEL Classification

R11 · R12 · R58 · Q13 · Q18

1 Introduction

Various factors that have a special impact on the processes occurring in the activities of industrial enterprises actualize the need for a total upgrade of existing business management methods, especially in terms of the rational distribution of available resources. This issue is particularly relevant from year to year. Effective and high-quality enterprise management is of particular importance in the conditions of global instability.

The analysis of management systems for the use of material resources in the operating cycle of a number of business entities in the manufacturing sector located in the city of Kstovo and in the Kstovo municipal district of the Novgorod Region allowed the authors to identify a common problem for these organizations—the absence as such or the presence of a poor-quality base of standardized material costs (BSMC). In the context of rapidly changing factors influencing the IIS (information and instrumental space), complete or partial "loss" from the information field of the decision maker (DM) of reliable and economically justified planning and standardization indicators, one way or another, makes it impossible to ensure the effectiveness of budgeting processes (budget planning) (Alpeeva and Volkova 2019; Bezmaternyh et al. 2021), strategies for reducing costs and eliminating production losses (Ilyina and Gorshenin 2021; Kuznetsov et al. 2021; Matveev 2021a), maintaining standard cost accounting and calculating product costs (Kuznetsov et al. 2021; Matveev 2021a), internal control (Rodionov et al. 2021), logistics (Smirnova and Kochnova 2019), etc.

According to the authors, the most sensitive consequence of this managerial dysfunction is a noticeable

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_56

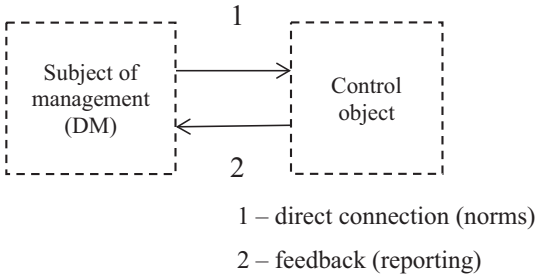

Fig. 1 Direct and feedback types of communication between the subject and the control object in the material flow management system of an industrial enterprise. *Source* Developed and compiled by the authors

decrease in relevant objects. From a cybernetic point of view, material consumption standards are tools for institutionalizing direct communication between subject and object in the material resource management system. Information about their implementation is feedback (Fig. 1).

Apparently, the violation of such connections minimizes the effectiveness of the DM. An analysis of research materials conducted at the mentioned enterprises showed that there has been a noticeable increase in the frequency of necessary adjustments to the base of standardized material costs (BSMC). Thus, starting from the spring period of the last and current years, in the organizations under study, on average, 10–15% of the items of resources used in production were replaced with other items; planned and calculated (standardized) prices and consumption parameters in physical terms have changed in more than 30% of IIS. Unfortunately, it is not always possible for almost all enterprises to synchronize these changes and update the BSMC. There is often an unjustified degree of aggregation of the norms presented in the considered information array and the lack of established (in some cases, "working") updating regulations (update schedules). The latter leads to ambiguity in management's understanding of some key terms. The content of the BSMC is evaluative, determined not by strict calculations but by the subjective professional judgments of the organization's employees. The features of structuring the information and instrumental space for rationing material resources involved in the operating cycle lead to an increase in the quality of the BMSK while the following series of tasks are solved, namely the search for the most optimal techniques and methods for updating and checking the contents of the register of information in question.

2 Methodology

The authors' complex analysis of the considered problems showed that the genesis of BSMC is realized based on two (as a rule) alternative models—calculation-analytical or empirical (Firfarov 2023). The key source of application of the first model is design and technological documentation (DTD) (Hodoskina et al. 2019; Polyanskaya et al. 2022) approved for a certain calendar period and making it possible to develop specific consumption rates for a specific resource for the manufacture of a product (performing work or providing a production service). As practice shows, norms of this type make it possible to detail the content of the BSMC significantly. Apparently, this significantly expands the space of the information and instrumental field when making management decisions related to the distribution of material flows, which certainly increases the theoretical knowledge of the decision-maker in this study. It should be emphasized that the formation of special standards provides a sufficient complication of the standardization stage, reveals a high degree of consistency in integrating different types of work, and increases the labor intensity of production and controls. Simultaneously, there has traditionally been a lack of special capacities and competent specialists in this matter.

Research has an empirical model of the genesis of BSMC that does not, as a rule, require the involvement of significant management resources and is based, for the most part, on approximate calculations and value judgments of specialists. The output information from the application of this model is consolidated standards reflecting the expenditure of material resources. Analysis of the research materials showed that almost all of the studied enterprises where BSMC is carried out operate with this type of norms.

In general, the rate of material costs N of material m spent on the production of product i is calculated by the following formula:

$$\mathrm{Nmi} = \mathrm{PR_{mi}} + \mathrm{TO_{mi}} + \mathrm{P_{mi}} \quad (1)$$

where:

$\mathrm{PR_{mi}}$ useful material consumption;

$\mathrm{TO_{mi}}$ technological waste caused by the established production technology;

$\mathrm{P_{mi}}$ loss of materials.

The first indicator presented in the form denotes the quantitative volume of the resource that was directly introduced into the final product (work or service). Technological waste also characterizes the consumption of a resource but is not embodied in a product and must be returned for processing or external sales. Material losses are an illustrative example of the loss and damage of material during loading or unloading, a shift from a defined list of standardization and specific conditions.

"The costs of raw materials and individual materials directly related to technical defects, or individual test work on samples, repairs of structures or individual equipment,

individual tools and mechanization elements, breakdown of instruments," by analogy, are not regulated (Kuznetsov et al. 2021; Polozhentseva and Klevtsova 2021). Such standards are traditionally evaluated by individual specialists, most often economic services, using visual controlling. According to the author, this approach to verification work does not provide the proper level of quality control of the information fund.

One of the scientific works (Matveev 2022; Smirnova and Kochnova 2019) says that it is necessary to make changes to the DTD "related to changes in standards and technical specifications for materials and products," which, in turn, catalyzes the update of the BSMC. The carrier of information about changes in the composition of standardized costs is the corresponding document established by the above State General Union Standard (SGUS).

At the studied enterprises, there is no approved form of document reflecting adjustments to the planned and calculated (normative) prices of materials, the source of which is the price tag nomenclature or other accounting register, which reflects the accounting prices in force at the enterprise.

The main elements of theoretical research applicable in the work are observation, systematization, formalization, decomposition, and aggregation of data.

3 Results

According to the authors, one of the most fundamental tools for creating systemic conditions for the effective updating of BSMC is the use of a calculation and analytical, as noted above, is specified standards. The results of the SWOT analysis of the incorporation of this model into the complex fabric of the information and instrumental space for managing material flows are presented in Table 1.

Updating the BSMC must be carried out in strict accordance with the regulations approved at the enterprise, which provide for the synchronization of the implementation of this procedure with the receipt of information about changes in DTD or accounting prices (Matveev 2021b). According to the authors, the set of the used verification tools should be significantly expanded and include an interconnected set of methods of system analysis, counter checks, arithmetic-logical and visual types of control, format checking, data update dates, etc. The last of these methods can be carried out by comparing the update dates of the DTD and accounting price registers with the update dates of the prices contained in the BSMC.

When considering material costs, which make up the bulk of production costs, using standards for management purposes, it is necessary to take into account the entire system of continuously changing real factors of production, fluctuations in production volumes and structure, market conditions, and pricing conditions for consumables (Fig. 2).

From a scientific point of view, a detailed analysis of deviations of the planned levels of indicators of the total consumption of material resources *M* in value terms in the context of specific types of products from the actual levels at the enterprise for various factors is fundamentally important.

The corresponding system of indicators includes the following:

- Parameter of the necessary expenditure of material resources in the production of a certain type of product, reflecting the rate of useful consumption of material resources, the rate of technological waste of material mt_i, and loss of materials *mxi*;
- Indicator of the price of a material resource *pi* in the production of the *ith* type of product;
- Indicators of volume *qi* and production structure.

The normalization factor characterizes the deviation from the planned norms of material consumption. The structural factor characterizes deviations in the production program of the enterprise and the production structure from the planned levels in the context of specific types of products. The price factor characterizes the deviation of actual prices from the planned dynamics.

To quantify the influence of relevant factors on the dynamics of the total consumption of material resources, the following index multiplicative model can be used:

$$\mathrm{IM} = \mathrm{I_q I_m I_p} \tag{2}$$

Table 1 Evaluation of the analysis of the improved model of material consumption standards

Conditions	Beneficial effect	Not a favorable effect
Internal	*Predominance*: creation of a maximally complete information base of expended costs	*"Neutralization" of factors*: complexity of the computational mechanism
External	*Wide range of new opportunities*: maximizing internal corporate communications in the management system	*Inhibiting factors*: lack of management resources

Source Developed by the authors

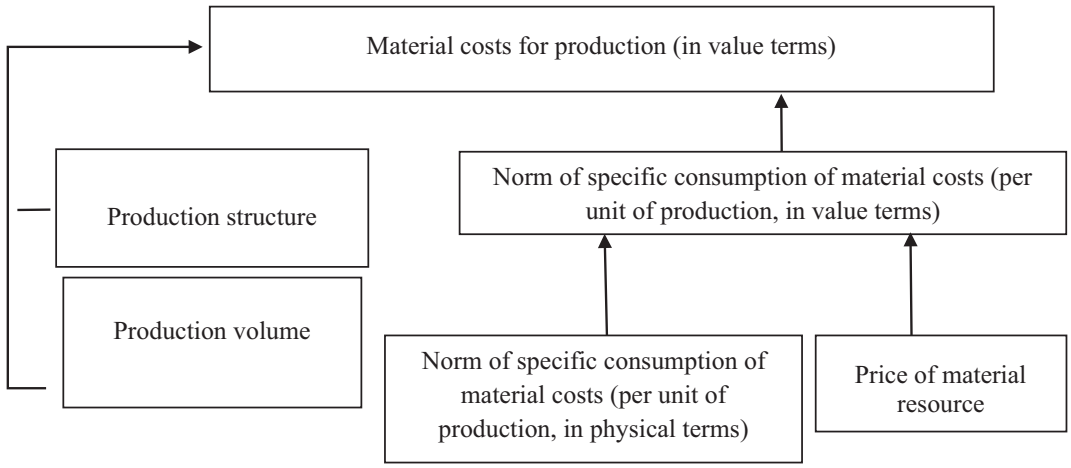

Fig. 2 The relationship between natural and cost indicators of standardization of material costs in the system of indicators of economic performance. *Source* Developed and compiled by the authors

where:

I_q general index of the physical volume of production;

I_m general index of specific consumption of material resources;

I_p general index of prices of material resources.

An in-depth quantitative analysis of factors must be carried out even if, in relative terms, the magnitude of the deviations is insignificant because the amount of overexpenditure or savings of material resources can be significant in absolute terms. For management purposes, it is important to have objective information about the degree and direction (positive or negative) of the influence of these factors on work performance because the multidirectional action of individual factors in the overall dynamics may often not manifest itself in any way.

The corresponding additive model of the deviation of the total consumption of material resources in absolute terms has the following form:

$$\Delta M = Mf - Mp = \Delta Mmp + \Delta Mmt + \Delta Mmx + \Delta Mp + \Delta Mq \quad (3)$$

where:

Mf actual level of total consumption of material resources;

Mp planned level of total consumption of material resources.

To quantify the influence of relevant factors, the authors propose to use Table 2.

4 Discussion

Effective management of material flows is a particularly important factor for the final performance of an industrial enterprise because it makes it possible to carry out the process of optimizing the use of various resources while reducing costs and increasing some efficiency of production and logistics processes of an industrial enterprise. Traditionally, the key aspects in this issue are planning and forecasting, procurement and supply, inventory and warehouse management, logistics and transportation, and automation of business processes. The listed elements of effective management of material flows require more detailed analysis, planning, and control.

5 Conclusion

According to the authors, effective updating of the BSMC should have the following systemic properties:

- Continuity, independence, and impartiality of execution;
- Systematic coverage of information space objects;
- Consistency with the processes of generating information relevant to management processes;
- Professionnal competence.

Table 2 Quantitative assessment of the influence of the parameters under consideration

Factors	Characteristic	Measurement
Useful material consumption rate	Deviation of the actual level from the planned norms of useful consumption of materials	$\Delta Mmp = qn \times pn \times (mpf - mpn)$
Technological waste standard	Deviation of the actual level from the planned rate of technological waste materials	$\Delta Mmt = qn \times pn \times (mtf - mtn)$
Material loss rate	Deviation of the actual level from the planned rate of material loss	$\Delta Mmx = qn \times pn \times (mxf - mxn)$
Price factor	Deviation of the actual price level of the material from the planned level	$\Delta Mp = qn \times (pf - pn) \times mf$
Volume-structural factor	Deviation of the actual production volume and structure from the planned level in general and in terms of output of specific types of products	$\Delta Mp = (qf - qn) \times pf \times mf$

Source Developed and compiled by the authors

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Prerequisites for the Formation of Digital Agro-ecosystems for Scientific Support and Commercialization of Innovations in the Agro-industrial Complex

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Abstract

The research aims to analyze and evaluate scientific support and innovation activity in the agro-industrial complex (AIC) of Russia, identify trends and patterns of innovation processes, and design the architecture of a digital agro-ecosystem. The research presents the prerequisites for forming a digital agro-ecosystem of scientific support and commercialization of innovations, reduced to the growing need to improve the efficiency of agriculture and the quality of products. The authors developed the methodological basis for building an integrated agro-ecosystem and substantiated the synergy of interaction between the state, universities, academic institutions, and agribusiness, considering the need for innovation in the context of industries and regions. The authors constructed a model of investment contribution to the gross value added of agriculture in 2021, which shows a direct dependence and substantiates the need to improve scientific support and commercialization of innovations in the AIC. The paper identifies innovative development trends and presents methodological aspects of forming an integrated and balanced agro-ecosystem, including principles, indicators, and methods for assessing the effectiveness of functioning. The presented methodology focuses on harmonizing all institutional groups of innovative development in the region—their resources, interests, and the results of activity in temporal and spatial aspects. The practical significance of this research lies in the possibility of using a set of target metrics to assess the effectiveness of the innovation potential of the regional AIC and develop targeted mechanisms of scientific and technological development.

Keywords

Agro-industrial complex · Competitiveness · Production growth · Innovative development · Agro-ecosystem · Scientific support · Institutional interaction · Congruence · Evaluation indicators · Efficiency · Digitalization of agro-industrial complex

JEL Classification

O30 · O40 · Q16 · R12 · Y1

1 Introduction

The relevance of this research is due to the need to improve the competitiveness of agriculture and ensure the food security of Russia in the context of unprecedented sanctions policy. Increasing the volume of food for the Russian market and export is inextricably linked to the need for a comprehensive large-scale system of support for promising research and development, including for critical products in the agro-industrial complex (AIC). The construction of this system is based on the congruence of interests of agricultural business, science, and the state, considering the diagnosis of the need of regions and industries in targeted innovations, financial and informational support, the improvement of the quality level of links between

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the subjects of the innovation process, and the balance of resources, knowledge, information, competencies, and technologies.

One of the prerequisites for forming a digital agro-ecosystem is the growing need to increase agriculture's efficiency, improve product quality, and provide the country's population with food and possible access to export markets. Advanced digital technologies (e.g., the Internet of Things (IoT), artificial intelligence (AI), big data analytics, and others) can help address these challenges.

In this regard, the main objective of this research is to develop the concept of a digital platform for agriculture capable of optimizing the processes in the AIC and ensuring effective communication between the industry's stakeholders. To achieve the research goal, it is necessary to solve the following interrelated tasks:

- To analyze the current state of agriculture and identify the main constraints;
- To study existing digital solutions in the AIC and identify their advantages and disadvantages;
- To develop the principles of functioning of the digital platform for agriculture, considering the requirements of all interested stakeholders;
- To justify indicators for assessing the economic efficiency and feasibility of implementing a digital platform in the AIC;
- To create regulations to improve agricultural information support through a digital platform.

The effective use of the digital platform for agriculture will optimize processes in agribusiness, improve the quality of communication between stakeholders, and improve the industry's information support to increase the efficiency and productivity of production, reduce costs, and mitigate environmental impact.

The main catalysts are technological advances, population growth, increased demand for food, the need for more efficient use of resources, and climate change.

Consequently, there is an improved quality and quantity of agricultural products, reduced costs, increased income for agricultural producers, and reduced environmental impact.

Opportunities include the implementation of new technologies, the use of advanced information systems, machine learning, sensors and devices of the IoT, and the development of specialized software.

Threats include the high cost of implementing new technologies, the shortage of skilled digital professionals, and the risk of data loss and privacy breaches.

Constraints include limited access to high-speed internet networks, weak government support, and insufficient investment to develop digital infrastructure in rural areas.

2 Materials and Methods

The assessment of scientific support and innovation activity in the AIC of Russia shows that there has recently been an increase in the number of innovative projects and investments in them. However, Russia's innovation level is still not high enough compared to developed countries.

It is also necessary to note the need to develop a digital agro-ecosystem to involve a wide audience of agricultural market participants, such as farmers, producers, suppliers, consumers, and others.

Various countries have laws and programs to support the digital transformation of agriculture (e.g., the Digital Farming Initiative in Germany and the Precision Agriculture Action Plan in the USA). In Russia, the Program for the Development of the Agro-industrial Complex of Russia until 2030 and the Digital Economy project serve as a legislative basis.

In recent years, many innovative technological solutions have been created in developed countries to help agricultural producers improve their business efficiency and increase crop yields.

One of the main areas of digital transformation of agriculture is the use of sensors and sensing. They can communicate information on soil moisture, temperature, light, and other parameters to help reduce technology management costs and increase yields.

Another important trend is the automation of processes through software and robotization. A berry-picking robot has been developed in the US that can handle up to 25 bushes in an hour. Autonomous seeding and harvesting equipment is actively used in some countries.

China has developed an artificial intelligence system that allows farmers to determine the optimal time for planting, watering, and harvesting. The gross value added to the industry increased by 3.1% due to the implementation of this system.

In Japan, farmers use vertical farms, allowing them to use less land and water and yield 100 times higher than conventional fields.

Such directions as precision farming and smart farming are actively developing in Europe. Various tools, such as drones, satellites, GPS, and digital mapping systems, are used to collect and analyze data.

Blockchain has been increasingly applied in agriculture in recent years. It can be used to improve transportation and marketing of products, reduce production costs, and attract investment.

The digital platform can significantly improve production efficiency, ensure rational distribution of state support funds, improve information support of the industry, and reduce damage from unfavorable climatic conditions.

The transformation of agriculture is certainly related to the development of scientific and technological progress and has a direct and strong connection with the innovation component of the improvement processes (FAO 2022).

In this regard, the ubiquitous penetration and spread of agricultural information support and the need to change approaches to assessing the capacity and qualitative composition of the AIC labor market is an important factor in the formation of a digital ecosystem and adaptive transition to Agriculture 4.0 in the world (Korshunov et al. 2021; Yakimova et al. 2023).

Innovative development of the economy, particularly agriculture, has a non-systemic character, depending on the convergence of the results of scientific and technological progress and the possibility of their application in the industry.

Many authors, such as Elmiger et al. (2023) and Wolfert et al. (2023), conclude that digital transformation has fundamentally relied on the support and automation of lower-level processes, further with the application of management information systems for integrated support of farmers in farm management. It is also necessary to note the increase in IT integration from standalone autonomous applications to a complex integrated system. Simultaneously, there is an expansion of the list of subjects and stakeholders of the process, with the increasing popularity of outsourcing specialized services. Digital transformation is a complex socio-technical change in key business processes that affects products, business results, and the enterprise architecture and management paradigm.

The evolution of IT infrastructure has now reached a level that includes complex systems integration and business ecosystems that involve multiple stakeholders in different roles. The transition to a new concept and a new paradigm of digital transformation capable of solving the tasks and meeting the new challenges of today's agriculture is becoming increasingly demanded.

Digitalization is widespread and is transforming agriculture. It is important to consider the implications of cumulative innovation processes to mitigate risks and capitalize on opportunities. Digitalization of agriculture includes the development, implementation, and integration of digital technologies in agriculture. It is the basis for transitioning to "Agriculture 4.0" (Fielke et al. 2019).

The smart farming approach means that farm management tasks and higher-level interactions in the supply chain are based on collected data, augmented by context and situational awareness, and triggered by real-time events on a single digital platform. In terms of increasing productivity and environmental burden through rationalization of resource use and high energy intensity has the potential to lead to negative consequences (Eastwood et al. 2019; FAO 2020).

3 Results

The digital platform of Russian agriculture is a comprehensive solution aimed at increasing the productivity of agricultural enterprises, improving the quality of products, and optimizing the use of resources. It brings together research institutes, public authorities, agricultural producers, suppliers, and buyers. The main characteristics of this digital platform are as follows:

- Integration of information technologies and related data to ensure a unified information space and process automation;
- Consolidation and analysis of data on production, market, consumers, and competitors, making it possible to forecast the market situation and manage agricultural production efficiently;
- Development and introduction of new technologies, tools, and methods of agricultural production management;
- Creating a single digital marketplace for agricultural products where suppliers and buyers can interact with each other more effectively;
- Improving the quality of education and training of agricultural workers.

Foreign experience shows that the successful implementation of digital platforms in agriculture can increase labor productivity by 20–30% and reduce resource consumption and production costs (Zavivaev 2022). This will improve the economic efficiency of agricultural production, increase its competitiveness in the world market, and ensure the country's food security.

According to Table 1, the use of personal computers by organizations in the aggregate for all types of economic

Table 1 Dynamics of use of information and communication technologies in organizations by type of economic activity: agriculture, forestry, hunting, and fishing and fish farming (%)

Indicators	2017	2018	2019	2020	2021	Deviation, +, −
Personal computers	92.1	94.0	93.5	80.7	81.8	− 10.3
Servers	50.6	53.4	53.8	46.4	42.2	− 8.4
Local area networks	61.1	63.9	63.5	54.7	54.9	− 6.2
Organizations that had a website	20.1	20.0	25.1	20.9	25.3	5.2

Source Compiled by the authors based on Abdrakhmanova et al. (2023)

activity in Russia averages 81.8%, which is completely identical to the agricultural sector. The leading subjects are the Belgorod Region (96%), the Lipetsk Region (91.4%), and the Stavropol Territory (90.7%).

Particular attention should be paid to the value of the indicator of organizations that have a website. In 2021, this figure in the agricultural sector amounted to 25.3%, which is 5.2% higher than in 2017 and almost two times lower than the national average (46.2%). This lag is caused by the specifics of agricultural activities, where the promotion of goods and search for customers and markets is not a target business function. The cost structure of digital transformation and increasing enterprise architecture maturity includes the following:

- 74.7%—Internal costs associated with the acquisition of machinery and equipment related to digital technologies;
- 37.1%—Maintenance, modernization, and current and capital repairs of machinery and equipment performed in-house;
- 18.1%—Software acquisition, software adaptation, and modification performed in-house;
- 31.1%—Other internal costs for introducing and using digital technologies.

It should be noted that the share of employee training costs related to introducing and using digital technologies is only 0.6%. There is a predominance of demand over supply in terms of IT consulting services in the AIC and growth prospects for this market. The share of employees of organizations (of the total number of employees of organizations) using the Internet in the Russian Federation is 38%, which corresponds to the 31st place in the rating of the statistical collection "Indicators of the Digital Economy 2022" developed by the National Research University Higher School of Economics (Abdrakhmanova et al. 2023). For comparison, this indicator in Iceland reaches 100%. Only 9% of employees in the Russian Federation have mobile access to the Internet provided by the employer, which is the lowest indicator among all countries.

It is possible to categorize regions and develop targeted mechanisms to stimulate innovation activity in the AIC in the conditions of digital transformation by assessing the following indicators:

1. Production intensity characterizes the production volume per unit area or number of animals. A high level of intensity indicates the use of advanced technologies and high productivity.
2. The innovative development index determines the degree of the use of innovative technologies in agriculture in the region. The higher the value of the index, the more developed the innovation sector in the region.
3. The share of the introduction of advanced technologies in agriculture reflects the percentage of the use of advanced technologies in the production process in the region. The higher the value, the more effectively new technologies are used in economic activity.
4. The size of agricultural enterprises determines the scale of production, efficiency, and competition in the market. Larger businesses can utilize more advanced technology and have higher productivity levels.
5. The share of investment in agriculture for innovation development shows the volume of investment in agricultural innovation. High investments make it possible to introduce new technologies and improve production efficiency.
6. The staffing level in agriculture reflects the level of professional training of personnel and their availability in agriculture. A high staffing level makes it possible to use new technologies and increase productivity efficiently.
7. The level of research and development in agriculture determines the degree of development of the scientific base for the agricultural sector. A high level of research and development makes it possible to create new technologies and improve production efficiency.

Figure 1 shows the evolution of the contribution of investment to gross value added of agriculture in 2021. The calculations show that the share of gross value added per 1

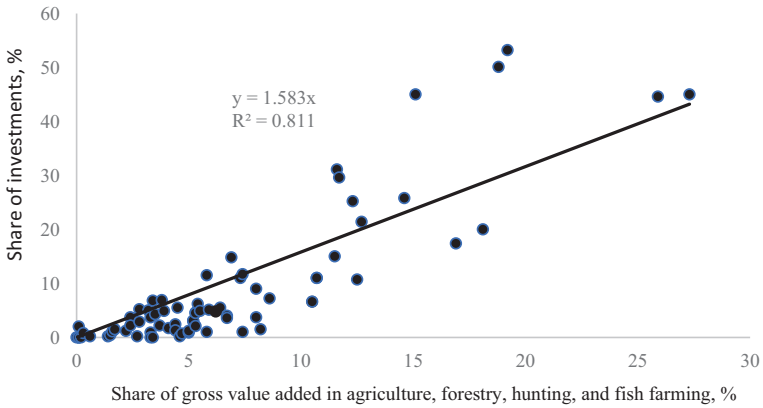

Fig. 1 Dynamics of investment to gross value added of agriculture in 2021. *Source* Compiled by the authors based on Abdrakhmanova et al. (2023)

employed person in the sector of agriculture, forestry, hunting, and fishing in the context of the subjects of the Russian Federation has a direct relationship with the share of investment in the industry with a coefficient of determination of 71.9%, which determines the need to improve the scientific support and commercialization of innovation in the AIC.

In the conditions of digital transformation, targeted mechanisms to stimulate innovation activity should be focused on the use of advanced technologies and their integration into production processes. Specific mechanisms may include support for innovative startups, establishment of innovation development centers, staff training, etc. (Fomin 2019; Goldina and Iovlev 2020; Platonova 2019; Sibiryayev et al. 2020).

The development of targeted mechanisms to stimulate innovation activity should consider the specifics of each region. For example, it may be more effective to provide grants for research projects in regions with a high level of industry development and little innovation. In regions with qualified personnel, the creation of competence centers for the digitalization of the AIC may be useful.

Thus, the development of targeted mechanisms to stimulate innovation activity in the AIC in the conditions of digital transformation should be based on the typology of regions, which makes it possible to consider the peculiarities of each region and adapt incentive mechanisms.

The digitalization of agriculture is an increasingly sought-after and relevant topic for developing and improving processes in the agricultural sector. There are many successful practices and projects around the world that can serve as an example for other countries and regions. Below are some of them:

1. In 2018, the Australian Government launched the AgriTech for Small Farms program, which provides funding for the adaptation and adoption of digital technology on small and medium-sized farms. One of the successful projects in this area is Aglive, which has developed an innovative platform for livestock monitoring and on-farm production management.
2. The agricultural sector in the USA is actively adopting digital technologies, such as autonomous vehicles and drones for cultivating crops, analyzing soil, and collecting vegetation data. Large agri-tech companies (e.g., Monsanto and Syngenta) are developing innovative technologies and programs to improve crop yields and control pests.
3. To improve the efficiency of agricultural production, China is actively adopting smart technologies such as autonomous tractors, drones, and robotic systems for land cultivation and crop cultivation. Large companies (e.g., Alibaba and JD.com) are also developing digital platforms to sell agricultural products and manage farm processes.
4. Germany has successfully implemented digital livestock monitoring systems to track animal health and behavior, manage production, and reduce livestock costs. These systems are used on farms of all sizes, from large commercial farms to small family farms.
5. Japanese farmers are successfully adopting vertical cropping in closed systems that are digitally controlled to increase yields and conserve water. This technology also allows crops to be grown all year round and protects against adverse weather conditions.

In general, the digitalization of agriculture is becoming an integral part of agricultural development worldwide. It makes it possible to increase production efficiency, reduce costs, and improve product quality.

The architecture of the digital platform for agriculture is a comprehensive solution that combines digital technologies and processes aimed at the digital transformation of processes in the AIC. It includes several modules that ensure sustainable development of rural areas, increase the quality of life, and improve the environmental situation in agriculture.

The digital platform for agriculture aims to increase information transparency and responsiveness of interaction between farmers and the government, as well as with other market players such as producers, suppliers, consumers, etc.

Digital platform departments for agriculture may include the following functional blocks:

1. Data monitoring and analysis in agriculture. This module includes observation systems that allow farmers to monitor the quality of crop and livestock production, meteorological conditions, soil cover, and other factors affecting agricultural productivity.
2. Production and resource management. The module ensures efficient use of resources, reduces production costs, and increases the level of automation and robotization in agriculture.
3. Financial module. It solves the issues of financial support for agricultural production, carries out rational distribution of state support funds, and provides access to financial services and investment opportunities.
4. Marketing and sales. The module ensures the effectiveness of marketing communications and pricing of agricultural products.
5. IT infrastructure. The module supports the technical infrastructure of the digital platform on agriculture. It includes integration, software development and testing, database management, and communication systems.

The process of creating a digital platform involves attracting financial allocations and comprehensive expertise and scientific research to justify the need and basic functionality

of the system. The normative and legal basis is the Decree of the President of the Russian Federation "On the national development goals of the Russian Federation until 2030" (July 21, 2020 No. 474), the Federal law "On the development of agriculture" (December 29, 2006 No. 264-FZ) (as amended December 30, 2021), and the Order of the Ministry of Agriculture of the Russian Federation "On the concept of development of agricultural science and scientific support of the agro-industrial complex of Russia until 2025" (June 25, 2007 No. 342). Stakeholders (represented by specialized ministries and agencies), the scientific community, suppliers, and manufacturers act as a mechanism for the realization of this project. The target function is a functioning mature ecosystem and an accumulated knowledge base used for continuous system improvement. Figure 2 shows a decomposition diagram of the digital ecosystem process.

The decomposition of the process involves the identification of six consecutive steps, including the following:

1. Formalization of requirements and creation of technical specifications. It is important to have full and comprehensive expertise and assessment of requirements to the designed system by means of strategic mapping and interviewing potential stakeholders. Designing an ecosystem architecture involves modeling a comprehensive system model and aligning the requirements with developer requests.
2. Development of a prototype of the system to test and identify shortcomings.
3. Testing involves passing the automatic testing system and evaluating the functionality and usability of the user interface. If errors are detected, a test report is prepared with their full characterization and subsequent correction.
4. Implementation is envisaged in test mode and debugging of the system functioning process with gradual expansion of the system functionality.
5. The process of utilizing the system, evaluating and improving functionality, and providing technical support.

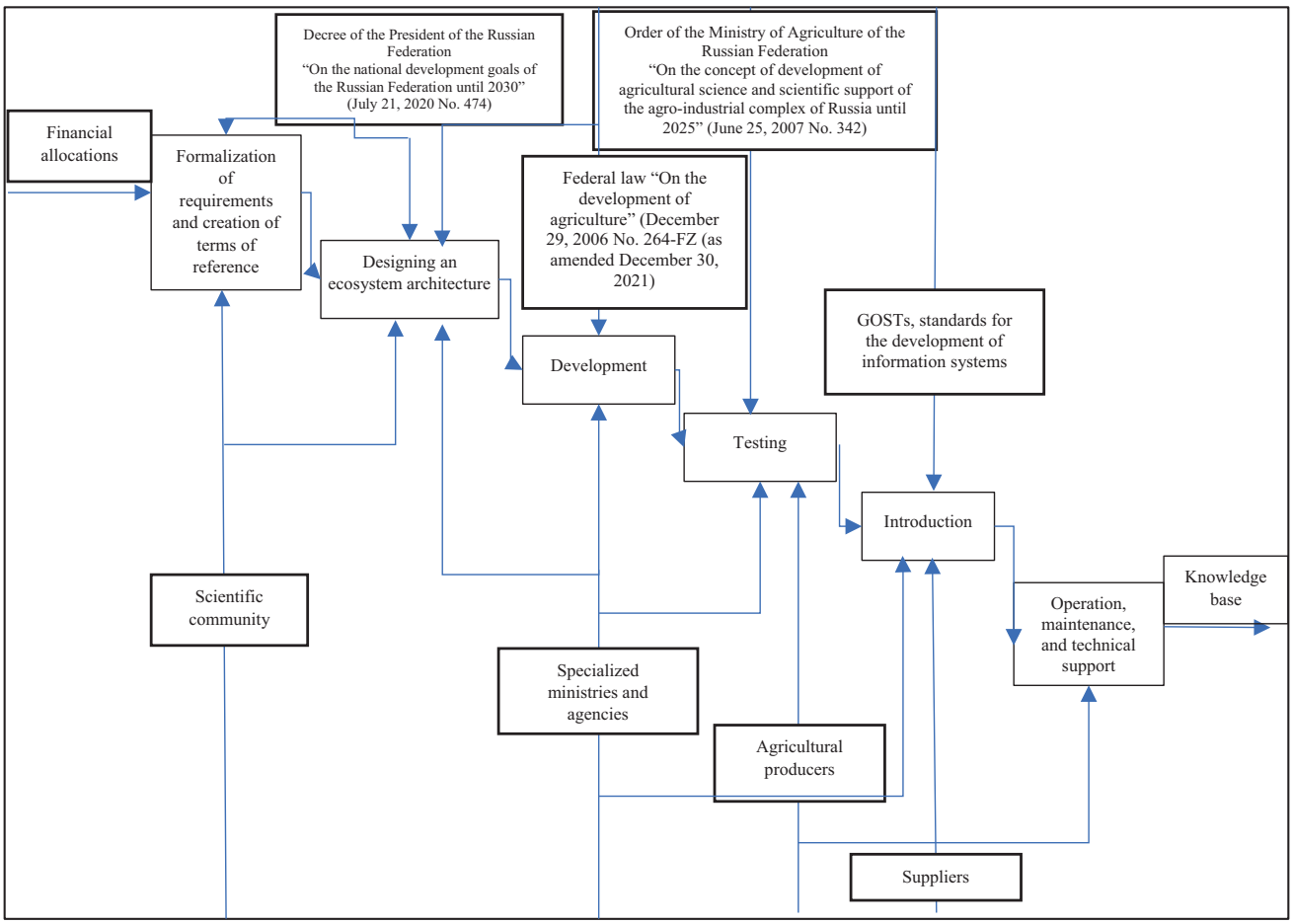

Fig. 2 Decomposition diagram of the process of creating a digital ecosystem of scientific support and commercialization of innovations. *Source* Compiled by the authors

The digital platform for agriculture is an innovative IT solution powered by the latest information technology that can eliminate many problems in agriculture.

It moves data from the physical environment to a digital platform, where it is analyzed based on AI. The platform provides data-driven solutions to improve production efficiency. It integrates multiple electronic systems into a single digital environment, enabling communication between all stakeholders.

The architecture of the digital platform includes the following components:

1. The production management system manages production processes and makes decisions based on data analysis.
2. The data monitoring and analysis system collects and analyzes data generated by IoT devices, stacking technologies, and control systems.
3. The cloud-based solution provides data warehouse and data-driven solutions, making the platform accessible to any internet-enabled device.
4. IoT devices and communication protocols provide increased system connectivity and information on the performance of individual agricultural devices.
5. Mobile applications provide access to the platform from any mobile device, monitor the progress of cultivation, and provide recommendations for adjusting agricultural technologies (Abdel-Basset et al. 2020; Chutcheva et al. 2021; Frey and Osborne 2017; Kuznetsova et al. 2019; Lazko et al. 2018; Panteleeva 2021).

4 Conclusion

The intensification of integrative institutional interaction between the subjects of the innovation process and the growth of the innovation activity of agribusiness are closely related. Innovation activity is an important factor in agribusiness development because this direction of entrepreneurial activity is associated with risk and requires the use of new technologies and methods.

Integrative institutional interaction of subjects of the innovation process makes it possible to increase the efficiency of implementing new technologies and methods in agribusiness. The joint work of various actors in the innovation environment, from research institutes to manufacturing enterprises, ensures the acceleration of the process of development and implementation of innovations. Additionally, each participant contributes and benefits in a collaborative innovation project, encouraging more active participation in the innovation process.

In turn, the growth of innovation activity of agribusiness contributes to the development of integrative institutional interaction of subjects of the innovation process. Successful implementation of innovative projects in agribusiness attracts new participants who are ready to contribute to the project's development. Additionally, the project's success can be an example for other participants in the innovation process, encouraging them to become more involved. Thus, the intensification of integrative institutional interaction between the subjects of the innovation process and the growth of innovation activity of agribusiness are closely interrelated and important for developing an innovation environment in agriculture.

The practical significance of this research lies in the possibility of using a set of developed target metrics to assess the effectiveness of the innovation potential of the AIC and the development of targeted mechanisms of scientific and technological development.

Acknowledgements The reported study was funded by the Russian Science Foundation, project No. 23-28-01785 "Modeling the growth of food production, taking into account the improvement of scientific support for economic entities of the agro-industrial complex."

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Digital Technologies in State and Regional Governance: The Case of Russia

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Abstract

The system of public governance in the face of new challenges of the external environment should become more adaptive to the occurring changes. This research aims to investigate the features of the use of digital technologies within the system of state and regional management in the interaction of authorities and consumers of digital services and develop proposals to reduce barriers to the long-term development of the GovTech sector. The authors identified the vector of digital transformation of the state and regional governance system, revealed the advantages of using GovTech technologies to meet changing consumer demand, and highlighted existing problems and limitations. The authors proposed indicators to assess the level of organization of digital interaction within the public administration system in Russia. They also identified the features of the use of GovTech during the provision of public services to consumers. The research analyzed the target audience receiving public services in digital form and identified the possibilities of optimizing the interaction of consumers and producers of digital public services. The authors identified the directions for further development of the digital system of state and regional governance in Russia through improving internal interaction and consumer participation in the creation and use of services.

Keywords

Digital technologies · Public administration · Regional administration · Public services · Digital platforms · Uncertainty · Digital public services · GovTech

JEL Classification

O33 · O38 · R58

1 Introduction

Like all other areas of human activity, the system of state and regional governance is being transformed in a dynamically changing world. Intensive digitalization and new challenges of the external environment (e.g., pandemic, increasing geopolitical tensions, and economic turbulence) force government authorities at all levels to adapt to changes in consumer demands, improve methods of providing services, interacting with consumers, expand the range of services, and increase the efficiency of their provision (Gukasyan et al. 2022; Karpunina et al. 2023a, b).

Focusing on consumers and their needs becomes fundamental when creating products and providing services. The users are also changing. For example, consumer preferences changed during the COVID-19 pandemic: problems of health, personal development, family, and home values came to the fore. This trend is reflected in the consumption of goods and services. It becomes important for the consumer to receive a public service, "sitting on the couch," safely for health, promptly, and as efficiently as possible.

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Therefore, the tasks of public administration bodies are the digitalization of state and regional services using artificial intelligence technologies, ensuring data security and convenience of applications and services, creating a complex of integrated services, and promptly bringing them to the relevant department.

The fact of providing services in a digital format requires the state and regional management system to automate the collection, storage, and transmission of information. That is, the task of using digital technologies in the provision of public services is becoming more ambitious and involves a "seamless" data exchange between different ministries and departments.

Specialists with skills in the field of digital literacy and programming of digital systems can ensure the work of public administration bodies in new digital areas of activity. Therefore, another basic task is to increase the digital literacy of civil employees and IT specialists.

Increasing the openness of data and information circulating in public administration bodies creates prerequisites for greater vulnerability of all participants in electronic interaction. Therefore, the next urgent task facing public administration bodies is the maintenance of the information security of subjects.

Thus, the research interest should focus on solving the complex problem of introducing GovTech technologies in the management system of the state and regions for transforming public services, improving the lives of citizens and optimizing the safe interaction of all subjects.

2 Materials and Methods

As a global trend in the development of the economy, its sectors, and areas of activity, as well as individual businesses and individuals, digitalization is the focus of the attention of various research groups (Karpunin et al. 2022a; Okunkova et al. 2023; Podorova-Anikina et al. 2022). Particularly, Karpunina et al. (2023a) assess Russia's digital lag in the global context and suggest ways to reduce it. The study of digitalization issues at the regional level is reflected in the works of Alyokhina et al. (2022), Fomenko et al. (2023), Karpunin et al. (2022b), Moskovtceva et al. (2022), and Plyusnina (2023).

Researchers do not forget about the threats of digitalization for all business entities and emphasize the need for diagnosis and risk assessment (Karpunina et al. 2021; Khashir et al. 2023; Lyapuntsova et al. 2018).

The works of Garkavtseva and Shakhvorostov (2019), Kaisarova (2021), Kipervar et al. (2020), Moskovtseva (2022), and Sidorenko et al. (2019), are committed to the research of digital technologies in the public administration system.

This research aims to investigate the features of the use of digital technologies within the system of state and regional management in the interaction of authorities and consumers of digital services and develop proposals to reduce barriers to the long-term development of the GovTech sector.

The research objectives are as follows:

- To establish contemporary trends of digitalization that determine the vector of digital transformation of the state and regional governance system;
- To reveal the advantages of using GovTech technologies to meet changing consumer demand;
- To identify the limitations in the system of state and regional management in Russia that hinder the introduction of digital technologies;
- To determine the vector of further digitalization of the system of state and regional management in Russia.

The research methods include analysis of literary sources, systematization, economic analysis, tabular method, and systemic approach.

3 Results

To establish contemporary trends of digitalization that determine the vector of digital transformation of the state and regional governance system, the authors will analyze the following blocks.

The first block is the organization of digital interaction within the public governance system and the use of GovTech in the provision of public services to consumers. In this aspect, it is necessary to assess the access to the Internet by public authorities, analyze the technologies used by GovTech in the process of interaction between departments and services to provide public services to the public and business, and determine the skills of civil employees in the use of digital technologies (Fig. 1).

Access to the Internet is becoming a basic condition for communication within the public administration system and with external users. From 2013 to 2019, there was an increase in the share of public authorities that used the Internet in their activities, amounting to 1.8%. In 2020, a new methodology for calculating indicators began to be applied with the allocation of access to fixed and mobile Internet. In 2020–2021, the share of public authorities using fixed (wired and wireless) Internet began to increase (+ 1.0%) against the background of a reduction in the use of mobile Internet (− 1.5%) (Federal State Statistics Service of the Russian Federation (Rosstat) 2023). The share of public authorities using the Internet with a data transfer rate of at least 2 Mb/s has also increased. This indicates an

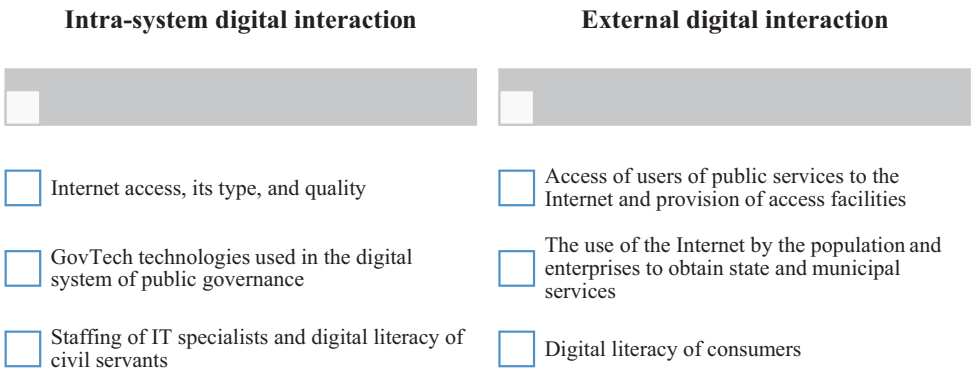

Fig. 1 Parameters for assessing digital transformation of the state and regional governance system. *Source* Compiled by the authors

improvement in the digital infrastructure of the country's regions during the COVID-19 pandemic, when there was a raised demand for online public services.

Another aspect of the use of GovTech technologies in the interaction within the system of state and regional administration is the assessment of the volume and quality of document flow. The digital public administration system includes a single portal reflecting unified data to be used in the public sector, the whole set of interdepartmental services, public exchange infrastructure, analytics, and a privacy system (Sidorenko et al. 2019).

The applied GovTech technologies contribute to the optimization of the activities of civil employees and accelerate the interaction between structural units. The basis of the electronic system of state and regional management are artificial and emotional intelligence, human–machine interaction, open-source software, everything-as-a-service, hybrid and multi-cloud infrastructure, blockchain, and open API (Moscow Innovation Agency 2021).

Public authorities actively used electronic document management systems; an increase in the use of 6.7% was observed in 2013–2019. The same trend is typical for the systems used for automatic data exchange (an increase of 2.4 times over the period) (Federal State Statistics Service of the Russian Federation (Rosstat) 2023). However, in 2020–2021, these types of information systems became less frequently used by state and regional governments. This is probably due not to a reduction in consumer demand but to the creation of a centralized information system of public administration in the country with more pronounced information security parameters (SecurityLab 2016). Steps in this direction are also being strengthened thanks to the development of the Runet, the creation of a Unified data Transmission network, the transformation of the State Unified Cloud Platform (Tadviser 2023), and the appearance of a protected segment of the Internet "Closed data transmission segment" with a security stamp (Piskunov 2016). In 2017–2022, the share of Russian software used in the public administration system increased by 45%.

Thus, the development of the digital public administration system is carried out in accordance with the principle of "seamless" data exchange within the system and the integration of integrated platform solutions to improve the quality of service (Moscow Innovation Agency 2021).

Their goal is to provide digital services and training of management personnel engaged in the provision of public services (Garkavtseva and Shakhvorostov 2019). From January 1, 2021, emphasis is being placed on increasing the number of state (municipal) employees and employees of institutions who have been trained to develop their digital competencies (D-Russia 2020). In addition, IT staffing is becoming increasingly relevant to meet GovTech development needs (Borshchevsky and Kalmykov 2017).

Second, we will analyze the target audience, that is, the population receiving public services in digital form and using them for life support processes. In this aspect, indicators are of interest that assess the population's access to the Internet, its use to receive digital public services, and the availability of appropriate digital skills among consumers (Table 1).

By 2022, more than 100 million Russian citizens were registered on the Unified Portal of Public Services. This was facilitated by the growth of the subscribers of fixed broadband Internet access by 43.6% and the growth of the subscribers of mobile broadband access by 79.8% in 2013–2021. This positive trend indicates the formation of basic conditions for the population to actively use digital public services.

Over the period from 2013 to 2021, the share of the population using the Internet to receive state and municipal services has increased 6.4 times. The most active in this context was the population aged 25–34 years (81%), women (76%), and people with higher education (81%) (Analytical Center "NAFI" 2023).

Users make a choice in favor of digital public services due to the absence of the need for face-to-face presence, high speed of receiving services, ease of using services through the application, accessibility of services to a wide

Table 1 Some characteristics of the target audience of GovTech technology users

Indicator	2013	2014	2015	2016	2017	2018	2019	2020	2021
The number of subscribers of fixed broadband Internet access per 100 people of the population	16.5	17.0	18.3	18.6	21.0	21.7	22.2	23.0	23.7
The number of subscribers of mobile broadband Internet access per 100 people of the population	59.8	64.5	68.1	71.1	79.9	86.2	96.4	99.6	107.5
The share of the population who used the Internet to receive state and municipal services in the total population (%)	10.7	10.6	18.4	28.8	42.3	54.5	56.5	58.7	68.1
The share of the population who used the Internet to receive state and municipal services in the total population who received state and municipal services (%)	30.8	35.2	39.6	51.3	64.3	74.8	77.6	81.1	85.1

Source Compiled by the authors based on Federal State Statistics Service of the Russian Federation (Rosstat) (2023)

audience, the possibility of consulting support on all emerging issues, reduced financial costs for users, and reduced corruption.

The COVID-19 pandemic has become a turning point for most users of public services. During this period, measures introduced by the state, such as restrictions on movement and self-isolation regimes, proved the absolute advantage of using the Internet to obtain public digital services in Russia and in other countries (Karpunina et al. 2022).

In 2023, the most popular services obtained through digital public services in Russia were social: health services (57%); services related to taxes and fees (55%); social security services (43%); housing and communal services (43%); and passport registration and the place of residence (35%) (Analytical Center "NAFI" 2023).

Despite the rapid development of GovTech, the level of digital competencies of the population remains insufficiently high, which limits the opportunities for the fullest possible use of the advantages of the technologies being implemented (Analytical Center "NAFI" 2023). This creates prerequisites for developing cybercrime related to the theft of personal data, money and moral damage by fraudsters: 65% of all cyber-attacks in 2020 against organizations are aimed at obtaining data, 37%—financial benefits, and 11%—hacktivism. Particularly, medical institutions ranked first in the number of cyberattacks in 2020, which led to failures in the operation of medical systems and refusals to provide emergency care to patients. In 2021–2022, as the volume of online services provided increased, the number of cyber-attacks on Russia's critical infrastructure continued to grow (2.5 times) (Tarabukina 2022).

The digital interaction of public administration bodies with organizations continues to increase. For example, the number of organizations that use the Internet to receive certain types of public services increased by 1.2% from 2020 to 2021 (Federal State Statistics Service of the Russian Federation (Rosstat) 2023).

Further digitalization of the system of state and regional management in Russia should be based on the principles of adaptive interaction between consumers and producers of public services. Digitalization should be carried out in the following two key areas:

1. Improving the activities of the system of state and regional management:
   - Regular analysis of consumer needs and adaptive design of services with the help of GovTech, considering the ongoing changes;
   - Flexible integration of GovTech technologies into the system of interdepartmental interaction to ensure seamless data exchange and rapid development and testing of prototypes when launching new services;
   - Creation of a digital training system for civil servants and a personnel reserve of IT specialists, organization of targeted training of specialists in the country's universities; formation of special data management units within the public administration system;
   - Development of mobility of civil servants through their participation in internship programs and exchange of experience, professionally oriented events, and trainings on project management;
   - Creation of tangible and intangible incentives for developing the digital creativity of civil servants;
   - Implementation of an integrated approach to ensuring the safe management of big data, the organization of their collection, processing, and storage, and the implementation of a set of cybersecurity measures;
   - Increasing the transparency of the implemented policy measures of state and regional administration, considering the opinion of consumers of services, and regularly informing them about planned innovations;
   - Digitization of all aspects of the activities of public authorities at all levels and the development of a unified system of state digital management.

2. In terms of improving consumer participation in the process of creating and using services:
   - Implementation of programs to improve the population's digital literacy at the federal, regional, and municipal levels;
   - Development of digital infrastructure to ensure greater public access to the Internet;
   - Creation of digital platforms for organizing public opinion research and regular user surveys by specialists of scientific and educational organizations, strengthening the predictive function of public policy, and providing a forecast of problems and needs before they arise;
   - Receiving feedback and suggestions from the business sector on various issues of territory development.

4 Conclusions

The research proposes parameters for assessing the digital transformation of the state and regional governance system. The authors identified the features of using GovTech to provide public services to consumers in Russia. The research analyzed the target audience of consumers of public digital services. The authors defined the possibilities of optimizing the interaction of consumers and producers of digital public services. The authors conclude that adaptability should become the main principle of functioning of the system of state and regional management in the conditions of changes, which implies operational improvement of methods of providing services and technologies for their implementation in accordance with changing consumer demands and improving technical solutions. In this regard, the directions of further development of the digital system of state and regional management in Russia are reduced to improving internal interaction to increase its readiness for technological changes and optimize consumer participation in the process of creating and using digital services.

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Mechanized Tobacco Post-harvest Processing Complex for Leaf Curing Using Solar Energy

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Abstract

In the Kyrgyz Republic, a labor-intensive manual method of harvesting and stringing tobacco leaves on cords is mainly used for sun-curing of tobacco leaves, which depends on weather conditions. Uncontrolled drying of the blade of the tobacco leaf and color fixation, due to the indefinite period of sun-curing, do not ensure that the tobacco withering process is carried out in optimal modes. Economically unprofitable in the conditions of the Kyrgyz Republic is the method of artificial drying—fire-curing and drying in a dense mass, where labor costs reach from 347 to 653 man-hours per ton, and the specific fuel consumption is 1.014–2.0 t.o.e.(Smailov 2003). Taking into account the above, as well as the natural and climatic conditions of Kyrgyzstan, where during the drying period of 1, 2, 3, 4 and the 5th tobacco leaf breakage (June–September), the average daily air temperature ranges between 20 and 26 °C, and the maximum temperarure varies from 28 to 38 °C, it is quite possible to carry out the processes of withering and sun-curing of leaf blade of the marked braekages in natural conditions without the use of artificial heat. And complete curing of midrib must be carried out in the drying chamber using the heat of solar energy. Therefore, the most rational way of drying tobacco in the climatic conditions of Central Asia and Kyrgyzstan is natural (solar) and combined using mechanized production lines with 100% use of heat from solar energy. The combined method contributes to the mechanization of all types of technological operations performed during the post-harvest processing of tobacco. The article presents a general scheme of a mechanized production line for post-harvest processing of tobacco, a kinematic scheme of individual lines and sections, the sequence of the technological process of tobacco curing.

Keywords

Tobacco leaves · Sun-curing on tiers · Production line · Withering · Sun-curing of leaf blade · Complete curing of midrib · Solar heaters · Fermentation · Humidification

JEL Classification

Q16

1 Introduction

Tobacco is produced in 97 countries of the world (Smailov 2003). In the Kyrgyz Republic, 94% of tobacco produced is exported. At the same time, in tobacco-growing areas, the income received from tobacco reaches up to 74%, which is about 37–40% of income from crop production (Smailov 2007). Despite this, the level of mechanization of tobacco production processes in Kyrgyzstan and the CIS countries remains still low and is only 20–25% (Vinevsky 2008).

The varietal composition and agricultural techniques for tobacco cultivation depend on the geographical area. The peculiarities of the climate, soils and terrain of a certain area determine the quality of tobacco. Tobacco raw

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materials from these areas are used as an additive in the manufacture of cigarettes, and giving an aromatic natural taste and smell.

To obtain high-quality tobacco raw materials, post-harvest processing of tobacco leaves plays an important role, which makes up a complex sequential chain of changes in their internal composition. It should be noted that the quality of post-harvest processing of tobacco depends entirely on the agrotechnical methods of tobacco cultivation and compliance with the technological modes of the drying process inherent in this region. The tobacco leaf should receive proper development and mature. Harvesting mature leaves and drying them are the most important labor-intensive operations in tobacco farming. In Kyrgyzstan, where small-leaved varieties of tobacco are cultivated and these operations account for 65–70% in the structure of labor costs (Smailov 2000). Tobacco cultivation, therefore, is a complex goal, where the drying process is the main and responsible one.

In the Kyrgyz Republic, a labor-intensive manual method of harvesting and stringing tobacco leaves on cords is mainly used for sun-curing of tobacco leaves on tiers and depends on weather conditions. The uncontrolled processes of sun-curing of blades of tobacco leaves and color fixation, due to the indefinite period of sun-curing, do not ensure that the withering process is carried out in optimal modes (Smailov et al. 2022a, b). Also, tabacco scrap formation, accompanied by large losses of raw materials, is the main disadvantage of this method.

The purpose of the study is to create a complex for drying tobacco, with 100% use of solar energy for drying tobacco leaves.

Research objectives:

- selection and justification of rational methods of drying tobacco leaves in Kyrgyzstan;
- experimental research of the technology of mechanized production lines for post-harvest processing of tobacco.

2 Methodology

Modern tobacco farming needs effective methods of drying tobacco leaves where regimes and technology are strictly observed. An example is artificial drying.

There is a well-known technological line for drying tobacco, where artificial drying is used. When it is implemented, stringing leaves on cords is excluded, which increases the loading capacity of the drying chamber (Smailov 2007).

A mechanized complex for drying tobacco in a dense mass is known MKSTPM-150, where needle cassettes forming a drying chamber and automatic temperature control devices with controlled air flow are used instead of frames (Stashkov 1982).

The technological process of drying tobacco in a dense mass in a known complex is carried out as follows: freshly harvested tobacco is delivered from the field in containers, then it is strung on needle cassettes. Up to 1400 leaves are placed on one cassette, while the weight of the leaves reaches 40 kg. Cassettes are filled with tobacco of the same grade, breakage and degree of maturity. At the same time, the unevenness in the density of the tobacco mass placed on one cassette should not exceed 5%, and the unevenness of the tobacco mass in the cassettes should not exceed 10%. The cassettes filled with tobacco are placed on storage racks, where they are kept for 10–12 h, after which they are loaded into the chamber. The chamber is purged with outside air for 5–6 h, and then warmed up for 2–4 h at a temperature of 41–420 °C and a humidity of 40–50%.

General disadvantages of artificial tobacco drying: there are deferts of the fermentation process of leaves in cassettes, which reduces the yield of 1 and 2 sorts of tobacco by 35–37%; high fuel consumption (1 kg/1 kg of dry tobacco) and electricity (1800 kWh/t).

Tobacco drying in a dense mass (artificial drying) is widely used in the USA (Skiba 1983) in Moldova (Zagornyan et al. 1987) and in Bulgaria (Cherakchiev and Papazov 1984), according to the system called "Bulk-Curing" or Maxi Viser—150 of the company "Powell" (Skiba 1983). The main advantages of this system: it eliminates the stringing of leaves on cords, increases the capacity of the drying chamber, low fuel and electricity consumption. In Uzbekistan, air-curing is recommended. With such method, the commercial quality of tobacco (grades 1 and 2) reaches 89% (Umurzakov and Petri 1987).

There is also a system for drying tobacco leaves in the natural and climatic conditions of Kyrgyzstan (USSR Patent No. 1200887, Bulletin No. 48 of 12/30/85, Leonov I. P., Momunov A. M., Smailov E. A., etc.). The disadvantage of this installation is that during the entire process, festoons of dried tobacco cords are hung on carts, where they are located tightly at the same distance from each other. This does not make it possible to accelerate the drying of the leaf blade in the natural drying zone and as a result, tobacco leaves enter the drying chamber with a significant moisture content. This increases the drying time of the midrib, reduces the quality of raw materials and increases energy consumption.

A brief analysis shows that the process of drying leaves occupies a special place in the complex of measures. Rational use of external weather conditions and knowledge of the biology and physiology of tobacco can control the processes of drying tobacco leaves using various methods and various technical means.

3 Results

In order to choose a rational method of artificial drying of tobacco leaves, in the scientific and production agricultural cooperative "Tameki" has tested the drying system "Bulk-Curing".

The tests were carried out on tobacco varieties Dubek 44-07, Talgarsky 25 and Virginia of the third, fourth and fifth tobacco leaf breakages. The typical drying mode developed for the Virginia variety has been tested.

This drying mode for the Talgarsky 25 and Virginia varieties have shown positive results, where the output of sorts 1 and 2 amounted to 94–97%. Large-leaved varieties have been dried. Curing tobacco in bulk (in cassettes) has not led to a deterioration in the quality of raw materials, the process of fixing and drying tobacco leaves is accelerated, when using forced ventilation, the withering process is completed with yellowing of the base mass by 90%.

When testing the specified typical drying mode for tobacco of the Dubek 44-07 variety, negative results have been obtained. The output of grades 1 and 2 has not exceeded 67%, there has been defects of fermentation of leaves in cassettes, which have led to a doubling of fuel consumption.

It should be noted that drying tobacco in a dense mass requires strict compliance with technological regimes, the presence of measuring instruments and a qualified employee. The optimal feature of the method of drying tobacco in a dense mass is that it is possible to dry the midribs of tobacco leaves at a humidity of 70–80%. At the same time, the external commodity advantages of raw materials are improved, the color of the blade is leveled or (light greens disappear) and the resistance of tobacco against mold is increased.

Labor costs and specific fuel consumption for various drying methods are shown in Table 1.

The analysis of Table 1 shows that with artificial drying, namely, when drying tobacco in a dense mass, the labor costs are less—347 man-hours per 1 ton of tobacco raw materials. However, the specific fuel consumption in this drying method is the largest—up to 1.014 t.o.e., that is, 2 times more if compared with the combined drying method. The method of artificial drying—fire-curing and drying in a dense mass—is economically unprofitable in the conditions of the Kyrgyz Republic, where labor costs reach from 347 to 653 man-hours per ton, and the specific fuel consumption is 1.014–2.0 t.o.e.

Taking into account the above, as well as the natural and climatic conditions of Kyrgyzstan, where during the drying period of 1, 2, 3, 4 and the 5th tobacco leaf breakage (June–September), the average daily air temperature ranges between 20 and 26 °C, and the maximum temperarure varies from 28 to 38 °C, it is quite possible to carry out the processes of withering and sun-curing of leaf blade of the marked braekages in natural conditions without the use of artificial heat. And complete curing of midrib must be carried out in the drying chamber using the heat of solar energy.

Based on the research results, we can conclude: the most rational way of drying tobacco in the climatic conditions of Central Asia and Kyrgyzstan is natural (solar) and combined using mechanized production lines with 100% use of heat from solar energy. The combined method contributes to the mechanization of all types of technological operations performed during the post-harvest processing of tobacco.

The general scheme of the developed mechanized production line for post-harvest processing of tobacco is shown in Fig. 1. The technological process of drying tobacco in this line is carried out in the following sequence. Tobacco leaves delivered from the field in metal mesh boxes using a device developed by us for cleaning tobacco leaves from sooty mould left from aphid infestation (patent No. 155 KG, bulletin No. 5 of 31.05.2013. Smailov E. A., Orozaliev T. O., Atamkulova M. T., Zulpuyev Z. B.) consisting of an electric talpher with a dynamometer, fall into the zone for unloading, weighing, washing leaves from aphids and dust. Next, the tobacco leaves washed in metal mesh boxes are installed on a groove and a stand for draining the remaining water. After the end of the process of water runoff and partial loss of turgor, the leaves fall on the tobacco-sewing machines (Fig. 1—points 1–22) for fixing on cords.

The cord with leaves fixed on it is hung on the extreme hook of the rod (20), then it is fixed on the adjacent pair

Table 1 Costs, labor and specific fuel consumption per 1 ton of tobacco raw materials

Drying method	Labor costs, man-hours per ton	Specific fuel consumption, t.o.e.
Natural: in the sun, under the film	860	–
Combined STG-1.5	530	0.63
Combined on transport carts (patent of the Kyrgyz Republic, No. 1200887)	510	0.47
On needle cassettes (in a dense mass—bulk-curing)	347	0.63–1.014

Source Developed and compiled by the authors

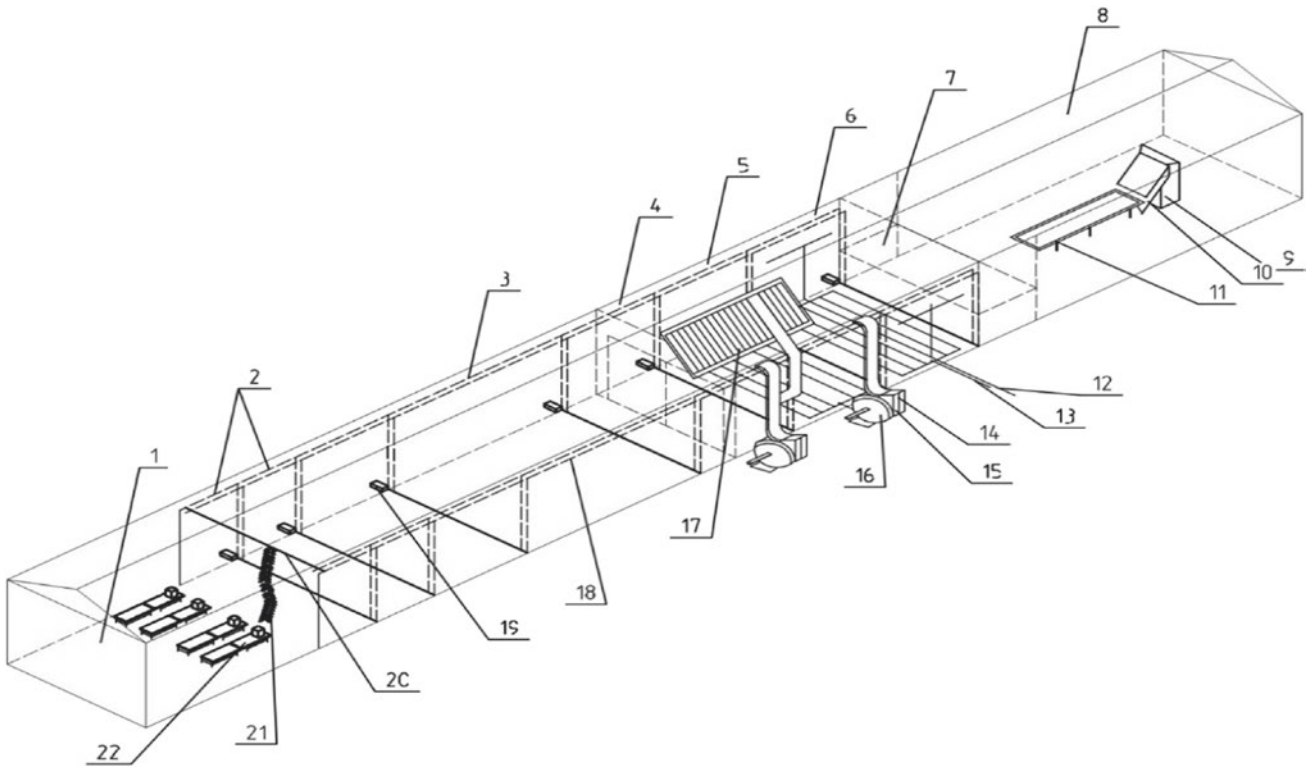

Fig. 1 Scheme of the mechanized production-line complex for post-harvest processing of tobacco for drying leaves using solar energy. *Source* Designed and built by the authors: * 1—loading area; 2—zone of withering; 3—zone of withering and natural drying; 4—chamber of drying and fixing; 5—chamber of the final drying and fermentation; 6—humidification chamber; 7—unloading area; 8—sorting shop; 9—press; 10—unit of hydrothermal processing; 11—sorting conveyor; 12—water pipelines; 13—steam pipelines; 14—air duct; 15—electric calorifier; 16—fan; 17—solar collector; 18—tranporter; 19—drive station; 20—rod; 21—tobacco garland; 22—tobacco sewing machine

of hooks, forming the first loop of the garland (21) 2.8 m long. After filling the rod with tobacco garlands in the accumulation zone 2-1 (Fig. 1), which is also a wilting zone, they move to zone 2-2—the zone of withering only. Both of these sections correspond to the length of the conveyors of 9 m. In total, tobacco is in the zone of accumulation and withering for 48 h (2 days, taking into account the loading of tobacco into accumulation zone 1 for 1 day). During this time, the process of withering occurs simultaneously in natural conditions. The calculated step of placing the rods in the accumulation and withering area, at 1, 2 and 5 tobacco leaf breakages, is 114.3 mm (since the step of the conveyor chain link is 38.1 mm, the rods are installed on the 1st and 3rd chain link), and at 3 and 4 tobacco leaf breakages—190.5 mm (here on the 1st and 5th chain link), which depends on leaf sizes of various tobacco leaf breakages. Then, using an electric drive (19) with a chain transmission, the rods with tobacco garlands lying on the chain links are moved along the chain conveyor (18) to section 3—the first zone of natural drying; the length of the chain conveyor in this section is already 13.5 m (Fig. 1). Chain conveyors are driven by drive stations located below the conveyors. Each of the seven drive stations (all the seven zones-sections, have its own drive station) consists of an electric motor, a gearbox and a chain transmission system.

The chain conveyor moves during the transition from zone 2 to zone 3 at a speed 1.5 times higher than the speed of the chain conveyor of zone 1 and 2, thereby pushing rods with tobacco leaves and increasing the distance between them; at 1, 2 and 5 tobacco leaf breakages, the distance is 171.45 mm and at 3 and 4 tobacco leaf breakages—285.75 mm, which creates the possibility of free movement of air between the garlands with tobacco leaves and this ensures rapid drying of the leaf blade (3th day) and the preservation of the color of the leaf blade acquired during withering (in zones 1 and 2). In the next two zones (4th and 5th days, the capacity to hold 2 batches of tobacco), which have a length of 13.5 m each (total 27 m), zone 4 (Fig. 1) provides better drying of the entire mass of tobacco due to the created gap between the garlands of cords with tobacco. After the zone of natural drying, the tobacco garlands are moved into the chamber of the final drying of the midrib (section 5, Fig. 1) using its electric drive (6th day).

At the same time, the step of installation of the rods approaches the original size (114.3 and 190.5 mm), in order to rationalize the use of the volume of the final

drying chamber. In the chamber final drying of the midrib, the temperature of the blown air is raised to 60–650 °C with a relative humidity of 30–40% with the help of a system of technical means of heating: an electric heater (15), a fan (16), a solar collector (17) (Fig. 1). The final drying of tobacco is carried out to a humidity of 10%. After the final drying, the tobacco garland moves sequentially (7th day) to the fermentation chamber (zone 6, Fig. 1) and humidification chamber (zone 7, Fig. 1) with the help of their electric drives. In the fermentation and humidification chambers there are 5 rows of perforated pipes with a diameter of 42 mm, through which steam is supplied from the boilers KV-300. Next, the rods with tobacco garlands alternately arrive at the loading area 7 (Fig. 1) where the worker removes the finished tobacco from the hooks of the humidification chamber rods and transfers them to the zone of separation of tobacco leaves from the cord.

In order to increase productivity and maintain optimal leaf moisture after moistening, we have developed a device for separating dry tobacco leaves from the cord of mechnized stringing (patent No. 1527 KG, bulletin No. 3 of 30.03.2013, Smailov E. A., Orozaliev T. O., Atamkulova M. T., Zulpuyev Z. B.). The tobacco removed from the cord is supplied evenly to the sorting section 8 (Fig. 1), where a sorting conveyor 11, a unit for hydrothermal processing 10 with a steam line 13 and a semi-automatic tobacco press 9 (Fig. 1) consistently perform their functions. Tobacco is pressed and packed into standard bales according to grades.

4 Conclusion

Sequential installation of zones and chambers with appropriate technical means in this complex ensures complete mechanization and flow of technological processes of post-harvest processing of tobacco. After fixing the leaves on the cord using tobacco-sewing machines, they are hung in the form of garlands on rods mounted on chain conveyors Subsequently, the processes of withering, drying of the tobacconleaf blade and partially the midrib are carried out in a stream on film canopies with controlled movement of the air flow and the distance between the garlands. The final drying of the midrib is carried out 100% in the chamber using the heat of solar heaters. The complex also has a chamber for fermentation of tobacco in a friable mass (which reduces the fermentation process of tobacco to 10–12 h comrared with fermentation plants, where the duration of this process is 7 days), a humidification chamber, a section for separating tobacco leaves from the cord of mechnized stringing (patent No. 1527 KG), as well as a sorting shop and a unit of hot pressing (necessary in a hot climate). A batch of tobacco comes out in the form of ready fermented raw materials for 7–8 days in the amount of 1 ton of dry tobacco. The complex is capable of processing tobacco raw materials on an area of 40 ha.

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Engineering Product Development Technology Through the Formation of a Universal Integrated PD System

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Abstract

The research reveals the problem of product development (PD) in contemporary mechanical engineering: the originality and closeness of the architecture do not allow one to get a flexible, relatively inexpensive, and uncomplicated product. In an attempt to form a universal product development system, the authors review the development experience of engineering industry leaders for integration. At the initial stages of product conceptualization, this adaptive PD system of the manufacturer and its stakeholders can reduce the number of engineering hours for design, manage the complexity level, and reduce the product development cost. Changing the elemental saturation of the product, structural content, and technical and economic support of the category is possible due to the formation of a universal integrated PD system, which provides an opportunity to reduce the production's complexity and the market environment's dynamism. Additionally, it determines the manufacturer's ability to consider changes in consumer demands. Within the PD framework, the selection of elements, tools, models, technologies, and criteria is carried out by integrating the participants' actions. An assessment was made using the Likert scale, index method, and relevance correlation matrix. It is proposed to build an integrated PD system under alternative choice conditions.

Keywords

Product development · Integrated system · Concept versatility · Technology · Selection criteria

JEL Classification

L21 · L23 · L25 · L53 · P00

1 Introduction

Product development (PD) leads to numerous production routes using unique tools and implementation methods, which is costly, laborious, and does not adapt to subsequent projects (Klyueva and Garina 2016; Tolstykh et al. 2020). The formation of a universal system of product development, which makes it possible to eliminate shortcomings through adaptive development of its basic provisions, determines the need to build a new logic of managerial decision-making. Additionally, the experience of the development of the leaders of the mechanical engineering industry in integration and networking also predetermines the need to develop a system basis for integrating the PD systems of the manufacturer and its stakeholders at the initial stages of product conceptualization, making it possible to reduce the number of engineering hours for its design and change the product's complexity level, which is universally determined by technological advances and production paradigms, as well as to reduce the product development cost (Chernykh 2017; Mizikovsky et al. 2023).

The task of complex development of a mechanical engineering product through the formation of a universal integrated PD system predetermines the following:

- A change in the elemental saturation of the product and the structural content and technological and economic support of the category "product development system";
- The need to form the basic provisions of parallel product development in the "macrosystem" of the entire set of participants;
- Substantiation of the economic space of decisions on developing an advanced engineering product.

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_60

This research aims to study the possibility of using common elements of a PD system at the stage of product conceptualization while maintaining the distinctive features of individual products at a high level, which will make the following possible:

- To realize economies of scale in production due to a high level of commonality between the variants of the product being developed;
- To reduce the complexity indicator while maintaining product diversity;
- To increase the efficiency and effectiveness of product development as the leading parameter of the project.

In turn, the gradation of value chains at the conceptual level of product development will make it possible to adapt the product being developed to the matrix of technological capabilities of manufacturers, considering the transformation of consumer requests towards the complexity of products and operationalizing the efficiency and effectiveness indicators of the PD system, which determines the relevance of this research.

2 Methodology

A study of open-source data shows that the use of modern industry product development technologies by manufacturers is most often based on a product development methodology classically based on product lifecycle management (PLM). This process is often static, knowledge-intensive, original in execution, and, therefore, costly and time-consuming to fulfill (Chase et al. 2004; Sidyakova et al. 2023). Parallel product development, used by leaders in mechanical engineering, is aimed at eliminating the identified shortcomings, which provides the following:

- Acting as a potential source of improvement and approval cycles, it increases development costs; the effectiveness of product development largely depends on the quality of assumptions, the stability of input data, and the impact of data changes on the speed of completion;
- It is not a plug-and-play process because the full integration of the product development and production system planning processes and the integration of participants is almost never achieved in practice;
- It makes it difficult to predict the final results due to the complexity of the dependent behavior of overlapping PLM phases;
- It does not make it possible to systematize the current practice, methodology, and prolongation of the results because its concepts, tools, and methods become more diverse with the growth of the parallel approach.

Increasing the production's complexity, the market environment's dynamism, and changes in consumer demands due to a change in the philosophy of production determine the need to form a universal system for parallel product development.

3 Results

The author's position suggests the following:

1. Parallel product development can be considered as a system. Therefore, the basic architecture of the system can be designed as a whole, improving performance and efficiency;
2. Shaping the architecture of the product development system can have a profound impact on the outcome of product development;
3. The design and development of a product development system can be achieved through the formation of an integrative architecture of the system with its subsequent redesign through a combination of three approaches to the issue (basic provisions) (Andryashina and Garin 2016; Garina et al. 2016):
   (1) Parallel design of the product and product development processes (CE) (synchronous engineering (SE)), followed by the transition to integrated product development (IPD concept), which allows the following:
      (a) To shift the moments of making key decisions on projects by initial stages of product conceptualization;
      (b) To consistently improve system performance by implementing the parallel design principles (Table 1).
   (2) Development of universal parallel PD system:
      (a) Integration of the vendor's PD system with stakeholders, which is based on such technologies as Higher Supplier Integration, Product Development Alliances, and Single Development Center;
      (b) Putting into practice: the strategy of "open architecture or platform" (Overt Product Platform Strategy);
      (c) Lean manufacturing;
      (d) Alternative choice.

The coordination of the "vendor-stakeholders" participants at the level of product development makes it possible to realize the following advantages:

- Reduce the time and cost of configuration and prototyping of the product;
- Save money by scaling innovations in engineering design;
- Achieve target costs and functionality;

Table 1 Principles of parallel design based on decision sets

Category	Identified principles, stages, changes
1. Strategic vision	(a) Formation of a portfolio of PD projects (b) Determination of the consumer value of PD projects (c) Correlation of projects by generated added value (d) Product conceptualization
2. Design	(a) Decomposition of the PD system into sublevels (b) Determination of the system's main characteristics (c) Identification of areas for improvement of subsystems and components (d) Change management based on accumulated knowledge, experience, and technological backlog
3. Parallel design based on decision sets	(a) Development of several alternatives for PD subsystems, elements, and components of the product (b) Formation of many possible combinations of subsystems (c) Identification of decision alternatives in terms of cost, quality, and performance (d) Evaluation of alternatives, "screening out the weak" (e) Possible changes in the project
4. Integration of subsets of vendor-stakeholder solutions	(a) Determination of compatibility and interdependence of system elements (b) Documentary support of decisions: specifications, standards, etc. (c) Ensuring the stability of the system to constructive and other changes (d) Achieving the minimum cost of the created product
5. Final decision	(a) Detailing the solution, coupled with a parallel narrowing of change proposals (b) Unification of solutions to the level of subsystems (c) Fixing decisions (d) Evaluation of selected sets of changes (e) Production process planning (f) Development of the final specification

Source Developed and compiled by the authors

- Provide product configuration flexibility through the implementation of a single project at the development level;
- Form joint competencies through the common use of technological backlog and experience in the early stages of product development (Garina et al. 2014; Shushkin et al. 2016).

In this case, the vendor-stakeholder product development system assumes the following:

- An integration network is sufficient for the development of concepts of alternative products;
- Based on AHP tools, decisions are made on the combination of consumer requirements and the characteristics of a particular element (functionality, modularity, and materials used in the product). Correlation in a matrix way of the lists of elements of each subsystem is implemented based on the priorities in the requirements for the product and the technical (technological) capabilities of manufacturers.

(3) The initial formation of a unified integrative product platform not of a separate product but of a family of products (MBPF)—that is, mass customization of the product configuration through the formation of a set of products based on product platforms at the level of product conceptualization, which, according to experts in 2020 years, allowed some industry leaders to reduce lead time by 30%, assembly time by 27%, and warehousing and assembly costs by 18–24%. Currently, the development of a product family configuration based on modules is constrained by a wide array of empirical material without consistent systematization.

The system of parallel development of a product in the conditions of alternative choice is formed by integrating the actions of participants in the framework of product development, the choice of its elements, tools, models, technologies, and evaluation criteria (Fig. 1).

According to the author's intention, a parallel product development system integrates solutions for product development (PDP), strategic vision of production systems (MSP process), and production, assuming the following (Chase et al. 2004; Usmanov 2020):

(1) Supplier selection based on comparative advantage already at the conceptualization stage;
(2) The use of the alternative choice between new elements and the existing backlog, including the following:
   (a) Structural units—design objects (parts, assemblies, modules, standard structures, platforms, etc.);
   (b) Relationships connecting structural elements;

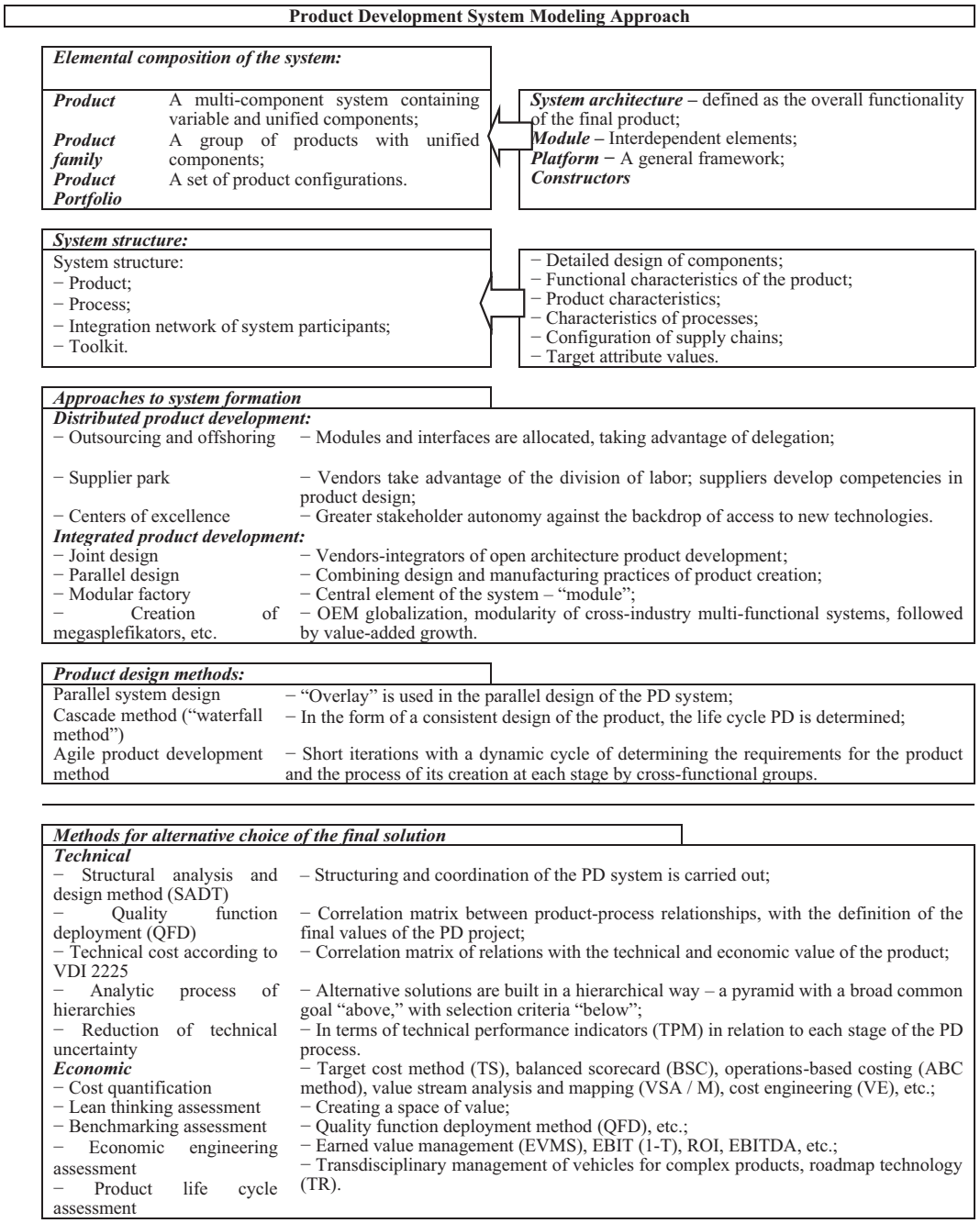

Fig. 1 Approach to modeling the product development system. *Source* Compiled by the authors

(c) Conditions for the formation and implementation of the product as a system (technologies, models, and tools).

(3) The parallel design methodology at any stage of product development is used in an integrated, block-based manner, providing a balance of technical, technological, and economic solutions due to the alternativeness of their choice.

The technology for selecting the final element of the system from existing alternatives is based on the use of the following:

(1) The Likert scale, which forms interval data, allowing researchers to justify the use of the arithmetic mean as a measure;
(2) Index method;

Table 2 Interpretation of the results of the calculated selection index

Index	Result
IV = 1	The optimal choice, the value of the element is the maximum
0.9 < IV < 1	Normative value of the cost. Variation of the element is possible
IV < 0.9	The element is critical. An alternative solution is required, including cost

Note ENAPS scoring system—European benchmarking database
Source Developed and compiled by the authors

(3) Correlation matrix of relevance. It is proposed to use the product development system element selection index (IiPD), defined as the quotient between the importance index (%I) and the relative cost (%C) of a function, characteristic, and component.

$$I_{PD}^{i} = \%I/\%C \quad (1)$$

where:

%C the ratio of the cost of an individual element to the sum of the costs of all elements of the product ($IMij_{(V)}$, $IMij_{(D)}$, FMi, …);
%I – the relative importance of an individual element (performance, functionality) in relation to other elements.

Table 2 interprets the results of the calculated selection index.

The proposed index allows the following:

(a) To include the cost of different types of value carriers as a parameter of alternative choice, not a factor arising from the product development process;
(b) To form a balance of efficiency (input = cost or effort, output = income, product, and other result) of each step of the PD, which provides the system with the property of universality, allowing the practice to be replicated in projects of distributed and integrated product development.

4 Conclusion

The necessity of forming a universal system of parallel product development is substantiated, with an emphasis on realizing the advantages of integrating a manufacturer (vendor), suppliers, contractors, and other stakeholders at the product development stage, which makes it possible to solve the issue of technological continuity of system participants, save money by scaling innovation in design, provide product configuration flexibility, and form joint competencies. Distinctive features are as follows:

(1) Due to the unification of PD, when combining the configuration of the product and OEM, FTS, and R&D suppliers, the development of the leading principle of the product design process is carried out, which makes it possible to increase the percentage of project feasibility;
(2) The formation of a universal architecture and elemental composition of the product, making it possible to implement the integration interaction of participants (ODM and OEM vendors, OES and OEM suppliers, FTSs suppliers, CEM manufacturers, and R&D suppliers) and manage the increasing complexity of the product through standardization, unification, and scaling.

In the research, the product is proposed to be represented as a set of functional components of the product family configuration with allocating a mandatory and variable set of components. At the early stages, recombination of elemental components of the BP is possible. The product's complexity is proposed to be determined by the formed interval of product configuration alternatives, with the subsequent calculation of the indicator "probability of combining alternatives of each subsystem"—the mandatory (unified) and variable parts of the system.

A technology for parallel design of a product development system is proposed, where the alternative efficiency of the product configuration and supplier selection is determined based on the comparative advantage of the following:

(a) Suppliers, already at the stage of conceptualization;
(b) New introduced elements and the existing backlog in terms of the formation and implementation of the product, thereby ensuring a balance of technical, technological, and economic solutions due to the alternativeness of their choice.

A distinctive feature is the use of the product development system element selection index, which is defined as a quotient between the importance index and the relative cost of a function, characteristic, or component.

The proposed index allows the following:

(a) To include the cost of different types of value carriers;

(b) To form a balance of the effectiveness of each PD step, which provides the system with the property of universality, allowing the practice to be replicated in subsequent product development projects.

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Carbon-Neutral Recycling Economy Models

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Abstract

The growing uncertainty of the development of the world economy, the speed of transformational changes, and intra- and intersectoral instability cause the need for a predictive scientific vision of the world economic future. This research examines international strategic change models and appraises current worldwide trends, considering development forecasts in the chemical industry as an illustrative example and accounting for technological and scientific advancement. The authors conducted a comparative analysis of predictive models of global economic development in combination with scenario analysis using the chemical industry as an example. The validity and reliability of the obtained results of the analysis and conclusions are conditioned by the use of general scientific and unique methods of scientific cognition, including retrospective and system analysis, methods of comparison and generalization, and normative and comparative statistical analysis. The authors analyzed various forecast models emphasizing the prospect of transition to a carbon-neutral economy, considering the transforming foreign policy trends and the digital transformation trend. The research emphasizes the necessity and relevance of adjustments to forecasts for the short and medium term, considering the dynamics of the foreign policy environment and post-pandemic consequences. The analysis of existing and future programs, strategies, and scenarios of change across multiple countries concerning the development of a carbon-neutral, waste-free economy resulted in identifying trends within the evolution of the chemicals industry based on the analysis of the development of the chemical industry. They also demonstrated the importance of scientific forecasting, which is necessary for industry development.

Keywords

Carbon-neutral economy · Trends · Forecast models · Digitalization · Industries

JEL Classification

D11 · D12 · E02 · Q53

1 Introduction

In today's conditions, it is impossible to imagine that society continued its development without transforming global processes in the world system. The shift from an industrial-based society to an informational society is primarily explained by the urgent need to achieve a state of sustainability. This state arises under the condition of optimization and transformation of socio-political and economic processes. Based on the study of international experience, the analysis of the conditions of development and its barriers, the resource base, as well as the innovative activity of economic entities and the innovation landscape, scholars appreciate the necessity and importance of shifting the social system to a different state. Nevertheless, it is worth noting that it is challenging to forecast long-term economic development trends in the process of transformational

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restructuring. However, if we do not consider and predict the development processes of global construction of world economic relations, chaos will control these processes. Therefore, scientists and the authors propose to define certain boundaries for predicting the long-term development of the global economy, which, according to the authors, is impossible without the application of integral modeling methods and studying fundamental factors of growth and development of the market, production technologies, and distribution tools (e.g., technological progress, investment, innovation, and international trade).

2 Research Goal

It is difficult to find tools with which it is possible to make accurate and long-term forecasts of the development of countries and industries. Nevertheless, it is essential to analyze country-level changes and assess the assumptions of developments within industrial production since, according to the authors, they should impact the development of the world economy, society, and individual countries. This research aims to conduct a detailed analysis of predictive models and identified trends, considering the theoretical and methodological transformation of the paradigm of society development. Furthermore, the authors present an industry illustration of the prospects for developing a carbon-neutral and waste-free economy, and examine the developmental trends within the chemical industry with an emphasis on the European experience.

3 Theoretical and Methodological Basis

The research is based on scientific publications devoted to identifying significant factors influencing economic development and analyzing the causes contributing to the emergence of the crisis. The importance of enhancing analytical techniques, indicators, tools, and analysis algorithms does not lose its relevance, which is why economic scientists analyze drivers influencing the development of socio-economic systems and the general prospects of social institutions. Moreover, many scientific papers are devoted to the external and internal environmental conditions that affect socioeconomic systems and can lead them to stagnation or depression. It actively offers methodological tools for optimizing the use of resources and replenishing and increasing the resource potential necessary to maintain economic entities' competitiveness and sustainable development. For example, some scientists emphasize the tendency to search for new models "exclusively on the principle of a new combination of already known features of existing models" (Buzgalin et al. 2015). For example, other proponents of the endogenous (exogenous) theory based on the economic growth model (Solow 1956) and analyzing the causes leading to crisis phenomena generally use relative indicators in binary organizational schemes that can highlight the impact of variables on social development, economic growth, and innovation activity. It is important to note that indicators of changes in labor supply and physical capital accumulation can help determine the growth rate of a socio-economic system (Mankiw et al. 1992). Some scientists are investigating the general equilibrium model and the interaction between heterogeneous labor market agents, businesses, and government institutions through income taxes and redistribution of funds received through a set of indicators of the production function, depending on the individual's managerial abilities based on the separation of accounting and economic profits, considering the effects of tax and market equilibrium parameters on the aggregated income of the economy (Achkasov and Pilnik 2017). Alternatively, mechanisms are suggested for developing multivariate models of internal growth drawing upon technological simulation parameters for various performance indicators. An example of this would be a Schumpeterian endogenous capital growth model (Polterovich 2017). A separate conceptual area of scientific discourse is the issues of economic growth and digitalization. Digitalization can transform the world into something completely new, including management paradigms, social and ethical norms, and familiar economic models and laws (Keshelava 2017).

The methodological basis of the presented analysis was fundamental research in macrostructural analysis and forecasting theory and methodology. The history of the development of the Russian school and foreign approaches can be found in the review article (Shirov 2022a, 2022b). The authors emphasize that a school of macrostructural analysis was formed in Russia more than 100 years ago (Masakova 2019; Sognnaes et al. 2021). Simultaneously, the main trends in macrostructural research are complex forecasts of socio-economic development.

At the level of global research, macroeconomic instruments aimed at assessing the effectiveness of world trade and the effects of climate policy have a special role in today's conditions of uncertainty (Edinak et al. 2021).

Separately, there is a range of works related to forecasting the development of green technologies in the framework of studying the issues of solving climate change problems in conjunction with economic and financial aspects (Bashmakov 2020; Bobylev 2019; Chepel 2022; Porfiriev 2019; Potravnyi et al. 2020; Ratner and Berezin 2019). There are also various scenario forecasts for the green modernization of the Russian and world economies (Dmitriev 2022; Li and Leung 2021; Lutz et al. 2021; Nalule 2020; Salikhov 2022; Strbac et al. 2021; Yang et al. 2019).

Among contemporary studies, the works devoted to forecasting the growth of various industries in the light of their digitalization occupy a significant place (Bressanelli et al. 2022; Butt 2020; Ganichev and Koshovets 2022; Ghobakhloo 2020; Hallstedt et al. 2020).

Thus, the issues of a prognostic nature of different levels, both philosophical conceptualization of the development of society and more applied issues of forecasting economic growth and structural shifts in the global and national economies, or at the sectoral level, are in the zone of active attention of the scientific community. Therefore, the arsenal of scientifically based methods for implementing applied research in this direction is extensive.

4 Results

Currently, predicting and tracking global trends with the capacity to transform the development of national economies, industries, or organizations is the only feasible means of devising long-term strategies that are dynamic enough to respond to environmental changes. Therefore, trend analysis is popular and demanded. These global, national, and industrial forecasts are constantly being generated by supranational and national government and private organizations, which include elite consultancy firms and expert industry associations.

Thus, using an upward approach from micro-trends (short-term trends in 1–2 years in various industries) through the formation by clustering of macro-trends (trends on the horizon of 3–10 years), the Trend One consulting company identifies megatrends describing structural changes in society that determine the living conditions for all subjects. These megatrends are then used to build their clients' strategies. They identified 17 megatrends of modernity. These include increased application and focus on artificial intelligence, big data, virtualization, sustainability, healthy living, exponential industrial growth, digital transformation, etc. (Trend One 2023).

Data from PricewaterhouseCoopers (PwC) also highlighted significant shifts in geo-economic relevance, as some of the historic centers of industrial development (e.g., many European countries) lose their economic leadership status to developing Asian countries. Indeed, PwC predicts that over 50% of global GDP will emanate from E7 countries, while the G7 nations' share will reduce by 10%. According to the forecast estimate of PwC by 2050, developing countries are highly likely to be included in the list of the world's largest economies. The world economy is also believed to double by 2042; the average rate is projected to be 2.6%. China, Brazil, India, Mexico, Indonesia, Turkey, and Russia will primarily drive this growth. While the mean annual growth rate is predicted to be around 3.5, it is only expected to be 1.6% in G7 countries (PwC 2017b).

The Morgan Stanley company emphasizes the variability of forecasts and the instability of the situation even in the horizon of 2–3 years. While forecasting a general slowdown in economic growth, it continues to develop the idea of forecasts from previous years, emphasizing the heterogeneity of cross-country trends and the ongoing transformation of the global landscape. It expects that the economies of developed countries will be at or near recession, while the economies of developing countries should recover slightly in the horizon of 2023–2024. In 2023 and 2024, India is predicted to become the fastest-growing major economy in the world, with strong domestic demand. India's GDP growth will average 6.5% over the next decade; by 2027, it will become the third-largest global economy (Stanley 2023).

Additionally, in its vision of the "World in 2050," PwC forecasts the economic future of over 30 nations that contribute around 85% of worldwide GDP. This forecast categorized the following nations as developed economies: the UK, South Korea, the USA, France, Canada, Germany, Japan, Italy, Spain, Australia, Poland, and the Netherlands. National economies categorized as rapidly developing include China, Argentina, Brazil, India, Mexico, Indonesia, Turkey, Russia, South Africa, Malaysia, and Saudi Arabia. Finally, nations termed as relatively fast-growing medium-sized include Colombia, Bangladesh, Egypt, Nigeria, Pakistan, Iran, Philippines, Vietnam, and Thailand (PwC 2017b).

It is important to note that the following forecasts have been refined to account for the consequences emerging post-pandemic and various global changes occurring over the last 24 months.

Despite the short and medium-term adjustment, the overall structural dynamics predicted earlier remain. Based on the forecast of PwC, it can be traced that China is starting to catch up with the US; countries that are gaining power, namely India, Indonesia, Brazil, and Mexico, are precisely traced (PwC 2017a).

To make long-term forecasts, it is necessary to monitor trends in the energy and environmental sectors of the economy. In 2018, the European Commission (EC) presented its strategic vision for 2050 as a rich, competitive, climate-neutral, and modern economy. The primary mission of this strategy is to avoid climate change on the planet. The presented strategy focuses on innovative development and forming a waste-free economy to achieve leading positions in green technologies. The EC has highlighted to EU countries that their waste management strategies need revision, which spans their policies on monitoring the public funds spent on recycling, waste prevention, and waste

collection. Advanced technology can aid in implementing these policies, specifically focusing on the organic digestion of perishable waste and treating sewerage gases. Our results indicate that polymer and inorganic sectors contribute 50–70% of greenhouse emissions. These are causing huge damage to the planet and contribute to climate change, which necessitates the need for further technological innovation in these sectors. The published reports outline a series of goals intended to decrease emissions by 2050, primarily by enhancing energy efficiency (Bazzanella and Ausfelder 2017; Boulamanti and Moya 2017). Figures 1 and 2 present the findings of the comparative analysis of technological solutions used to reduce emissions and enhance industrial energy efficiency (ECOFYS & Fraunhofer ISI 2018).

In the EU, several categories of scenarios have been developed to stimulate industrial development. These scenarios emphasize continuous improvement, the shift to waste-free production, and the digitization of economic entities to decrease the negative effects of harmful greenhouse gases (ICF and Fraunhofer ISI 2018).

1. Category 1 scenario—assumes unremitting enhancement;
2. Category 2 scenario—includes utilizing the best current methods;

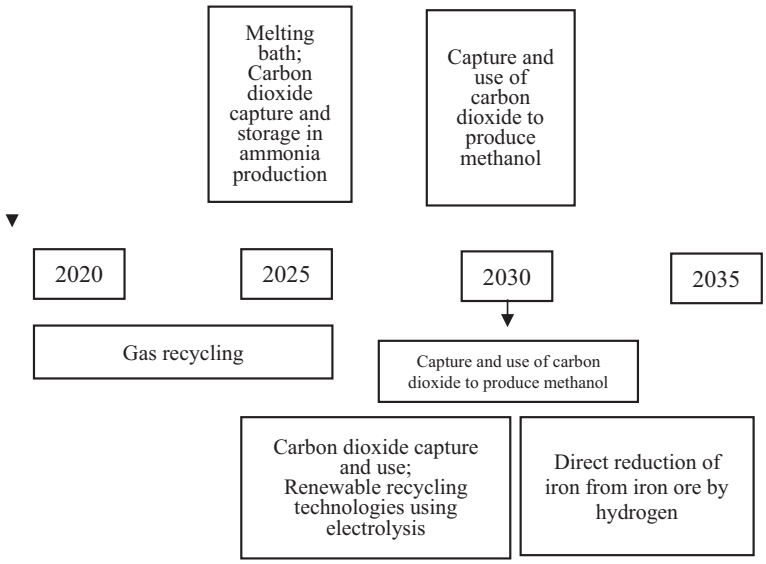

Fig. 1 Low-carbon projects in metallurgy (iron and steel production). *Source* Compiled by the authors

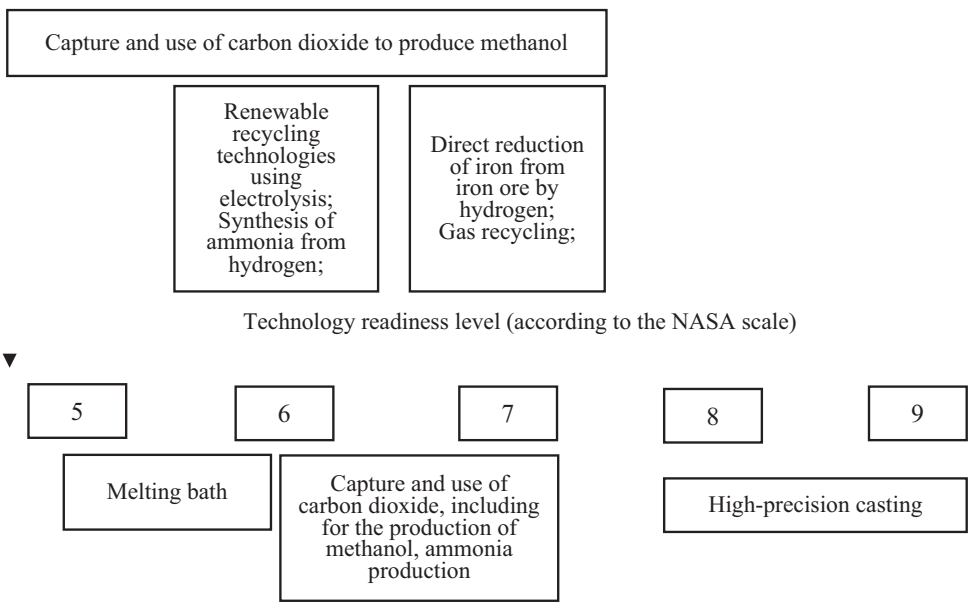

Fig. 2 Low-carbon projects in chemical production. *Source* Compiled by the authors

3. Category 3 scenario—includes using a decarbonization scenario with a different technological orientation.

When forming these scenarios, the development trends of the EU were laid down, namely, the optimal use of resources, the diffusion of digital technologies across society and the economy, and issues related to environmental and climate change.

The European predictive model of strategic decisions contains many alternatives to mitigate the processes associated with industry transformation. Exogenous technologies aimed at energy absorption will improve energy efficiency in production processes. Nevertheless, it is essential to understand that the chemical industry must be developed for any country to have a competitive carbon-neutral sector.

It is quite evident that it is difficult to answer such questions as:

- What should companies, enterprises, and organizations prepare for in the future?
- What drivers and reference points will influence the dynamics shaping future events?
- How can we position ourselves?
- How do we find the best way to solve known and unknown problems, and the future risks are not at all known to us today? (Aengenheyster et al. 2017).

5 Discussion

The results presented in the Cefic reports confirmed the conclusions of other researchers on the development of the world economy that the global economic balance is shifting towards China, India, and Africa. Simultaneously, China continues to move from investments and exports to imports and consumption. India's economy, dependent on several reforms, is outpacing the growth of Japan's economy. Overreliance on natural resources and inefficient institutions limits Africa's growth potential. The regionalization of trade is becoming more likely. Experts are confident that China will cope with the problems and become a leader in the global economy, while India and Africa will compete for sales markets. However, it is doubtful that India will become number two in the international economy. Additionally, experts expressed the opinion that a waste-free economy will bring new prospects to the business model. The European chemical sector will play a leading role in transforming a waste-free (circular) economy. The Fourth Industrial Revolution will affect the trade in goods and bring production closer to consumption.

The reports predict that leading companies, considering consumers' requirements, will use transparent platforms focused on the environment, working conditions, etc., in 2050. A strict regulatory environment will provide a competitive advantage for the chemical industry in Europe compared to other regions and bring it to the first place. Nevertheless, the state support of national leaders of other countries will continue to aggravate the problems of creating equal playing conditions (rules) in the market. By 2050, automation will replace 50–60% of manual labor and will be able to change the rules of the game in the labor market, especially for workers with low qualifications. The network economy will characterize the global economy. The participation of individual consumers in the global economy through widespread platforms (digital business models) will become so cost-effective and profitable that most other solutions will become secondary. The economy of the leading countries and companies will be increasingly based on business models using blockchain technology, which will provide more efficient and transparent solutions by 2050. A waste-free economy and economic models with the use of recycling will become essential due to innovations in the field of industry digitalization. Technological solutions will lead to a new business model for introducing industrial innovations, which will facilitate the access of new players to the market.

6 Conclusion

Industry forecasts were adjusted in light of the post-pandemic consequences and the situation in Ukraine. Despite the expectations of companies, the pandemic and post-pandemic recession do not allow individual industries to recover in the near year to the level of 2019. In other industries, including retail and healthcare, spending growth will be sustained in value terms due to price increases but low or negative in real terms. Meanwhile, energy and financial services industries faced geopolitical risks barely conceivable a year ago. The combination of China's zero-tolerance COVID policy and sanctions restrictions on Russia has profoundly impacted global trade and energy flows, pushing up commodity prices and fueling high inflation. Considering the general prevailing negative trends, it is necessary to emphasize the points of realization of opportunities. Among them, the electric car market, online sales, and tourism will continue to grow strongly, especially in Asia and the Middle East. From the metaverse to automated vehicles and data analytics (especially in healthcare), innovation will attract investment, with some companies also taking advantage of the opportunities offered by volatile financial markets (EIU 2023).

Examining the implementation of the underlying trends and trends in the forecasts considered, it should be stated that in the last two years marked by the COVID-19 pandemic and the subsequent economic crisis, the chemical

industry in Europe has proved its significant strategic role for the EU countries, including in the production of necessary medical materials and equipment. The EC recognizes the unique role of the chemical industry in achieving the goal of the new European green course despite the transformation of the external environment. The predicted trend and focus on the climate neutrality of the chemical sector by 2050 is upheld. Importantly, the energy crisis situation has corrected the ambitious forecast goals for the European chemical sector. For the first time ever, the EU imports more chemicals than exports in volume and value, resulting in a trade deficit. In the initial six months of 2022, it amounted to 5.6 billion euros. The same energy crisis is hitting the chemical industry's competitiveness, which is one of the most energy-intensive in Europe, and is forced to compete on the world market with players from regions with more favorable energy prices.

It should be emphasized that the EU chemical industry spends more than 9 billion euros annually on research and innovation and constantly invents new materials and products. Advanced materials developed by the chemical industry are already making the EU's environmental transition possible. The Safe-and-Sustainable-by-Design concept can become a global benchmark for safe and sustainable innovation and an additional catalyst for the industry's transformation to achieve the goals of 2050. In light of the development of digital technologies, the emphasis is on the generation of data by companies on manufacturing innovations and changes that need to be recorded in a specialized scoring system. On the one hand, this is a positive change, as it will help to develop a set of FAIR data (Findable, Accessible, Interoperable, and Reusable) to accelerate the innovation process. On the other hand, it adds additional reporting requirements for enterprises, including SMEs, which will require additional resources and capacities.

In general, there is no tendency to revise the guidelines in light of the current situation. In the professional community, initiatives are being discussed to expand measures to support the industry from the state. The uncertainty and slowing down of the industry's transition to the goals of 2050 are indicated (Cefic 2022). An effective EU industrial strategy, in which solutions for the chemical industry are considered the central element of a strategic ecosystem that includes hundreds of thousands of SMEs, will be critical for the realization of the "Green Agreement." It is proposed to make adjustments to the EU industrial strategy. Among them, a consistent sectoral approach with a roadmap with clear priorities and realistic deadlines that would help strengthen investor confidence in Europe; better coordination of EU programs and national financing programs, for example, through a "one-stop shop" approach; a call for the formation of a single market and the realization of its scalability advantages of solutions; tracking the current and future availability of zero-CO_2 energy at competitive prices; monitoring the costs of ongoing transformations, etc. (Cefic 2021). Thus, there is a tendency to demand more attentive state coordination and support of the sector.

Acknowledgements The research was prepared as part of the research project No. 064705-0-000 by RUDN University.

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Marketing Aspects of Russian Beverage Brand Entrance to West Africa Markets: The Case of Bryanskpivo Kvass

Gibrilla Barrie, Ekaterina A. Degtereva, and Sergey U. Chernikov

Abstract

Adopting the appropriate market entry strategy for a given market is crucial for any organization considering international market expansion. It establishes the strategy's groundwork and reveals the suggested approach's benefits and risk profiles. The primary goal of this research is to elaborate on the market entry possibility for the Bryanskpivo soft-drink brand in the West African market. This goal means proposing the optimum entry mode for Bryanskpivo and an outlook to possible strategy. Additionally, it looks at SWOT analysis to show how these factors affect the company's market entry strategy. A strategic approach for the projected entrance was also developed using the qualitative research methodology. Secondary data was collected from the company's official website, online sources, and other published works. The study's findings indicate that Bryanskpivo has several options for market entry methods in West Africa. However, the most attractive option would be establishing a subsidiary company in Nigeria through foreign direct investment with a strategic distribution hub to other parts of the target region. This tactic would likely give the company the long-term advantage of leveraging facility ownership, directly interacting with suppliers and customers, and invariably having stronger control over its business operations. The research findings could help Bryanskpivo achieve its objectives of market expansion by providing insight and knowledge.

Keywords

Marketing strategy · Russia soft-drink · Market entry · Bryanskpivo company · Kvass beverage · West Africa

JEL Classification

M14 · M31 · L31 · L81

1 Introduction

In the beverage market of West Africa, growing consumer preferences for branded alcoholic and non-alcoholic beverages result from rising incomes and spending capacity. The expansion of numerous industries in West Africa reflects the impact of the continent's robust economic growth. The regional shift away from locally made alcohol and non-alcoholic beverages toward branded beverages is a significant sector tendency.

According to the most recent United Nations report, the 16 West African nations currently constitute 5.47% of the world population (https://www.worldometers.info/world-population/western-africa-population/), with an annual GDP of $724.70 billion (https://www.worlddata.info/trade-agreements/ecowas-west-africa.php). Due to its fast urbanization and technological advancement, this region has much potential for attracting foreign businesses.

This research aims to delve deeply into the marketing issues of the Bryanskpivo company's potential entry into the West African markets with its kvass products. The authors present some important findings. In the current literature, there are many publications dealing with foreign market entry. Despite the volume of relevant studies, there is still a lot of uncertainty regarding the operational methodology of such a venture (Guercini and Milanesi 2022).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_62

Since ancient times, Eastern Europe has considered kvass, a traditional fermented Slavic and Baltic consumed beverage. A classic beverage made in Russia since ancient times is bread kvass. For many decades, efforts have been made to improve the quality of kvass and explore different flavors, production methods, and procedures. So far, various naturally fermented kvass with various flavors, including lemon, apple, mint, beets, and strawberry, have been incorporated into the production phase. Traditional bread kvass is a drink with a dark brown color, a tart and sweet flavor, and a pleasant flavor reminiscent of rye bread. Kvass is made from a wide range of essential resources, including malts of different varieties (red rye, light barley, and light wheat), rye, wheat, barley flour, sugar, and maltose syrup.

Traditional kvass is distinguished by its mild sweetness, golden to brown color, nice rye bread or utilized malt flavor, low alcohol concentration (less than 1.2%), and sparkling effect. The growing popularity of a balanced diet and increasing health awareness among consumers are driving the growth of the global functional beverages market. The added polyphenols, fiber, vitamins, minerals, and substances derived from cereals and fermentation give kvass its health-promoting characteristics (Polanowska et al. 2021).

Joint Stock Company (JSC) Bryanskpivo is a dynamically growing business that keeps up with the latest beer and alcohol-free beverage market trends. Currently, many consumers in West Africa place great emphasis on the healthiness of the products they consume. Because of this, the kvass health and nutritional benefit offer is Bryanskpivo's most impressive "unique selling proposition" (USP). In terms of nutrition, kvass is a good source of iron, copper, magnesium, manganese, vitamin B12, selenium, and niacin. Kvass is a fantastic beverage for increasing nutritional intake and enhancing metabolic activity because it contains a wide variety of different minerals, vitamins, and other active substances to support the digestive system and lessen lactose intolerance symptoms and other gastrointestinal issues: constipation, excessive gas, bloating, and even a risk of colorectal cancer can all be relieved by consuming kvass. Due to certain phytonutrients, kvass can lessen blood toxicity, making it an excellent circulatory system cleanser (https://bryanskpivo.ru/brand/production/bezalkogolnye_napitki/kvas/). In contrast to other products that can only be consumed while cold, kvass is a wonderful drink for a hot day, which can also advantageously position the brand because of the region's hot climate. However, since kvass is a naturally brewed drink, it can contain between 0.5% and 1.5% alcohol. This may represent issues in some West African countries due to the legislative definition of a soft drink, which excludes the possibility of it containing any alcohol. This should be kept in mind during the market entry strategy drafting.

In terms of products, Bryanskpivo has a well-focused range of beverages. These are three types of kvass ("Bread" kvass, "Bread Eco" kvass, and "Homemade" kvass), which come in various bottling sizes. Other units within their product range include 22 types of beer, two vitamin water, three energy drinks, four alcohol cocktails, and a rye malt (https://bryanskpivo.ru/brand/about/#). Kvass of Bryanskpivo has a health-promoting remedy; it is a basis for several popular dishes in Russian cuisine. In terms of cost, the company adopts a value pricing approach as product prices are slightly higher than competitors so as not to give the impression of low quality. The Bryanskpivo kvass products are mostly sold through physicalized offline stores and supermarket chains; the products are also available at the largest Russian online marketplaces Sbermarket and Ozon. The company has a vast network of distributors that get the products to retail points and HoReCa across Russia, Eastern Europe, Finland, and China. The company's promotion strategy in the Russian market is traditional for soft drink markets. Bryanskpivo interacts with consumers through promotion events, newspapers, social media, and point-of-sale incentives. The company also engages in a series of sponsorship activities—mostly connected to sports development, healthcare, and education.

2 Methodology

The paper is composed on the content-analysis basis of a range of statistical resources and publications relevant to the research topic. The statistical data is derived from specialized national and international commodity databases and information portals. The discussion points concentrate on topical journals. The profitable success of a company depends on a regular assessment of a company's procedures to make sure all operations are as efficient as possible. With this in mind, the authors applied SWOT analysis—one of the most effective tools to examine internal and external factors of the company to comprehend all necessary factors (Phadermrod et al. 2014). The latter can include a variety of market entry barriers that should be overcome (Naape 2023).

3 Results

In the beverage market of West Africa, growing consumer preferences for branded alcoholic and non-alcoholic beverages result from rising population, increased urbanization, and shifting demographics diversification. The beverage distribution in West Africa suffers due to inadequate infrastructure, mostly in suitable storage and transportation

services. Despite this, this is probably the most competitive consumer market in the region, with lots of domestic beverage companies and brands. For example, most of Nigeria's various beverage or bottling producers are indigenous companies.

The non-alcoholic beverage market is locally divided into the following categories. Fizzy drinks refer to carbonated soft drinks packed in glass, PET, or aluminum cans (e.g., Coke, Sprite, and others). Energy drinks often contain caffeine and other revitalizing supplements. The final section focuses on healthful beverages (basically non-carbonated soft drinks). It includes most fruit drinks, bottled water, and yogurt (Thread Group 2021). Drinks such as Zobo, Kanu, Adoyo, Burukutu, Fura da Nono, and most distinctively African palm wine have significant popularity. Domestic and foreign manufacturers such as Rite Foods, Ajeast, SBC, Coca-Cola, Sierra Leone Brewery, King Production Sierra Leone Limited, Kadko Sierra Leone Limited, Nigerian Breweries PLC, Capitol Food, Suntory Beverage and Food, Twellium, Nigerian Bottling Company Limited, Dangote Group, Chi Limited, Kasapreko, GIHOC Distilleries, Voltic, Accra Brewery PLC, Arla foods, Cadbury Nigeria plc, Friesland Campina Wamco, Promasidor, and many other are actively in play.

The revenue of the non-alcoholic drinks segment in West Africa is projected to reach $57.79 million in 2023. It is expected to show an annual growth rate (CAGR 2023–2027) of 16.84%, resulting in a projected market volume of $107.70 million by 2027, with a projected market volume of $56,060 million in 2023. In the non-alcoholic drinks segment, the number of users is expected to amount to 46.6 million users by 2027. User penetration will be 7.0% in 2023; this indicator is expected to hit 10.3% by 2027. The average revenue per user (ARPU) is expected to amount to $2 (Oyedijo et al. 2022).

An interesting, distinctive feature of the region is that beverage companies can rely on supply chain collaboration (SCC) to obtain a competitive edge and create internal and external opportunities. This is due to the fact that local supply chains operate in environments marked by fierce competition, high levels of uncertainty, demanding and unpredictable customers, inadequate infrastructure, corruption (https://www.statista.com/outlook/dmo/ecommerce/beverages/non-alcoholic-drinks/western-africa#revenue), and rapidly evolving technologies.

The region's concentration on Internet use has grown significantly and made the marketing process more open and competitive. Convenience, accessibility to various beverage brands, and savings provided by online sellers helped increase online sales. Due to rising digital adoption, e-commerce is becoming a reality and, as a result, is reinventing customers' paths to purchase, forming new user interactions, toppling business models, and opening up new growth opportunities for single- and multi-brand stores selling alcohol and non-alcohol products throughout the region. Over the years, the population of West Africa has recognized a significant increase in the number of active Internet users, with an average daily usage of over three hours in these nations. As of January 2023, Nigeria had over 122 million Internet users, the most outstanding figure recorded in Africa (Statista 2023b). Leading digital markets in Africa saw a significant increase in mobile device-generated online traffic. In Nigeria, one of the nations with the highest percentage of Internet users worldwide, cell phones accounted for 82% of web traffic and PCs for around 16%.

The market specifics conditioned the relevant results of the SWOT analysis based on the company's research, which showed several important features that the company should pay attention to when developing its market entry strategy (Table 1).

Despite its strengths, Bryanskpivo is by far not the largest beverage company in Russia. One of the important challenges connected to this fact will be limited resources for building up its presence in the target market. As the company management would need to be aware of the differences between the various West African countries, regional infrastructure, and cultural diversity may be another area for careful consideration.

Certainly, the growing population and rapidly developing economy of Western Africa is a significant opportunity for JSC Bryanskpivo. The 16 nations of Benin, Burkina Faso, Cape Verde, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, the Gambia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo create a unique opportunity for international market expansion and profit maximization with their estimated population of over 440 million people (https://www.worldometers.info/world-population/western-africa-population/). The health benefit of Bryanskpivo products, especially kvass, which helps to regulate the body's metabolic functions and provides a good taste, does have a niche in this growing market. However, the presence of a small percentage of alcohol in the kvass crafted in accordance with genuine recipes presents an additional issue in supermarket placement and limitation to positioning and advertisement. However, the threats are rather significant as the region is notorious for political instability, supply chain infrastructure gaps, corruption, and high poverty. Besides these practical issues, there is also a problem of dealing between two distant countries that are increasingly present in the modern world (Li and Lai 2022). Due to the intense competition in the West African soft-drink markets, there is a great challenge for the Bryanskpivo in finding a reputable local partner, localizing the production in the conditions of raw material shortage, and finding ways to avoid currency risks. The importance of a local partner in turbulent developing markets has had

Table 1 SWOT analysis of Bryanskpivo company in West African markets

Internal	**Strengths**: Dominant position in Russia's beverage sector Highly demanded traditional drinks High-quality kvass High brand positioning Product diversity	**Weaknesses**: Limited global recognition Regional and cultural diversity Limited experience with African market entry High product pricing
External		
Opportunities: West Africa's rapid population growth Social media coverage growth Health issues awareness increase Average temperature growth in the target region "Russia" brand popularity growth in the region	**S/O** Develop a new, unique product package for the West African market Establish a strong foundation in the regional market Strengthen messages on the current health benefits of kvass Social media promotion preference	**W/O** Develop a variety of products with a wide price range for the target markets Special care to supply chain construction due to the region's features Careful local partner and logistic provider choice for initial entry to gain knowledge of the region
Threats: • High competition in the regional market • High risk of political turmoil • Scarce raw material for product localization • Uneven economic development of region countries • Unstable regional exchange rate system	**S/T** Continuous promotion based on the USP of the company to meet the markets' middle-income demand Minimized local production Product range based on middle-income segments but with low-income products • Search for countertrade possibilities with local partner	**W/T** Localized adapted promotion performed mostly by local partner Engage in cordial customer-producer relationship campaign Market preference tracking system development for sustained market share

Source Compiled by the authors

several discussions in literature and cannot be overlooked (Khan et al. 2023).

With all the above in mind, overall marketing entry recommendations would include the following patterns. The West African market would be distinct from any other market in which Bryanskpivo has previously operated. It would be near impossible to expand hastily to all sixteen capital cities of the region without an established foothold. To reach the region's medium and small countries, the company would first concentrate on creating a subsidiary in a country with a sizable population and economy, such as Nigeria. Nigeria's soft drink market is the largest in the region, with in-home consumption of almost 12 million liters and projected revenue in 2023 of $32.67 billion at a 15.78% CAGR 2023–2027. The average volume per person is presumed to reach a significant 57.51 L in 2023, equal to per-person revenues of $147. Over 70% of soft drink consumers in Nigeria are between 18 and 34, meaning a higher openness to new products and experiences. Simultaneously, almost 80% of soft-drink consumers belong to middle- and high-income strata of Nigerian society, which is crucial for the higher quality and higher price position of Bryanskpivo kvass (Statista 2023a).

The Nigerian soft drink market is more established than the other 15 countries in the target region, providing a better opportunity for a long-term investment strategy and establishing a local partner hub for marketing and distribution across the region. Due to the necessity to find a local partner for entering the regional market and the SWOT analysis combination, Promasidor seems like a good company to start with. It has a strong track record of international sales in Africa, yet only one soft drink brand (Drink-O-Pop) that does not compete directly with kvass (https://promasidor.com/brands/beverages/). Managing to make a partnership agreement with a relatively large distributor like Promasidor would also allow Bryanskpivo to engage in local SCC activities, which would significantly decrease operational costs. However, there are many companies in the Nigerian market to choose from.

The main goals of the local partner would be to support the sales and make sure Brayanskpivo products are widely accessible in the regional shopping complexes and intermediaries. This is very important because most of the soft drinks in the region are consumed at home. Therefore, the product's presence at big stores and retailers in predominantly urban areas is important. The availability at the HoReCa segment is purely secondary and can be postponed to the distant future.

Bryanskpivo's positioning as a brand in West African markets will be determined through various advertising, sales promotions, and social media channels, utilizing the consumer age and mobile Internet usage spread. As the product is new to the region, upon gaining a foothold in the Nigerian market, the Bryanskpivo company would have higher chances through the consumer education strategy, stressing innovation, original taste, and health

advantages of the products produced. The product's ability to offer a healthy alternative to traditional beverages is a solid start for the business to succeed and establish an intriguing competitive edge. Such a strategy would require working with electronic word-of-mouth through consumer reviews, public figures, and collaboration with influencers and communities (Yozani et al. 2022). It is possible that a new, completely non-alcohol kvass would be developed for the market to provide consumers with easier access to the product and familiarize them with the brand. Including influencers like Diane Russet or Ify Mogekwu as a component of the marketing effort is crucial. They may work with the product range to present evaluations, taste tests, blogs, vlogs, and YouTube videos on the company's brand. With prominent marketing efforts, the problem of Bryanskpivo products entering an already highly competitive market can be significantly diminished (Arshi et al. 2023).

Prominent and well-known beverage companies have embraced social media marketing to spread the word about their company, build brand recognition, and eventually enhance profits. A social media presence on websites like Facebook, Instagram, TikTok, and Pinterest should be a part of Bryanskpivo's digital marketing plan. The company should concentrate on growing a sizable following on these sites.

However, the company will eventually want to incorporate social advertising, presumably through event marketing. Bryanskpivo can use this method to either organize an event or participate as an exhibitor or sponsor; events can be held offline or online. In this case, the focus of the market is to reach customers and prospects and increase sales for the company; this may also involve using news media to promote the event. PR can also participate in such events, focusing on creating a positive image for the company and building a positive relationship with the company's various stakeholders. Certainly, none of the above deletes the necessity of simple promotional events, like gift coupons for a free kvass package or bottle lid lottery.

These activities would be partly funded by the local partner, as this is a widely spread practice. However, for the initial two years, the larger part of expenses would have to be borne by Bryanskpivo. After gaining experience and knowledge of the market, the company would have a chance to enter other West African markets in better conditions and build up its presence further.

4 Conclusion

The entrance to a unique and uncertain West African soft drink market would present a certain challenge for the Bryanskpivo company at logistic and promotional levels. However, it is possible to get a share of a growing market through prioritizing digital channels and relying on local partnerships to construct supply chains. Despite being a significant player in the global economy, Russia has little to no soft drink brand recognition. Thus, such brands need to be established on a regional basis and develop a presence and identity as part of their marketing and expansion strategies.

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Neural Network Modeling of Top Management Motivation in Regional Control Structures as a Classification Problem

Sergey N. Yashin, Nadezhda I. Yashina, Egor V. Koshelev, Alexey A. Ivanov, and Zhanna V. Smirnova

Abstract

The research aims to create a neural network model. Using neural networks, the authors modeled criteria for top management motivation and strategic potential of the region. Material motivation refers to the salary of a senior civil servant. Non-material motivation refers to career growth. In this case, the target function is the coefficient of natural increase in the region's population. Its positive value is evaluated positively (1—Success), and its negative value is evaluated negatively (0—Failure). As a result, the problem of binary classification in the trained neural network is solved. In the previous model, the total verification error for the functions of non-material and material motivation and strategic potential amounted to 39%. In our case, this error amounted to only 12%. This suggests that neural networks can achieve much greater prediction accuracy. The research results are used to develop a constructive motivation system for top managers.

Keywords

Top management motivation · Non-material motivation · Material motivation · Neural networks · Classification task

JEL Classification

C38 · C45 · H83 · O21 · R58

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1 Introduction

The issues of constructive motivation of the top management of state structures are always important for planning the balanced development of regional economic systems. Despite a significant number of scientific works in this area, there are still no universal models of motivation. Thus, the considered question remains open.

Let us consider the methods for modeling processes and systems using data science. This is justified in the case of the presence of large data arrays (big data), the processing of which requires serious computational algorithms. We are talking about neural network modeling, which is also applicable for planning the constructive motivation of top management in the public sector of the economy.

The very problem of top management motivation has been studied by various scientists for a long time, which made it possible to develop the fundamental principles of this process.

We consider the three types of managerial leadership skills: technical, interpersonal, and decision-making skills (Munna 2021).

Research on motivation in the civil service has proliferated in parallel with the question of how to improve the performance of civil service personnel. Findings from Christensen et al. (2017) confirm a number of lessons—using public service motivation as a selection tool, promoting motivation in public service through workplace collaboration, conveying work value, and building leadership around public service values.

Serhan et al. (2018) examine the importance of employment motivators in the Lebanese public sector. The results of the analysis using the NVivo program determined that the main role in increasing employee motivation is determined by remuneration and working conditions. Finally, guidelines and recommendations are provided for implementing remuneration research findings and job assessment proposals.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*,
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_63

Ritz et al. (2021) examine the role of motivation of civil servants and its relation to individual performance. More specifically, these relationships are explored by focusing on Public Service Motivation (PSM), a stream of research developed over the past three decades emphasizing the service-oriented personality of the public servant.

Since this research uses the construction and training of neural networks to model the motivation of top management of state structures in the regions, let us dwell in more detail on the type of problem solved in this case.

The solution to classification problems using neural networks has already been a long tradition, making it possible to obtain new useful results in various fields of knowledge.

The research by Wu et al. (2020) evaluates a deep neural network approach for classifying and clustering big data (Convolutional Neural Network [CNN] and Deep Belief Network [DBN]).

Mishra and Jiang (2021) apply computational methods of machine learning classifiers and neural networks.

Deep learning networks outperform machine learning classifiers with 86%–90% accuracy.

Kandimalla et al. (2021) consider a deep attentional neural network (DANN). The network is trained on nine million Web of Science (WoS) annotations, covering 104 topic categories. The network consists of two bidirectional recurrent neural networks.

Radhakrishnan et al. (2023) identify and construct an explicit set of sequential neural network classifiers. The results highlight the advantage of using deep networks for classification problems, as opposed to regression problems where excessive depth is detrimental.

Perišić and Jovanović (2022) consider the problem of classifying images of real and fake faces because they cannot be distinguished by the ordinary eye. Two different architecture models of convolutional neural networks are applied. The first one represents the VGG16 model using the transfer learning method. The second model is based on the first model. During the training process, methods such as reducing the learning rate, dropout, and periodic normalization were applied. The obtained results of both models are compared.

2 Materials and Method

Data for building and training neural networks is presented in Table 1. Thus, it is assumed that the development of the region's strategic potential in the future may affect both types of motivation of top managers. Material motivation refers to the salary of a senior civil servant. Non-material motivation refers to career growth.

In this case, the target function is the coefficient of natural increase in the regions' population. Its positive value is evaluated positively (1—Success), and its negative value is evaluated negatively (0—Failure). The result is a binary classification problem in a trained neural network.

There are five stages of neural network modeling of the motivation of top management of state structures in the regions:

- Stage 1—collecting the necessary data for building and training a neural network. Table 1 contains data on the places occupied by the constituent entities of the Russian Federation according to the selected nine indicators, as well as data on the natural population growth rates in each of the 83 analyzed regions. The studied period is ten years—from 2010 to 2019. As a result, 830 observations are obtained, which leads to a matrix of dimensions. After that, positive rates of natural increase are assigned a categorical value of 1 (i.e., Success), and negative rates are assigned a value of 0 (i.e., Failure).
- Stage 2—building and training a neural network for the classification task. The binary classification problem obtained at the previous stage is solved in the Statistica program. For this purpose, the authors apply the method of multiple subsamples to build and train neural networks with different architectures (i.e., the number of neurons in the input and hidden layers of the network). In this case, multilayer perceptrons (MLP) and radial basis functions (RBF) are studied. Then, the network with the smallest error on training, validation, and test is selected. The focus is on test results. Lift Charts of networks are also considered.
- Stage 3—verification of the obtained neural network using the data of a new observation period. The year 2020 is taken as such period. The success of model verification is evaluated by all outcomes—Success and Failure. The verification error is compared with the error in the previous step.
- Stage 4—determination of the leading regions and segments of the planned parameters of the model. The data predicted by the neural network are compared with the original data in Table 1. Simultaneously, we are only interested in those 20 regions where the Government of the Russian Federation approved territorial innovation clusters. Only those cases in the matrix where the predicted value of Success matches the actual value are considered because we are creating a model that predicts population growth in the regions. Based on these cases, those leading regions that are observed in the matrix more often than others are identified. The cut-off for each of the nine model parameters is then determined for these regions according to the considered cases. After that, the segments for all the most frequently leading regions are combined for each of the nine model parameters. The most important of the nine variables

Table 1 Data for building and training neural networks

Regions	The place occupied by the subject in the Russian Federation									Rate of natural increase of the population
	Non-material motivation			Material motivation			Strategic potential			
	GRP per capita	Investment in fixed assets per capita	Organizations spending on innovation per capita	Average per capita cash income (per month)	Total residential area per capita	Share of paved roads	Tax receipts per capita	Employment rate	Number of students per 10,000 population	
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	y
2020										
1. Belgorod Region	19	32	17	23	6	10	34	16	18	−7.6
2. Bryansk Region	62	67	51	43	15	56	60	54	52	−9.0
…	…	…	…	…	…	…	…	…	…	…
83. Chukotka Autonomous Area	3	3	69	2	69	83	5	1	83	0.4

Source Compiled by the authors

(parameters) are also determined, which will provide important additional information about the model and the importance of the planned indicators for motivating top management in the regions.

- Stage 5—assessment of the compliance of the studied region with the planned parameters of the model. The actual values of the places occupied by the subject of the Russian Federation are compared with the planned segments, obtained at the previous stage. Such a comparison is carried out for all nine parameters for the last two years—2019 and 2020. This makes it possible to determine how to motivate the region's top civil servants based on the results of the region's development in 2019 and 2020. The strategic opportunities of the region are also assessed, which may affect the material and non-material motivation of top managers of the state structure of the region in the near future.

If the resulting neural network shows a small error in steps 2 and 3, then it can be applied in subsequent years. If, according to the developer of the neural network, the error is not small enough, the model is refined by including the data of new years in the initial sample. To do this, a new neural network is built and trained on a larger sample.

3 Results

Let us consider the process of neural network modeling of motivation of top management of state structures in the regions on the example presented in Table 1. We will draw final conclusions for the Novgorod Region as an example. The considered region has two territorial innovation clusters.

Let us move according to all five stages described above:

- Stage 1—collecting the necessary data for building and training a neural network. These data are collected in Table 1 for 83 regions from 2010 to 2019. Natural growth rates are assigned categorical values of 1 (Success) or 0 (Failure).
- Stage 2—building and training a neural network for the classification task. In the Statistica program, the authors used the method of multiple subsamples to build and train neural networks with different numbers of neurons on the input and hidden layers of the network. The network with the smallest error on training, validation, and test was selected—5.42%. It is a multilayer perceptron (MLP) with nine neurons on the input layer and 20 neurons on the inner layer of the network.
- Stage 3—verification of the obtained neural network according to the data of the new observation period. The year 2020 is taken as the verification period. The

Table 2 The results of the work of the top management of state structures of the Novgorod Region

Year	Non-material motivation			Material motivation			Strategic potential			*Coefficient*
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	y
2020	36 [4; 22]	**25** [9; 33]	2 [3; 30]	**21** [2; 52]	32 [36; 82]	**50** [1; 61]	30 [5; 17]	**13** [3; 79]	29 [1; 10]	−8.6
2019	34 [4; 22]	41 [9; 33]	2 [3; 30]	**20** [2; 52]	33 [36; 82]	**49** [1; 61]	31 [5; 17]	**16** [3; 79]	29 [1; 10]	−5.6

Source Compiled by the authors

total network classification error was 12.05%, which is slightly more than 5.42% for training, validation, and network tests. Therefore, the selected neural network gives a fairly high-quality forecast of future values of the coefficient of natural population growth in terms of the increase or decrease in the regions' population.

- Stage 4—determination of the leading regions and segments of the planned parameters of the model. First, only 20 regions with territorial innovation clusters approved by the Government of the Russian Federation are selected. Further, the authors find in Table 1 those cases where the value of Success predicted by the network is the same as the actual value. This is more often observed in Moscow, the Republic of Tatarstan, and the Tomsk Region. Then, according to Table 1, a cutoff for each of the nine model parameters is determined for these areas leading to the considered cases. After that, the segments for the leading regions are also combined for each of the nine model parameters. The sensitivity of the constructed model to input variables is important. This determines the priority of variables for the analysis and forecast of the coefficient of natural population growth in the regions. The most important variables are the total area of dwellings per capita (x5), tax receipts per capita (x7), and per capita cash income per month (x4). It is they who primarily determine whether there will be population growth in a particular region. Consequently, the correspondence of their values to the segments for the leading regions should, first of all, determine the motivation of top managers in the regional governments.
- Stage 5—assessment of the compliance of the studied region with the planned parameters of the model. Table 2 compares the actual values of the places occupied by the Novgorod Region with the planned segments obtained at the previous stage. Matches are underlined separately. According to the results of 2019 and 2020, top managers in the Novgorod Region should only be encouraged financially.

In 2020, the situation has changed slightly for the better (i.e., top managers can also be encouraged non-materially). The region's strategic potential is underdeveloped.

Let us compare the accuracy of the model in the considered example with the accuracy that was obtained in the model of Yashin et al. (2023) using logistic regression. The total verification error for the functions of non-material and material motivation and strategic potential was 39%. In our case, this error was only 12%. This suggests that neural networks can achieve much greater prediction accuracy.

4 Conclusion

The most important conclusions of this research are as follows:

1. Material motivation refers to the salary of a senior civil servant. Non-material motivation refers to career growth. In this case, the target function is the coefficient of natural increase in the regions' population.
2. If the resulting neural network shows a small error, then it can be applied in subsequent years. If, according to the developer of the neural network, the error is not small enough, then the model is refined by including the data of new years in the initial sample. For this purpose, a new neural network is built and trained on a larger sample.
3. The presented model has been tested for the Novgorod Region. According to the results of 2019 and 2020, top managers of state structures of this region should be encouraged only financially. In 2020, the situation has changed slightly for the better (i.e., top managers can also be encouraged non-materially). The region's strategic potential is underdeveloped.

Acknowledgements The research was funded by the Russian Science Foundation (project No. 24-28-00464).

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Environmental Aspects of Agricultural Development in the Context of Climate Change

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Abstract

The research aims to formulate a systemic understanding of the ecological aspects of agricultural development in the context of climate change and reevaluate agricultural innovations from the perspective of this vision. The research relies on the materials from the UN Sustainable Development Report for 2023, covering 193 countries worldwide. The econometric analysis was conducted using correlation and regression analysis methods. As a result of the research, the author drew the following conclusions. First, a key practice in combating climate change for the agricultural economy is the reduction of carbon emissions during the export of fossil fuels. Second, reducing carbon emissions during the export of fossil fuels is amenable to stimulation through innovation. Third, the benefits of climate change mitigation in the agricultural economy include the following (in decreasing order of dependence on climate change mitigation): increased nitrogen management resilience in agriculture, improved grain yields, and a reduction in the export of hazardous pesticides. The theoretical significance of the obtained results and the author's conclusions based on them lies in the systematization of the ecological aspects of agricultural development in the face of climate change. The practical significance of the research is expressed in its support for sustainable development in the agricultural economy (implementing SDGs 2 and 13) until 2030. The managerial significance is evident in that the disclosed perspective and the proposed author's recommendations will help optimize the ecological aspects of agricultural development in the context of climate change in Kyrgyzstan until 2030.

Keywords

Agriculture · Climate change · Combating climate change · Agricultural innovation · Kyrgyzstan · Agricultural economy

JEL Classification

O13 · Q16 · Q54

1 Introduction

Agriculture is one of the sectors most susceptible to the impacts of climate change. The agricultural economy is notable and specific in that attempts to reduce its dependence on climate influence have not unequivocally produced positive effects. Instead, these attempts have yielded contradictory outcomes. This is most vividly exemplified in the creation and implementation of advanced pesticides and pest control measures in the agricultural economy. On one hand, these means and fertilizers have improved plant survival rates and increased crop yields, thus enhancing labor productivity in agriculture. On the other hand, some of these substances have proven hazardous to human health. In other words, reducing dependence on climate is accompanied by a decrease in the ecological sustainability of agriculture.

The transition to smart vertical farms has provided a more pronounced positive effect, associated with the growth of the agricultural economy in regions with unfavorable climates. On one hand, vertical farms can achieve almost

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complete autonomy from the surrounding environment (i.e., independence from climate conditions). On the other hand, the cost of agricultural production on smart vertical farms is higher than in horizontal agriculture. This hinders the development of vertical farms, whose production capacity, even in the long term (until 2030), will not be large enough to begin displacing horizontal farms.

Thus, the agricultural economy requires a special and carefully considered approach to combating climate change, considering its specificity. This approach should involve selecting the most effective and least contradictory agricultural innovations and high flexibility in their implementation on contemporary farms to preserve organic (natural) agriculture. The relevance of the selected research topic is determined by these considerations. The research aims to formulate a systemic understanding of the ecological aspects of agricultural development in the context of climate change and reconsider agricultural innovations from the perspective of this vision.

2 Literature Review

The research is grounded in the scientific concept of climate agricultural economy presented in the works of Popkova (2023) and Popkova and Shi (2022). Various ecological aspects of agricultural development under climate change conditions have been explored in existing publications by Ergasheva et al. (2021) and Shabaltina et al. (2022), emphasizing the significance of combating climate change. However, from the available publications, it remains unclear what the quantitative returns are from implemented measures to combat climate change.

This raises the following research question (RQ_1): How do climate change mitigation practices impact agricultural development? The advantages of combating climate change in the agricultural economy noted in the literature but lacking sufficient empirical confirmation are as follows:

- Increase in cereal crop yields (Litvinova et al. 2017);
- Enhancement of nitrogen management sustainability in agriculture (Karbekova et al. 2022);
- Reduction in the export of hazardous pesticides (Ilina et al. 2019).

Numerous scientific works have been published on the topic of agricultural innovations, extensively covering issues related to digital agriculture (Agriculture 4.0) and the operation of smart farms, particularly vertical farms (Popkova 2022, 2022b). However, the connection between innovations and climate change mitigation is not specifically delineated in the existing literature, making it somewhat ambiguous.

This prompts the following research question (RQ_2): How do innovations help optimize the ecological aspects of agricultural development under climate change conditions? The potential benefits of innovations for climate change mitigation are as follows:

- Reduction in carbon emissions from the combustion of fossil fuels and cement production (Bogoviz et al. 2018);
- Decrease in carbon emissions during imports (Altukhov et al. 2019).
- Reduction in carbon emissions during the export of fossil fuels (Butorin and Bogoviz 2019).

Based on the results of the literature review, we can conclude that there is a lack of systemic knowledge in the field of climate agricultural economy. This underscores the need for further research in this area. To form a systemic understanding of the ecological aspects of agricultural development under climate change conditions and reconsider agricultural innovations from this perspective, this research conducts econometric modeling of the causal relationships of these processes, relying on contemporary international experience.

3 Materials and Methods

The research relies on the UN Sustainable Development Goals Report 2023 (2023). The sample includes all 193 countries globally, for which statistical records are maintained in the specified source. The following indicators are utilized as manifestations of climate change mitigation:

- CO_2 emissions from fossil fuel combustion and cement production (tCO2/capita) (cl_1);
- CO_2 emissions embodied in imports (tCO_2/capita) (cl_2);
- CO_2 emissions embodied in fossil fuel exports (kg/capita) (cl_3).

The advantages of climate change mitigation in the agricultural economy are assessed using the following indicators:

- Cereal yield (tonnes per hectare of harvested land) (Agr_1);
- Sustainable nitrogen management index (best 0–1.41 worst) (Agr_2);
- Exports of hazardous pesticides (tonnes per million population)" (Agr_1).

The factor of innovation is accounted for by utilizing the indicator "Expenditure on research and development (% of GDP)" (rd).

The study employs the method of correlation analysis to examine the relationship between indicators. Regression analysis is applied to determine the following dependencies: (1) Agr = F(cl); (2) cl = F(rd). Based on the established dependencies, the perspective of optimizing the ecological aspects of agricultural development under climate change conditions in Kyrgyzstan is determined for the period up to 2030.

4 Results

As a result of econometric modeling of causal relationships between climate change mitigation and agricultural development in 2023, the following multiple linear regression equations were obtained:

$$\mathrm{Agr}_1 = 2.68 + 0.21\mathrm{cl}_1 + 0.03\mathrm{cl}_2 - 0.00002\mathrm{cl}_3 \quad (1)$$

Model (1) implies that a reduction in carbon emissions from burning fossil fuels and cement production by 1 tCO_2/capita leads to an increase in cereal yield by 0.21 tons. A reduction in carbon emissions from imports by 1 tCO_2/capita results in an increase in cereal yield by 0.03 tons.

A decrease in carbon emissions from the export of fossil fuels by 0.00002 1 kg/capita leads to a reduction in cereal yield by 0.00002 tons. The multiple correlation coefficient is 0.3257, indicating that 32.57% of cereal yield is determined by the success of climate change mitigation.

$$\mathrm{Agr}_2 = 0.77 + 0.002 + \mathrm{cl}_1 + 0.04\mathrm{cl}_2 + 2.24\mathrm{cl}_3 \quad (2)$$

Model (2) implies that a reduction in carbon emissions from burning fossil fuels and cement production by 1 tCO_2/capita leads to an increase in nitrogen management sustainability in agriculture by 0.002 points. A reduction in carbon emissions from imports by 1 tCO_2/capita results in an increase in nitrogen management sustainability in agriculture by 0.04 points.

When reducing carbon emissions from the export of fossil fuels by 1 kg/capita, there is an increase in nitrogen management sustainability in agriculture by 2.24 points. The multiple correlation coefficient is 0.4022, indicating that 40.22% of nitrogen management sustainability in agriculture is determined by the success of climate change mitigation.

$$\mathrm{Agr}_3 = 101.71 - 5.98\mathrm{cl}_1 + 11.45\mathrm{cl}_2 + 0.001\mathrm{cl}_3 \quad (3)$$

Model (3) implies that a reduction in carbon emissions from burning fossil fuels and cement production by 1 tCO_2/capita leads to an increase in the export of hazardous pesticides by 5.98 tons. A reduction in carbon emissions from imports by 1 tCO_2/capita results in a decrease in the export of hazardous pesticides by 11.45 tons. A decrease in carbon emissions from the export of fossil fuels by 1 kg/capita leads to a decrease in the export of hazardous pesticides by 0.001 tons. The multiple correlation coefficient is 0.2787, indicating that 27.87% of hazardous pesticide exports are determined by the success of climate change mitigation.

$$\mathrm{cl}_1 = 3.52 + 1.61\mathrm{rd} \quad (4)$$

Model (4) implies that an increase in research and development expenditure by 1% of GDP leads to an increase in carbon emissions from burning fossil fuels and cement production by 1.61 tCO_2/capita (correlation: 0.2693).

$$\mathrm{cl}_2 = 1.55 + 0.45\mathrm{rd} \quad (5)$$

Model (5) implies that an increase in research and development expenditure by 1% of GDP leads to an increase in carbon emissions from imports by 0.45 tCO_2/capita (correlation: 0.2206).

$$\mathrm{cl}_3 = 10401.2 - 1372\mathrm{rd} \quad (6)$$

Model (6) implies that an increase in research and development expenditure by 1% of GDP leads to a decrease in carbon emissions from the export of fossil fuels by 1372 kg/capita (correlation: 0.0720).

Based on the established relationships (1)–(3) and (6), the authors determined the prospects for optimizing the environmental aspects of agricultural development in the face of climate change in Kyrgyzstan by 2030 (Fig. 1).

As shown in Fig. 1, to reduce carbon emissions from the export of fossil fuels to zero in Kyrgyzstan (compared to 202.89 kg/capita in 2023), it is recommended to increase research and development expenditure from 0.09% of GDP to 1.10% of GDP. This would lead to the following benefits for Kyrgyzstan's agricultural economy by 2030:

- Increase cereal yield by 6.52% (from 2.34 tons to 2.49 tons);
- Enhance nitrogen management sustainability in agriculture by 2.42% (reducing the risk from 0.72 points to 0.70 points);
- Decrease the export of hazardous pesticides by 12.60% (from 250 tons to 218.50 tons).

5 Discussion

The research contributes to the literature on the concept of climate agricultural economy by clarifying the environmental dimensions of agricultural development under climate change (Table 1).

As shown in Table 1, in support of Litvinova et al. (2017), this research establishes that the increase in cereal yield is influenced by climate change mitigation efforts (by 32.57%). Confirming Karbekova et al. (2022), this research demonstrates that the improvement in nitrogen management

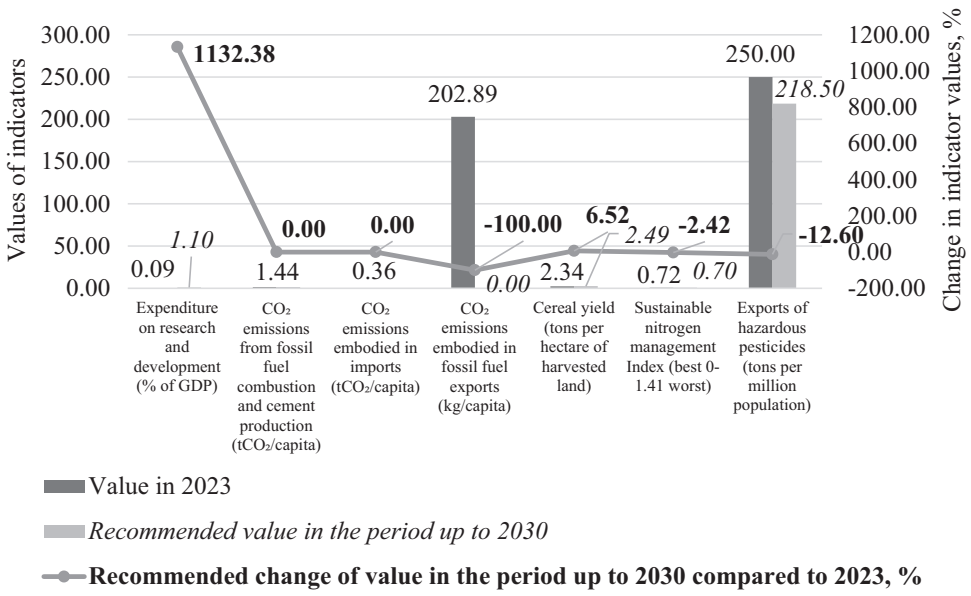

Fig. 1 Perspective of optimization of environmental aspects of agricultural development under climate change in Kyrgyzstan. *Source*: Calculated and compiled by the authors

Table 1 Contribution of the results to the literature on the concept of climate agricultural economy

Research questions (RQs)	Existing answers to RQs in the published literature		New answers received in this research
	Answer	Literature	
RQ_1: How do climate change mitigation practices impact agricultural development?	Increasing grain yields	Litvinova et al. (2017)	It is driven by climate change by 32.57%
	Increasing sustainability of nitrogen management in agriculture	Karbekova et al. (2022)	It is driven by climate change by 40.22%
	Reducing exports of hazardous pesticides	Ilina et al. (2019)	It is determined by climate change by 27.87%
RQ_2: How do innovations help optimize the ecological aspects of agricultural development under climate change conditions?	Reducing carbon emissions from fossil fuel combustion and cement production	Bogoviz et al. (2018)	It is not achieved in practice
	Reducing carbon emissions from imports	Altukhov et al. (2019)	It is not achieved in practice
	Reducing carbon emissions from fossil fuel exports	Butorin and Bogoviz (2019)	It is driven by innovation by 7.20%

Source Compiled by the authors

sustainability in agriculture is genuinely determined by climate change mitigation (by 40.22%). Supporting Ilina et al. (2019), the research provides evidence that the reduction in the export of hazardous pesticides is indeed determined by climate change mitigation (by 27.87%).

In contrast to Bogoviz et al. (2018), this study finds that the decrease in carbon emissions from the combustion of fossil fuels and cement production is not determined by innovations. Differing from Altukhov et al. (2019), the research reveals that the reduction in carbon emissions from imports is not determined by innovations. In confirmation of Butorin and Bogoviz (2019), the research establishes that the decrease in carbon emissions from the export of fossil fuels is genuinely determined by innovations but to a small extent—by 7.20%.

6 Conclusion

Thus, the research has formulated a comprehensive understanding of the ecological aspects of agricultural development in the context of climate change and reevaluated

agricultural innovations from this perspective. The primary conclusions drawn from the econometric analysis of international experience in 2023 are as follows. First, a key practice in combating climate change for agricultural economies is the reduction of carbon emissions during the export of fossil fuels. Second, reducing carbon emissions during the export of fossil fuels can be incentivized through innovation. Third, the benefits of climate change mitigation in the agricultural economy include the following (in decreasing order of dependence on climate change mitigation): increased nitrogen management sustainability in agriculture, improved cereal yield, and a reduction in the export of hazardous pesticides.

The theoretical significance of these results and the derived conclusions lies in their systematization of the ecological aspects of agricultural development under climate change conditions. The practical significance of the research is evident in its support for sustainable development in the agricultural economy (implementation of SDGs 2 and 13) until 2030. The managerial significance is expressed in the revealed perspective and the proposed authorial recommendations, which will assist in optimizing the ecological aspects of agricultural development in the conditions of climate change in Kyrgyzstan until 2030.

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Popular Science Tourism as a Direction of Sustainable Economic Development

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Abstract

Amidst restrictions on international travel, the hospitality industry in Russia is increasingly becoming a significant sector of the economy. It engages existing accommodation facilities and attractions and opens up new directions that were previously closed to the broader public. The research aims to identify popular science tourism as a promising direction for sustainable economic development in the hospitality industry. This involves intensifying scientific development, shaping sustainable economic growth, and enhancing more effective career guidance activities. As a novel niche in tourism, popular scientific tourism aims to popularize science and involve a broader audience in the scientific sector. The research reveals the underexplored and underutilized nature of this type of educational tourism, highlighting the substantial potential for its development. This potential creation of new attractions will elevate the tourism potential of regions where key scientific facilities are located, promoting science and engaging a diverse audience in the scientific community. The proposal involves defining the role and position of popular scientific tourism sites in the tourist market system. This aims to facilitate effective interaction between tour operators, travel agents, and tourists while consuming tourist services with a popular scientific component. The research delves into the fundamental mechanisms of developing popular scientific tourism, emphasizing personnel preparation's role in supporting this form of tourism. It recognizes the role of universities, research centers, and regions in forming routes, as well as the necessity of financial support. Conclusions are drawn, emphasizing that for sustainable economic development, the driving forces of popular scientific tourism should be research organizations and higher education institutions targeting students receiving basic and secondary vocational education. This approach aims to immerse them in the world of science and innovation, ultimately increasing the country's technological potential and nurturing a generation of individuals concerned about the environment.

Keywords

Science · Tourism · Popular science tourism · Popularization of science · Tourist efficiency · Sustainable development

JEL Classifications

Z320

1 Introduction

The intensification of scientific development in the Russian Federation is progressing rapidly, supported by government authorities. The website "годнауки.рф" has been established; more than 6500 events have been conducted, engaging millions of participants. According to Forbes research (Borisova-Sale and Kirilochkina 2021), most initiatives have been directed towards popularizing science, resulting in increased involvement of students and schoolchildren and a heightened interest among parents of prospective university students in choosing scientific specialties.

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The positive response from the Russian public, the active stimulation of science by the government and business (Nagalevsky et al. 2011), and the establishment of the national project "Science and Universities" (Bocharov et al. 2021) have led to the creation of a new direction: popular science tourism.

2 Materials and Methods

To formulate effective mechanisms for developing popular science tourism, it is necessary to explore theoretical approaches to the studied definition. Nowadays, it appears insufficiently examined in Russian and international works (Guo et al. 2022; Krylova 2022).

Popular science tourism is a niche, specialized form of tourism belonging to the category of educational tourism (Wang et al. 2023).

Educational tourism is a means of embracing cultural heritage and understanding the world by developing personality (Chernenko 2011; Mishra et al. 2022). It can take various transformations depending on the goals of knowledge: cultural-cognitive (Frolova and Rogach 2017; Shmyrev 2019), health-cognitive (Bestayeva and Kodzayeva 2020), recreational-cognitive (Ooi 2015), scientific-cognitive tourism (Kritskaya and Ostapenko 2022; Testina 2021), and others. In this research, popular science tourism falls within the scope of scientific-cognitive tourism. However, it exhibits the following distinguishing features:

1. Focus on popularizing science among an unprepared mass audience. Non-fiction, science fiction (sci-fi), and popular science presentations become a new linguistic norm and a significant factor in personality formation (Kulikova 2022).
2. Introduction to unique scientific objects, leading scientists, and their scientific schools (Pryadkina 2008).
3. The opportunity to observe and conduct research of varying complexity. As previously described, people want to participate in scientific research to be useful. The result of a popular science tour may also lead to publication or scientific research development (Baranova 2022).
4. Science as entertainment (Testina 2021) requires presenting science in an attractive form to stimulate consumers of tourism services.
5. Knowledge with comfort. The use of hospitality industry infrastructure in popular science tours: comfortable buses, hotels, attractions (Wang 2009), and others.

Popular science tourism is closely linked to educational, scientific, business, agricultural, and industrial tourism and, depending on the object of knowledge, with astronomical, ecological, ornithological, and even apitourism.

According to the Concept for the Development of Popular Science Tourism in the Russian Federation until 2035 (January 25, 2023), popular science tourism refers to the temporary travels of Russian citizens and other individuals with permanent residence for educational, professional, business, and other purposes, carried out along approved routes with visits to infrastructure facilities of organizations associated with scientific, innovative, educational, and enlightening activities, adhering to safety requirements and security measures of these facilities, promoting the popularization of Russian scientific and technological achievements. This definition is the most comprehensive in terms of goals. However, in the author's opinion, it is insufficiently elaborated from a technological perspective: it does not specify the minimum duration of the tour, financial aspects, etc.

3 Results

To assess the possibilities and prospects for developing popular science tourism within the tourist industry system, let us analyze its efficiency indicators.

The current conditions of hospitality industry development are influenced by various factors: epidemiological, geopolitical, demographic, socio-economic, and many others. Analyzing the dynamics of inbound and outbound tourist flows over the last five years in the Russian Federation, according to the Federal State Statistics Service of the Russian Federation (Rosstat) on tourism, we can note their tendency to recover, albeit at a very slow pace.

The outbound tourist flow in 2022 amounted to 49.6% of the pre-pandemic level in 2019. The inbound flow was 33.6% in comparative analysis for a similar period. The calculated coefficient of linear correlation using Excel functions showed a value of 0.978, indicating a very strong correlation according to the Chaddock scale (Zablotska et al. 2023). Such a strong correlation suggests a direct relationship between the magnitude of inbound and outbound flows; that is, the more tourists we receive, the more Russians will travel to other countries and vice versa.

Let us analyze the indicators of the effect and efficiency of Russia's external tourist activities from 2018 to 2022. The following indicators are proposed for use:

1. The Tourist Effect Indicator (Tour Effect) will be the difference between tourist arrivals (T_a) and departures (T_d) (Eq. 1).

$$\text{Tour Effect} = T_a - T_d \quad (1)$$

This indicator reflects how many thousands more people arrived in the Russian Federation than left its borders.

Depending on a positive value, in the case of a prevalence of arrivals over departures, or a negative value in the opposite case, conclusions can be drawn about the impact of geopolitical processes on tourist flows, acceleration of domestic tourism, depreciation of the ruble exchange rate, and other factors, the evaluation of the influence of which should be considered in detail in the context of multifactorial correlation-regression analysis. The indicator should aim for an increase.

2. The Tourist Efficiency Indicator (Tourist Efficiency) is the ratio between tourist arrivals (T_a) and departures (T_d) (Eq. 2).

$$\text{Tourist Efficiency} = T_a/T_d \quad (2)$$

The efficiency indicator reflects how many people arrived from other countries for each departing tourist. Despite the direct correlation previously identified between the arrival and departure of tourists, according to which the more Russians travel abroad, the more foreign tourists come to us; it should be noted that outbound tourism contributes to the outflow of money from the country. Therefore, this indicator should aim for an increase.

3. The Tourist Independence Indicator (Tour Indep) is the ratio of tourist departures (T_d) to domestic tourist flow (T_{dom}) (3).

$$\text{Tour Indep} = T_d/T_{dom} \quad (3)$$

The tourist independence indicator reflects the efficiency of the ratio between outbound and domestic tourist flows, showing how many tourists entered the Russian Federation relative to the number traveling within the country. The less dependent the industry becomes on inbound tourist flows, the more opportunities there are to plan its further development. However, when considering countries as such, a decrease in competition among sellers may lead to a reduction in the quality of domestic tourism products with an increase in their price.

Calculating these indicators will make it possible to identify turning points in trends and determine the mechanisms influencing tourist flows to address imbalances. The calculation of indicators is presented in Table 1.

It is essential to note that the indicator "Domestic tourist flow" began to be officially tracked by Russian statistical authorities only from 2022. Therefore, data on trips within the country for 2018–2021 are approximate, reflected in various non-periodic sources of information provided in Table 1.

Based on the data in Table 1, the following conclusion can be drawn. The tourist effect indicator has a negative value, showing a tendency to decrease further, as foreigners visit Russia less than Russians travel abroad. In 2018, the value was higher than in 2019 due to the FIFA World Cup held in Russia. Subsequently, despite an increase in this indicator in 2020 during the mass COVID-19 pandemic, it continued to decline, although it has not yet reached the 2019 level. To increase its magnitude, it is necessary to use the "soft power" of tourism (Ponomareva and Savinov 2022), increase the interest of foreign citizens in traveling across Russia, develop regional brands, enhance their reputation on the international stage (Freire 2011), improve the quality of service, strengthen environmental protection, make trips more accessible to various categories of citizens, and offer unique niche tour products (e.g., in the field of popular science tourism, leading to its sustainable development).

Table 1 Dynamics of analytical indicators reflecting the effect and efficiency of the tourism industry in Russia for 2018–2022, thousand people

Indicators	2018	2019	2020	2021	2022
Tourist departures (T_d)	41,964	45,330	12,360.7	19,199.1	22,486
Tourist arrivals (T_a)	24,551	24,419	6359	7079.8	8242.5
Domestic tourist flow (T_{dom})	60,000	65,100	21,700	56,000	141,274.6
Tourist effect	−17,413	−20,911	−6002	−12,119	−14,244
Tourist efficiency	0.59	0.54	0.51	0.37	0.37
Tourist independence	0.70	0.70	0.57	0.34	0.16

Source Compiled by the authors based on (Analytical Center for the Government of the Russian Federation 2020; Federal State Statistics Service of the Russian Federation 2023b; HSE University 2020; Information Agency Inerfax 2021)

After a decline from 2018 to 2021, the Tourist efficiency indicator in the considered period maintained the value of 2021 in 2022, which can be regarded as a positive moment in stabilizing the ratio of tourist flows. However, in the future, it is advisable to increase the value of the tourist efficiency indicator by promoting Russian tour products in the international market, for example, for CIS countries, EAEU, BRICS, and others, as mutual tourism enhances the economic efficiency of countries (Sirchenko 2011) and increases the transport accessibility of Russia through stimulating charter flights, developing railway and cruise tourism.

The dynamics of the tourist independence indicator reflect a decrease in inbound tourism accompanied by an increase in domestic tourist flow. In 2018–2019, this indicator stood at 0.7%; by 2022, it reduced to 0.16%. This

indicates that the tourism industry, having received a positive impetus through various state support programs, such as the creation of the national project "Tourism and hospitality industry," tourist cashback, promotion of niche and personalized products, popularization of tourism among schoolchildren and youth, improvement of transport infrastructure, etc., managed to compensate for external demand with internal. However, there should not be a tendency towards further reduction of this indicator, as Russia should strive for an open economy in the context of the tourism industry, albeit restricted (Afanasiev 2022).

Overall, it is necessary to note positive prospects for Russian domestic tourism. This trend, coupled with the stimulation of the popularization of science, the development of the "Concept of the development of popular science tourism," the "Plan of measures for the development of popular science tourism in the Russian Federation, designed to attract talented youth into the field of research and development and increase the accessibility of information about the achievements and prospects of Russian science," and others, will contribute to the effective promotion of popular science tourism.

Additionally, through informing on their websites, social networks, or events about Russia's scientific achievements and the development of popular science tourism, Russian representatives abroad can contribute to the activation of inbound tourism.

Let us analyze the infrastructure of popular science tourism. The "All-Russian registry of popular science tourism objects" currently includes 755 institutions, encompassing educational organizations, research institutes, laboratories, educational centers, boiling points, museums, reserves, parks (eco-parks, geoparks, techno-parks, etc.), industrial facilities, such as hydroelectric power stations, factories, etc. An important role in this should be assigned to various scientific and enlightenment societies: the Russian Geographical Society, the All-Russian Society "Knowledge," and others.

According to Kuskov and Sirik (2018), objects of popular science tourism should be classified as service providers in the tourist market system. However, there is a difficulty in understanding which block of service providers this category of objects should be assigned to excursion or entertainment organizations.

From a technological perspective, objects of popular science tourism are classified as excursion organizations because they provide excursion support within the framework of popular science tours to their facilities. On the other hand, objects of popular science tourism can be attributed to entertainment organizations due to the fact that "science as entertainment" is one of the distinctive features of popular science tourism, making it possible to present complex concepts in simple terms, adding interactivity to narration, visualizing objects using AR or VR technologies, etc. This duality is an undeniable characteristic of the researched type of tourism. Let us present the tourist market system with the placement of objects of popular science tourism within it, according to A. S. Kuskov, in Fig. 1.

According to Fig. 1, objects of popular science tourism located at the intersection of excursion and entertainment organizations should interact with receptive tour operators, participating in the formation of the tourist product.

Let us analyze the prospects of Russian popular science tourism and present the dynamics of the number of organizations conducting scientific research and development according to the data from the Federal State Statistics Service of the Russian Federation (Rosstat) in Fig. 2.

According to Fig. 2, 4175 organizations in Russia were engaged in scientific research and development in 2021. Positive dynamics in the overall number can be observed from 2017 to 2021, with an increase of 241 institutions. There was a decrease in the number of design organizations by 40 units and experimental plants by 30 units. Growth is observed in all other directions.

The largest share is occupied by research organizations (39%) and higher education institutions (24%). There has been growth in these categories of organizations from 2017 to 2021. They can become the main drivers of popular science tourism.

The most promising target audience for developing this tourism direction includes preschoolers, school students, and those studying in the system of secondary vocational education and higher education, focusing on career guidance. In 2021, there were 32.3 million students in Russia. According to the structure of students by levels of education in Russia in 2021 (Hochberg et al. 2022), the largest share belongs to the category "primary, secondary general, and secondary vocational – programs for the training of qualified workers, employees (ISCED (International Standard Classification of Education) 2, 3, and 4)"—32%. Other categories have approximately equal shares. In 2021, compared to 2019, there was an increase in values in all categories; the overall number of students increased by 0.8 million people.

Popular science tourism in resort areas can lead to the differentiation of regional tourism products, redistributing tourist flows from "overheated" tourist spots to scientific objects.

4 Conclusion

The research revealed prospects and opportunities for developing popular science tourism in Russia. The exploration of this field has shown its insufficient study and extensive potential for engaging youth in science, stimulating

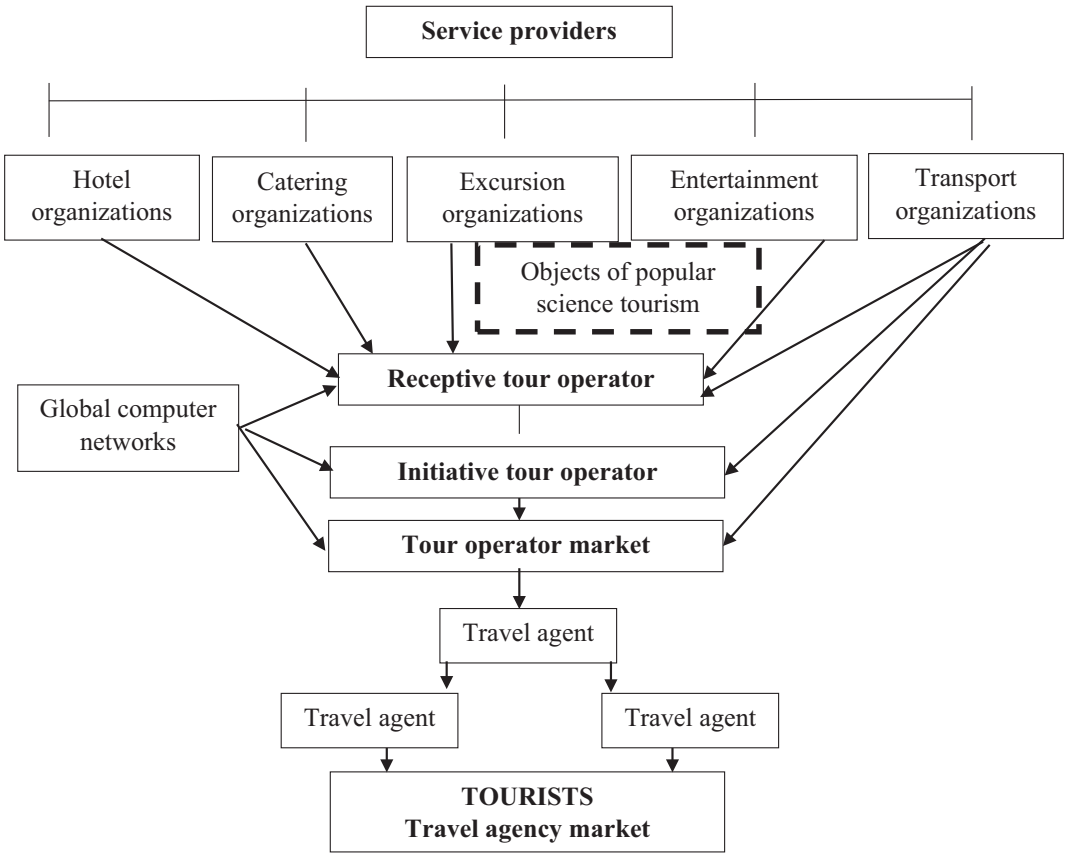

Fig. 1 The system of the tourist market, indicating the place of popular science tourism objects in it. *Source* Compiled by the authors based on Kuskov and Sirik (2018)

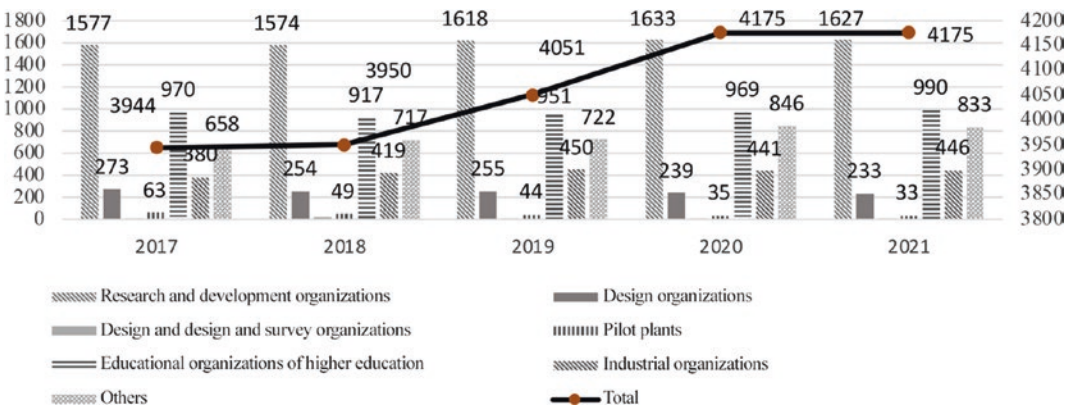

Fig. 2 Dynamics of organizations that performed scientific research and development for 2017–2021 according to the data of the Federal State Statistics Service of the Russian Federation (Rosstat). *Source* Compiled by the authors based on Federal State Statistics Service of the Russian Federation (2023a)

research, and popularizing science as a whole, as well as specific scientific disciplines, depending on the current social development goals.

To assess the development prospects of popular science tourism within the domestic tourism system, the authors analyzed the dynamics of statistical indicators for 2018–2022. The period was intentionally chosen to include data from pre-pandemic, pandemic, and post-pandemic periods. The authors identified positive trends indicating a potential increase in domestic and inbound tourist flows. For a more qualitative analysis, the authors developed indicators evaluating the effect, efficiency, and tourist

independence of tourism. The analysis of their dynamics confirmed positive trends, indicating the activation of Russian tourism, including popular science tourism, which will positively impact its sustainable development.

The evaluation of the infrastructure of popular science tourism has identified its place in the hospitality industry. The dual functionality of infrastructure objects has shown that they should be at the intersection of excursion and entertainment organizations, interacting with receptive tour operators and travel agents. The study of the dynamics and structure of popular science tourism objects led to the conclusion that research organizations and higher education institutions should become drivers of popular science tourism, acquiring a career orientation. The prospective target audience includes preschoolers, school students, and those studying in the system of secondary vocational education and higher education. The main emphasis should be on students receiving basic secondary, secondary vocational, and higher education, introducing them to science and thereby increasing the technological potential of the country.

The development of the studied direction will diversify the tourism product for various categories of citizens, raise the level of education, and eventually involve them in ecological research. In turn, this will positively impact the tourism industry's income and the country's economy, contributing to sustainable tourism development.

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Financing Green Projects in the Sector of Sustainable Development of the Russian Economy

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Abstract

The research focuses on the issues of green financing and its dynamics in contemporary Russia, considering global environmental and economic threats and constraints. The authors overview the toolkit of green financing and the structural sectoral shifts in sustainable financing that emerged in recent years. The authors demonstrate the involvement of large, small, and medium businesses in sustainable investing, along with the reasons for the decline in investment activity. The decisive role of the state is justified as a legislator, direct participant, and regulator of green financing processes. The spread and diversification of financial instruments in green financing indicate an increase in the attractiveness of green projects and signify a growth in the involvement of investors with different capital sizes and risk levels. Not all instruments are currently accessible and clear to investors; risks remain quite high, mainly due to entrepreneurs' formal attitude towards implemented projects and the adjustment of goals towards profit growth rather than environmental conservation measures. The authors conclude that it is necessary to scale up green investment across the entire country based on government support and the improvement of business incentives in implementing sustainable development projects.

Keywords

Green economy · Green projects · Green finance · Government · Big business · SMEs

JEL Classifications

G1 · P1 · Q5

1 Introduction

The topic of humanity's responsible attitude towards the environment has captivated the minds of scholars and practitioners for a considerable period. The outcome of research on the impact of human activities on the environment and the consequences for future generations has given rise to the green economy. Throughout the entirety of its existence, humanity has exerted influence on the external environment, utilizing Earth's resources and, with each passing century, doing so with increasing depth and sophistication. Over the last century, the degree of human impact on the environment has undergone a fundamental transformation. From being a helper in survival and development, the surrounding world, with the advancement of intellect and under the pressure of civilization, has turned toxic, prompting individuals to contemplate their future and that of their offspring apprehensively. The planet's limited resources, in relation to population growth, will be unable to ensure a high quality of life in the future while maintaining the established economic model of global organization. Many scholars believe that, for the preservation of stability, at least in the medium-term perspective, the green economy can serve as a means to address the complex array of existing socio-economic and ecological issues in society (Zakharova 2011). The protection of the environment in the context of the modern economy requires innovative solutions and corresponding

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financial support, leading to the development of green projects and the implementation of green financing. The global nature of the challenges at hand necessitates government intervention, regulation, and financing.

2 Methodology

The implementation of green economy concepts, given its global nature, necessitates state regulation, support, and financing. From a practical and theoretical standpoint, the financing of green economy projects requires constant analysis and refinement. When discussing green finances, it is essential to add to the definition the resolution of ecological challenges, thereby emphasizing the government's policy orientation towards the functioning and development of the economy that promotes population welfare, ensures social justice, and significantly reduces risks to the environment and the depletion of nature (UNEP 2011). In relation to the global financial system, several international financial organizations consider green finances as one of its subsystems. This approach is associated with the UN initiative on the new global green course (UNEP 2011). In our view, such an interpretation is highly premature and requires justification.

Green finances imply the financial activities of the state aimed at improving ecological outcomes, stimulating the economy to address environmental challenges, and managing financial risks related to climate and the environment.

In a general sense, green financing involves investing in the implementation of green projects, and the instruments of green investment can be diverse. Since 2012, it has become fashionable to discuss the sustainable investment model, which seeks to achieve the investor's commercial goals and aims to reduce the project's negative impact on the environmental state, improve social well-being, and enhance quality of life. A characteristic feature of green investment is the decisive role of the government, which demonstrates, regulates, and organizes green investment processes, indicating a commitment to addressing the socio-economic and ecological issues facing society.

3 Results

Before providing an overview of the dynamics of financing green projects, or, as it is commonly known, sustainable investing, let us recall that the concept of green economy and sustainable development are two sides of the same coin, addressing the challenges of the future of human civilization.

However, despite its global significance, green financing is marked by significant shortcomings. Green financing involves substantial costs, rendering them inaccessible to small and medium enterprises (SMEs). The complexity of compliance with standards, which are not entirely transparent and clear for green investments, poses a challenge. Consequently, there are difficulties in assessing the effectiveness of investing in green projects, especially concerning their social and environmental components. Additionally, the reputation of green financing is tarnished by the so-called greenwashing or green sheen. Greenwashing involves investments ostensibly for environmental protection and ensuring the ecological safety of products, services, or business practices. In reality, it serves as a tool for money laundering without any actual environmental initiatives. Therefore, organizational measures are necessary to organize, incentivize, and support the implementation and financing of green projects. Corresponding infrastructure is also required (Bik 2023).

In international and Russian practices, green financial instruments for investment are grouped as follows:

- Retail business instruments;
- Corporate and investment banking;
- Asset management;
- Insurance covering the main segments of the financial market and key aspects of its functioning.

The object of financing in the green economy is represented by green projects. The distinctive feature of such projects is their focus on preserving and improving the state of the environment, the implementation of resource-saving technologies, the minimization of emissions into the environment, and the development of technologies for producing raw materials that substitute natural resources. The implementation of such projects is intended to ensure environmental sustainability. The project sphere encompasses the resolution of issues in the fields of energy, waste reduction and utilization, transition to carbon-neutral fuel in transportation, improvement of land quality, resilience to climate risks, etc. One of the early steps in financing green projects was the issuance and placement of the first green bonds on the Moscow Exchange in 2018.

In January 2019, Russia approved the national project "Ecology." For Russia, the past few years have been a period of trials, including for green investment. The pandemic period led to a reevaluation of the global significance of green ideology and a reconsideration of the importance and substance of green projects. The year 2022 was a shock for Russian green investment not only due to the reallocation of state priorities but also the disruption of international connections and projects. Nevertheless, from 2018 to 2021, 23 issuances of green bonds took place in Russia, totaling 330.5 billion rubles.

According to experts, amidst external challenges and global changes in the external environment, the Russian

market for green financing continued to evolve (Terloev 2023). The total volume of green financing for 2021–2022 increased by 146.5%. Over the past four years, it surged by more than 25.8 times. In the structure of green financing instruments, green bonds hold the leading positions, with their share in the total volume predominating and showing a positive trend, except for 2022, when their positions decreased by 2.4%. A popular and accessible instrument for green financing is also financing with a green discount, the share of which is quite significant (ranging from 14.4% to 23.2%) and has strengthened its position in 2022 compared to the previous period. However, the niche of social bonds is consistently shrinking.

In the structure of business participants in the green financing market (Fig. 1) (Terloev 2023), the oil and gas sector traditionally dominates (comprising more than half) alongside the transportation sector. Moreover, in all directions, except for the oil and gas sector and energy, growth is observed. The composition of business participants, particularly large enterprises, influences the market structure.

In Russia, the enhancement of sustainable development infrastructure and support for green projects continue despite global challenges and inflationary processes. Currently, the urgency of the issue of forming a market for green financial instruments is due to restrictions on access to foreign capital because of sanctions and geopolitical tensions. However, the adoption of a strategy to develop a low-carbon economic model by 2060 also requires the transformation of the financial market and an increased role of the government in supporting green projects. A proprietary system for evaluating green projects has already been developed based on the taxonomy created by VEB.RF (Government of the Russian Federation 2021). Government Resolution specifies parameters that, when achieved in the implementation of a green or adaptation project, make it possible to attract preferential financing through special bonds or loans. These parameters harmoniously reflect the 17 United Nations Sustainable Development Goals and national priorities, including achieving carbon neutrality by 2060.

Despite these efforts, some projects are still stalled. The government has decided to ease specific regulations on enterprises' environmental activities, defer the expansion of the national project "Clean air," and delay the implementation of the EGAIS timber tracking system. Due to sanctions, the inflow of international investments into green projects has been halted. The Central Bank's policy does not stimulate investment activity. Recognizing the importance of green projects, the Russian government signed Resolution "On amendments to the Resolution of the Government of the Russian Federation of September 21, 2021 No. 1587" (March 11, 2023 No. 373) (Government of the Russian Federation 2023). This resolution is designed to support projects with minimal impact on the environment through the use of special bond loans and preferential credits. The list of priority green projects was expanded to include projects in the field of housing construction with the use of energy-efficient solutions, projects for the restoration of water infrastructure objects, and projects for capturing and neutralizing greenhouse gases.

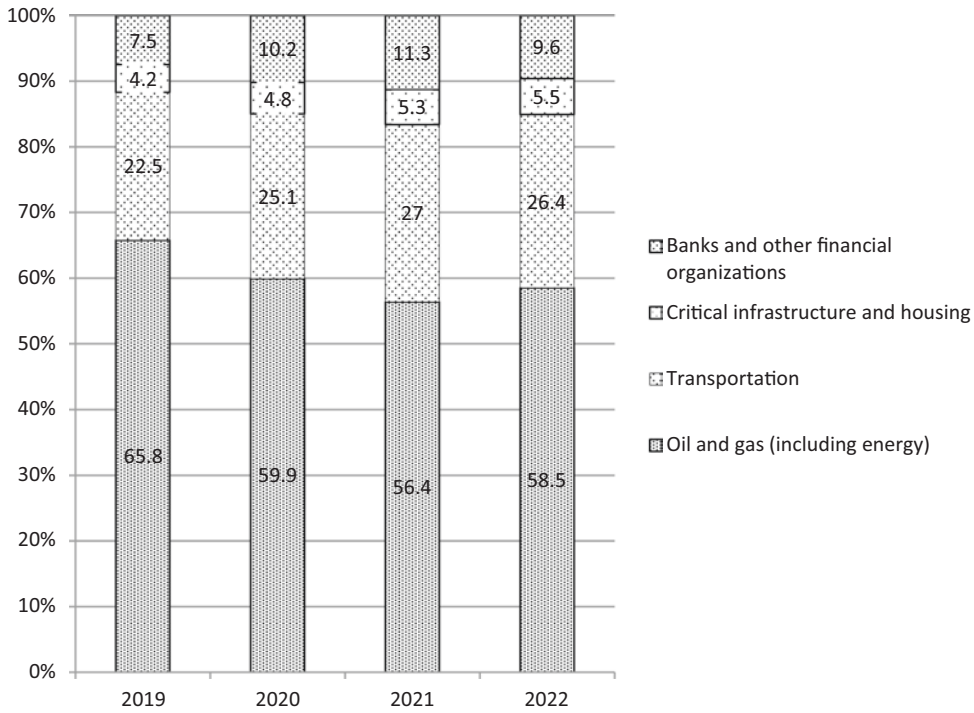

Fig. 1 Structure of businesses participating in the Russian green finance market in 2019–2022, %. *Source* Compiled by the authors based on Terloev (2023)

Nowadays, the state development corporation VEB.RF serves as the conduit for green projects and green financing in Russia. Its functions include the development of local standards and direct project financing. By accumulating funds from commercial banks, VEB.RF increases the accessibility of green financing for projects of various levels and scales.

In the absence of government support, green investments lead to an increase in the economic burden on companies, limitations on technologies used, and a significant reduction in their economic efficiency. Nevertheless, large businesses prioritize and implement green investment projects. For example, in 2022, Rosneft allocated 57 billion rubles for the implementation of green projects; sustainable investments over the past three years have amounted to approximately 156 billion rubles. These funds were directed towards enhancing the reliability of pipelines, improving wastewater management, waste disposal, and the reclamation of disturbed lands (Rosneft Oil Company PJSC 2023). In 2022, Dom.RF issued ESG bonds in the social segment totaling 6.7 billion rubles (Kuznetsov 2022).

However, it is important not to assume that green projects are only within the reach of large businesses. More than 40% of small and medium enterprises (SMEs) produce environmentally friendly products and implement green technologies. Over 13% of representatives in the small and medium business sectors are independently involved in the development of environmentally friendly products (Ekzarkhova 2023). These statistics are significant because, under conditions of stringent sanctions, rising refinancing rates, and credit resources for businesses, the share of Russian SMEs is no less than that in developed countries. Unfortunately, nearly 9% of entrepreneurs have not even heard about green financing and do not see any prospects in green projects (Ekzarkhova 2023).

An important criterion when deciding to invest in a green project is its effectiveness. According to research by the Higher School of Economics (HSE), more than a quarter of SMEs, as of the end of 2022, were able to improve working conditions and employee motivation through financing green projects. Over a third of companies enhanced the attractiveness of their workplaces. During February–November 2022, 15% of SMEs improved safety and occupational health conditions. For instance, only 3% of SMEs experienced deterioration in this area. Thus, Russian SMEs demonstrate high adaptive potential and positively assess the effectiveness of green financing.

Bond loans for green projects remain the most optimal financing instrument. From 2018 to 2022, Russia witnessed 40 issuances of green, social, and other bonds (securities, one form of a loan) totaling 524 billion rubles. The top three in terms of maximum financing were as follows:

- CSR 11 "Sustainable cities and settlements" (22.0% of investments);
- CSR 13 "Climate change mitigation" (21.3%);
- CSR 9 "Industrialization and innovation" (13.7%).

The distribution of green investments by SDGs shows the crucial importance of improving the quality of life for the Russian population. Despite the development of financing instruments for investment projects, green bonds remain the most attractive and convenient for entrepreneurs.

4 Conclusions

Over five years of formation and development, green financing in Russia has gained recognition among all economic entities and in various fields of activity. The reasons hindering the development of green financing for sustainable development projects can be attributed to the lack of tangible advantages in funding green projects, the complexity of assessing their effectiveness, and imperfect legislation. The authors believe that for businesses, a range of incentives should be developed for financing green projects depending on the priority of solving development tasks in the regions of their presence (UNEP 2011). Such a system of incentives can make it possible to implement projects in economically developed territories and cities, as well as in remote areas of the country, where issues of sustainable development are equally relevant. The development of green financing in Russia primarily occurs thanks to the public sector and state financial organizations, which possess significant financial capabilities and are more resilient to risks and external challenges. It will be challenging to implement a green financing system effectively without legal regulation and support from the financial regulator.

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Specifics of the Implementation of Regional Economic Policy in the Pharmaceutical Market in the Context of the Sustainable Development Concept

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Abstract

The research presents the study of the implementation of economic policies in the pharmaceutical market of Russia within the sustainable development concept. The research aims to identify the specifics of implementing economic policies in the pharmaceutical market of Russian regions in the sustainable development context and develop strategic guidelines aimed at fostering green growth in pharmacy business and the economy. During the research, the authors applied theoretical, logical, and semantic analysis, as well as methods of synthesis, comparison, and practical modeling. The research extensively analyzes the peculiarities of the pharmacy business's participation in achieving the third global goal of sustainable development—ensuring a healthy lifestyle for all people of all ages and contributing to their well-being based on the analysis of the Russian market of dietary supplements (DS): the dynamics of sales in natural and cost assessments; the structure and price range of revenue from sales. The authors conclude that within the framework of implementing the sustainable development concept, the pharmacy business is increasing sales volumes and expanding the share of dietary supplements in the turnover of retail trade, contributing to the effective adjustment of the population's nutrition in Russian regions and maintaining the body in physiological balance. The authors justify the necessity of the participation of all economic entities, including consumer cooperatives, in the Russian market of dietary supplements, and ensuring the green economic efficiency of the pharmacy business in the long term.

Keywords

Economic policy · Sustainable development · Healthy lifestyles · Pharmaceutical market · Dietary supplements · Pharmacy business · Green growth · Green economy

JEL Classifications

E21 · I112 · I118 · O11 · O24

1 Introduction

In 2015, the global community adopted the 2030 Agenda for Sustainable Development. The Agenda serves as a roadmap for the future. Through it, the global community aims to ensure a decent life worldwide while simultaneously preserving the natural means of existence on a sustainable basis. This process encompasses economic, ecological, and social aspects. All countries are encouraged to align their actions with this development vector. Many organizations and countries have already declared their ambitious plans for implementing sustainable development principles at an early stage. The 2030 Agenda for Sustainable Development includes 17 Sustainable Development Goals (SDGs) and tasks covering a wide range of issues. One of the important directives is SDG 3: to ensure a healthy lifestyle for all people of all ages and contribute to their well-being. It is time

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to make healthcare part of the social infrastructure, viewing health as a public good that should be accessible to all (UN General Assembly 2015).

The list of goals and indicators for SDGs is periodically reviewed and expanded. In the version from March 2020, SDG 3 includes 27 specific indicators for its achievement, including mortality rates, the incidence of various diseases per 100,000 people, coverage of treatment and basic medical services, the number of healthcare workers per capita, and their distribution (UN General Assembly 2015).

Within the framework of implementing tasks to strengthen the capacity of all countries in the early warning, risk reduction, and management of national and global health risks, the development of the eco-product market holds significant importance. Contemporary challenges and threats to ecosystem security act as stimuli for transforming businesses, orienting them toward the eco-economy. The growth of this type of economic structure is driven by the modernization of its processes, as well as social practices aimed at increasing human well-being and health. The economic potential realized in the development process can be aggregated into a green growth strategy adapted to a specific economic system or economic entity. One of the benchmarks for this strategy is highlighted as the eco-product market. A healthy lifestyle for humans is primarily associated with environmentally clean food products and a balanced diet aimed at eliminating deficiencies in vitamins and minerals. Dietary supplements (DS) contribute to the effective adjustment of a full diet, differing from medications in their specificity for maintaining the body in physiological balance.

The green growth strategy implemented in Russia for the business in the DS market has been quite successful. However, it lacks methodological substantiation. Developed ideological and philosophical approaches, theoretical and practical works of Russian and international scholars related to studying the features of implementing the green economy in the DS market in the pharmaceutical industry show the insufficient exploration of the research topic.

Ideological approaches to the concept of green economy as a concept for environmentally educating businesses were considered at meetings of the UN Sustainable Development Commission in 2008 (https://commission.europa.eu/). Worldview perspectives regarding the necessity of greening organizational activities are presented in the World Development Report for 2017 (https://commission.europa.eu/). Theoretical and empirical aspects of the need to strategize commerce for green growth are reflected in the research of the European Commission and the Copenhagen Centre for Corporate Responsibility (https://commission.europa.eu/). The necessity of involving companies in corporate social responsibility, considering the interests and well-being of society, was studied by Gulyuk and Novichkova (2018).

These studies confirm the conceptual developments of green economic policies in business. However, there is a need for detailed elaboration regarding the strategic management of economic entities in the pharmaceutical industry oriented toward their green growth within the sustainable development framework. The definition of the category and factor composition of green economic policies in pharmaceutical activities is formulated as the research subject. The authors provide methodological justification for the approaches to work, their orientation, and the subsequent use of the results for ensuring strategic management of economic entities in the pharmaceutical industry, considering green economic efficiency in the long term.

The presented information determines the theoretical, methodological, and practical role of the research topic, while unresolved issues become the targeted priorities and tasks of the study.

The research aims to establish the features of implementing economic policies in the pharmaceutical market of Russian regions within the context of sustainable development and to develop strategic guidelines aimed at the green growth of pharmacy business and the economy.

The research tasks are as follows: (1) to define the concept of green economic policies in pharmaceutical activities, (2) to synthesize factors for the strategic management of economic entities in the DS market of the pharmaceutical industry of the Russian Federation, and (3) to diagnose strategic directions to ensure green growth in business economic efficiency in the long term.

2 Methodology

The theoretical foundation of this research is rooted in the works of international companies and Russian scholars, including N. V. Gulyuk and I. V. Novichkova, which are associated with studying the intricacies of implementing green economic policies by economic entities (https://commission.europa.eu/; Gulyuk and Novichkova 2018). The informational basis relies on statistical data and materials from DSM Group (https://dsm.ru/). Throughout the research, the authors employed a combination of theoretical, logical, and semantic analysis, synthesis, comparison, and practical modeling.

3 Results

During the theoretical, logical, and semantic analysis, the authors characterized the definition of green economic policy in the pharmaceutical industry as a state of balance within the economic system of the pharmaceutical sector. This state provides the opportunity for the most effective

and systemic management of economic entities in the pharmaceutical market to ensure green economic opportunities in the long term.

To substantiate the concept in the research, the authors identified the specificity of implementing economic policy in the dietary supplement market within the pharmaceutical industry. According to alternative medicine, human health is 50% determined by lifestyle (the completeness and variety of nutrition, the presence of harmful habits and stressful situations, conditions of professional activity), 20% by genetic background, 10% by the level of healthcare system assistance, and 20% by the state of the surrounding ecosystem (https://fcgie.ru/; https://minzdrav.gov.ru/). Global natural reforms in ecology have an impact on the human body. As a result, we observe a general increase in morbidity over the past twenty years by 63.5%: from 106,742 diagnoses in 2002 to 174,517 in 2022 (https://rosstat.gov.ru/). The expected life expectancy with a planned indicator of "80+" in 2018 was 73.4 years in 2023 (https://rosstat.gov.ru/).

The COVID-19 pandemic has contributed to more careful attention to one's health, timely diagnostics, and prevention. The expansion of the availability of non-prescription drugs through online trading has led to an increase in the dynamics of dietary supplement sales in the Russian Federation (Fig. 1).

Over the analyzed five years, the turnover of dietary supplements in Russia in monetary terms increased by 1.9 times (from 54.2 billion rubles in 2018 to 105 billion rubles in 2022), with a simultaneous increase in sales in natural volume by 11% (from 328 million packages in 2018 to 364 million packages in 2022) (https://dsm.ru/; https://minzdrav.gov.ru/). The dynamics of the cost of dietary supplements vary in the range of 2.3% in 2019 to 12.3% in 2022, indicating sufficient profit margins for sales in this direction due to the applied markup (https://dsm.ru/; https://minzdrav.gov.ru/).

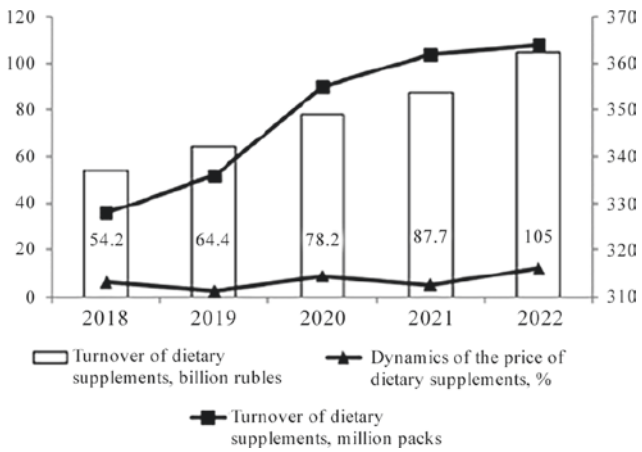

Fig. 1 Dynamics of sales of dietary supplements and their cost in the Russian Federation (2018–2022). *Source* Developed by the authors based on (https://dsm.ru/)

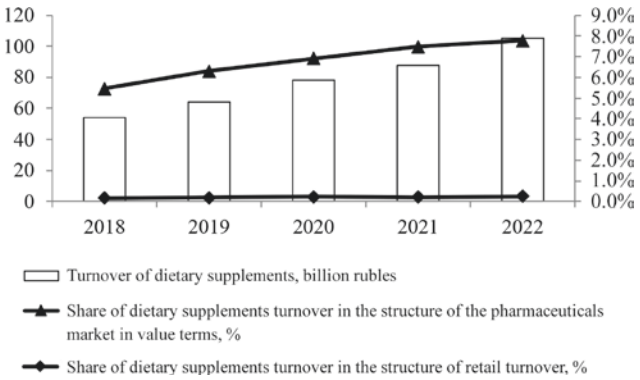

Fig. 2 Share of dietary supplements turnover in the structure of the retail market for pharmaceuticals and total retail turnover in the Russian Federation (2018–2022). *Source* Compiled by the authors based on (https://dsm.ru/)

Despite the suspension of orders on trading platforms such as "iHerb" and "Herbalife," the Russian segment of this market remains attractive to foreign companies, as confirmed by the product cards on "Yandex.Market." The dietary supplement market continues to grow (Fig. 2) due to inflation and the offerings of proprietary brands from pharmacy and medical organizations, where higher markups can be applied, leading to maximum revenue generation.

These include vitaminized supplements (C and D3), collagen, magnesium, and sedatives. The share of dietary supplements in the structure of the Russian retail market for medicinal products in monetary terms increased from 5.5% in 2018 to 7.8% in 2022 while maintaining a share of 0.2% in the overall turnover of retail trade over the five years (https://dsm.ru/; https://minzdrav.gov.ru/).

In terms of price range in 2022, 61% accounts for supplements priced over 500 rubles, 17% from 300 to 500 rubles, and 13% from 150 to 300 rubles. The shares of "50–150 rubles" and "up to 50 rubles" are at 7% and 2%, respectively, with an average purchase size of 288 rubles (https://dsm.ru/; https://minzdrav.gov.ru/).

The leaders in sales of dietary supplements for 2022, with a share of 32%, are the biological active supplements that affect the whole body. Supplements affecting the digestive tract occupied a share of 20%, the central nervous system—9%, bone structure—8%, and reproductive health—7%. The share of other dietary supplements is less than 5% (https://dsm.ru/; https://minzdrav.gov.ru/).

The analysis of the share of turnover of dietary supplements in the structure of the retail market for medicinal products in Russia in natural terms for 2018–2022 is presented in Table 1.

With the decrease in the volume of the Russian pharmaceutical market in natural terms from 2018 to 2022 by 12.2%, the share of dietary supplements in its structure

Table 1 Share of dietary supplements turnover in the structure of the retail market of pharmaceuticals in the Russian Federation in physical terms (2018–2022)

Indicators	Years					2022 in % to 2018
	2018	2019	2020	2021	2022	
Market capacity of pharmaceutical products, million packs	5101	5005	4945	4573	4478	87.8
Share of dietary supplements turnover in million packs, %	6.4	6.7	7.2	7.9	8.1	1.7

Source Developed by the authors based on (https://dsm.ru/)

increased from 6.4% in 2018 to 8.1% in 2022 (https://dsm.ru/; https://minzdrav.gov.ru/).

The price range of dietary supplement sales in natural terms for 2022 is as follows:

- Up to 50 rubles—31%;
- 50–150 rubles —21%;
- 150–300 rubles—17%;
- 300–500 rubles—12%;
- Over 500 rubles—19%.

The top sellers of dietary supplements in the pharmaceutical industry in 2022 were "Evalar" CJSC, with an industry share of 13%, and "SOLGAR" LLC, with 8% (https://dsm.ru/). The shares of other organizations are less than 2.7%. It should be noted that 81% of the natural turnover of dietary supplements is contributed by Russian manufacturers (https://minzdrav.gov.ru/).

The pharmacy network of consumer cooperative organizations also participates in the implementation of economic policy in the context of the sustainable development concept (Table 2).

Cooperative organizations in the Volga Federal District hold the leading positions in the number of pharmacies and veterinary pharmacies, accounting for 48%, followed by the Central Federal District with 31% (Centrosoyuz of the Russian Federation 2023, https://rus.coop/en/).

Despite the decrease in the number of pharmacies by 186 units from 2015 to 2022, the volume of medical services provided by the Central Union of Consumer Societies of the Russian Federation (Centrosoyuz) in rural areas has increased by 3.1 times (Centrosoyuz of the Russian Federation 2023, https://rus.coop/en/). Additionally, consumer cooperative organizations actively participate in the procurement of pharmaceutical raw materials and wild-harvested products (859 tons and 256 tons in 2022, respectively) (Centrosoyuz of the Russian Federation 2023, https://rus.coop/en/).

Implementing a strategy of green growth, cooperative organizations and business companies in the Russian regions enjoy a positive image and are characterized by high technological advancement and competitiveness. The primary goal of their implemented regional economic policy is sustainable development in the context of the eco-economy.

Table 2 Number of pharmacies and veterinary pharmacies of consumer cooperative organizations by Federal Districts of the Russian Federation in 2015–2022

Federal District	Availability as of January 1, 2023, units			
	Drugstores, pharmacy kiosks, and outlets	Specific weight, %	Veterinary pharmacies, kiosks, and outlets	Specific weight, %
Centrosoyuz of Russia—total, incl	141	100.0	48	100.0
Central	50	35.5	8	16.7
North-Western	6	4.3	13	27.1
North Caucasus	3	2.1	4	8.3
South	–	–	–	–
Volga	70	49.6	21	43.7
Ural	3	2.1	–	–
Siberian	6	4.3	1	2.1
Far Eastern	1	0.7	–	–
Others	2	1.4	1	2.1

Source Calculated by the authors (Centrosoyuz of the Russian Federation 2023, https://rus.coop/en/)

4 Conclusion

The conducted analysis of the implementation of economic policy in the pharmaceutical market within the framework of the sustainable development concept allows us to identify the following features:

1. In the context of implementing the sustainable development concept, the pharmacy business is increasing sales volumes and expanding the share of dietary supplements in the retail trade, contributing to the effective adjustment of the population's nutrition in Russian regions and maintaining the body in a physiological norm. There is observed green growth in the turnover of dietary supplements in the Russian retail market of pharmaceuticals by 50.8 billion rubles (1.9 times) during 2018–2022, with a simultaneous increase in the market structure share from 5.5% to 7.8%.
2. The average purchase size of dietary supplements is 288 rubles, with a predominance of sales volumes in the price segments "over 500 rubles" (61% of the total sales volume for 2022) and "from 300 to 500 rubles" (17% of the total sales volume for 2022).
3. Dietary supplements that have a positive effect on the whole body (32% of the total volume) and the digestive system (20%) are leaders in the sales of dietary supplements for 2022.
4. The share of turnover of dietary supplements in the structure of the capacity of the Russian pharmaceutical market in natural terms increased from 6.4% in 2018 to 8.1% in 2022, with a simultaneous decrease in the sale of drugs in packages by 12.2%.
5. Sales of dietary supplements in packages for 2022 prevail in the price range "up to 50 rubles" (31% of the turnover), "from 50 to 150 rubles" (21%), and "from 150 to 300 rubles"—17%. The segment "over 500 rubles" constitutes 19% of the total turnover.
6. The share of medical and veterinary services of consumer cooperatives in rural areas is growing.

Thus, within the framework of implementing the concept of sustainable development, the pharmacy business is increasing the share of dietary supplements in the retail trade, contributing to the effective adjustment of the population's nutrition in Russian regions and maintaining the body in a physiological norm. The growth in the implementation of green economic policies in the market of dietary supplements in the pharmaceutical industry makes it possible to pay increased attention to resource conservation and focus on a responsible approach to human health. Green growth strategies in the dietary supplement market should consider the individual characteristics of social, political, and economic business activities. Greening the mechanisms of the pharmaceutical industry contributes to increasing its economic potential and ensuring the sustainable development of the Russian economic system.

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Optimization of the Methodology for Evaluating the Economic Efficiency of Green Projects in the Automotive Industry

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Abstract

Despite the controversy and temporary inefficiency of some directions, the green economy, as well as one of its fundamental pillars—green energy, inevitably continues its development and consistently permeates into new areas of our lives. Moreover, one of the priority directions for further increasing the level of environmental safety in today's economic systems remains the electrification of vehicles. The overwhelming majority of green energy projects have environmental and other effects (e.g., social, humanitarian, political, and others). This scientific-applied research focuses on the economic effect of business projects currently implemented in the field of green energy. Particularly, the authorial team presents proposals for optimizing the methodology for assessing the economic efficiency of green projects in the automotive industry, primarily those related to the electrification of automotive transport. Based on the results of the applied research, the authors developed a formula to conduct a quantitative comparative assessment of the cost equivalent of the actual energy consumption levels of electric cars and vehicles equipped with internal combustion engines.

Keywords

Road transportation · Electric vehicles · Green economy · Green energy · Electrification of vehicles

JEL Classification

R40 · R41 · M10 · M12

1 Introduction

Despite emerging problems and resistance, the green economy is advancing rapidly in the Russian Federation and within the global economic system. Conservation and resource-efficient technologies are increasingly penetrating various industries and economic clusters, with a significant portion targeting the energy sector.

Various types of machinery and equipment consume a significant share of energy, including automotive transport. According to the most recent statistical data, the transportation sector of the global economy currently consumes about a quarter of all energy produced by the global energy system (Baines and Hager 2022). According to analytical documents from the IEA (Energy Efficiency Indicators: Fundamentals on Statistics) for 2023, over 90% of this energy volume is attributed to petroleum products. Practical experience shows that from the 1970s to the present day, the share of petroleum products in the overall volume of transport energy consumption has only reduced by 3.5% (IEA 2023).

The share of petroleum products in the total volume of transport energy consumption is currently 91%. The reason for this is apparent because nearly all modes of transportation (except for railways) utilize petroleum-derived products as fuel. Aviation uses kerosene; marine and river transport uses diesel or bunker fuel, and automotive traffic uses gasoline with varying octane numbers or the

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aforementioned diesel fuel. The situation in the Russian Federation is practically the same as in the world (Nemov 2018).

It is noteworthy that the primary consumer of petroleum products is automotive transport. Therefore, it is logical to assert that one of the promising and priority directions for the further development of the green economy is the reduction of energy consumption and the maximization of the environmental friendliness of automotive transport.

In light of the above, the thematic focus of the presented scientific-applied research, dedicated to optimizing the methodology for assessing the economic efficiency of green projects in the automotive industry, appears relevant and timely.

2 Materials and Method

The issues of ensuring energy security in general (Dvinin 2018), particularly the complex matters of electrifying automotive transport, are increasingly coming under the scrutiny of researchers at various levels and fields of scientific activity (Karev 2020). The genesis of such processes is attributable to the actively progressing crisis phenomena in the global economy, directly impacting the energy sector (Himchenko and Plaksina 2016).

There are many publications on energy security matters and automotive transport's electrification challenges. Their number has significantly increased due to recent events, which can be described as the activation of the business strategy by the leaders of Western countries.

Lebedev (2022), Brown and Clough (2017), and Simionescu et al. (2022) explored the general aspects of the functioning and development of the energy market.

A vivid example of works on green energy are the works by Dovgotko et al. (2020), Himchenko and Plaksina (2016); Shaw and Lind (2022); and Qiu et al. (2022). The problematic issues of wind power generation are addressed in the publications of Kutrakov (2022), Grosu (2019), Mutalimova (2022), and Afewerki and Steen (2022). Madaeva et al. (2021) and Jelley and Smith (2015) conducted studies in the field of solar power generation. The industry of hydrogen power generation is described in the works of Vasilyeva and Tsarev (2018), Evdokimov et al. (2019), and Malik et al. (2021).

The largest number of scientific publications can be observed in the field of electrifying automotive transport, including the works of Tenishev et al. (2017), Dhote et al. (2021), and Xi et al. (2019).

During this research, the authors applied the methods of abstraction, induction, analysis, synthesis, and generalization. Applied aspects of the study were ensured by applying methods such as observation, measurement, and comparison. During special research activities, the authors employed the methods of economic analysis, statistical-economic methods, and calculation-constructive methods.

The factual data and theoretical materials obtained during this research were summarized and logically structured in accordance with the general requirements for developing scientific-methodical foundations on the research topic.

3 Results

Currently, the development of electric vehicles is actively underway. There are also numerous attempts to maximize the practical application of electric vehicles.

Within the scope of this research, it is essential to pay close attention to the positive aspects of electrifying automotive transport. First, let us discuss the peculiarities of the technical maintenance of electric cars compared to vehicles equipped with conventional internal combustion engines. In terms of technical maintenance, any electric car is more economical than vehicles with internal combustion engines. An electric vehicle does not require the replacement of filters, spark plugs, oil, and generator belts. Additionally, thanks to regenerative braking, there is a much less frequent need to replace brake pads. Most importantly, the operational lifespan of the power unit of an electric vehicle is calculated at 900,000 km, while foreign internal combustion engines come with a warranty of uninterrupted operation at mileages ranging from 300,000 to 350,000 km. A warranty for uninterrupted operation of Russian combustion engines is 150,000–200,000 km under normal operating conditions.

Furthermore, electric cars are safer, primarily due to the absence of a large engine capable of causing significant injuries in emergencies to the driver and passengers. The rigid frame securing the electric batteries adds much greater strength to the body; placing batteries in the car's center under the seats reduces the center of gravity, ensuring more reliable protection against rollovers.

The operation of electric vehicles is also preferable from an environmental perspective. According to research conducted by scientists from the University of Oxford, nitrogen dioxide, a component of emissions from internal combustion engines, is annually responsible for the deaths of more than 10,000 people worldwide. Moreover, the health impact of diesel emissions is approximately five times higher than gasoline engines and 20 times higher than hybrid engines, such as those in the Toyota Prius.

The substantial difference in harmful emissions into the atmosphere by different types of car engines is the cause of this phenomenon.

Thus, if the CO_2 emissions during the operation of a car with a gasoline engine average 125 g, then for an electric car powered by electricity from mixed sources, the

equivalent is only 57 g on average throughout the EU. The maximum emissions during the charging of electric vehicle batteries with an extended range from fossil sources would be 102 g/km while using wind generators would result in 0 g of CO_2 emissions. Thus, the operation of electric cars appears unquestionably more environmentally preferable.

Therefore, the social and environmental impact of electrifying automotive transport is undoubtedly significant. The question of evaluating the economic efficiency of business projects in this field remains open.

Within the operation of electric vehicles, the question of the economic and technical efficiency of energy carriers becomes particularly interesting. In this regard, it is essential to say a few words about the efficiency coefficient of electric vehicle engines compared to internal combustion engines. It is most convenient to conduct such an analysis using the example of the gas energy sector. Thus, let us delve into the gas sectors of the power industry and automotive transport. It is easier to assess the economic effect of electrifying automotive transport in cases where the source of electricity and the fuel for the internal combustion engine of the car are identical (e.g., in the case of electrifying a gas-powered vehicle by transitioning to electric power generated by gas-fired thermal power stations). In such a scenario, the economic efficiency of electrifying automotive transport should be determined as the simple arithmetic ratio of the cost of gas, on average consumed by a car with an internal combustion engine per 100 km, to the cost of gas also spent on average for generating the electricity required by an electric vehicle to cover a similar distance. Additionally, it is advisable to consider the maintenance cost in such calculations. The formula for calculating the economic impact of electrification in this context would be as follows:

$$P = \frac{\mathrm{Ct} + Ac}{Ce + Ae}$$

where:

C_t cost of traditional fuel consumed for one year of operation of a car with an internal combustion engine, rubles;
C_e cost of electricity consumed by the electric vehicle for one year of operation, rubles;
A_c average annual cost of ownership of a car with an internal combustion engine, rubles;
A_e average annual cost of electric vehicle ownership, rubles.

The above formula is very convenient and straightforward in calculations yet maximally objective. The use of this formula for the needs of this research would be ideal if its application were not limited exclusively to the gas industry.

The average gas consumption rate per 100 km traveled when using gas equipment in internal combustion engines for an average passenger car ranges from 8 to 8.5 cubic meters (Fomichev et al. 2022). Meanwhile, from 1 cubic meter of gas, it is possible to generate (under normal operating conditions) 9 kWh of electricity at gas-powered power stations (Fomichev 2022a). In contrast, under normal operating conditions, an electric car consumes approximately 20 kWh per 100 km (Fomichev 2022b), the generation of which requires slightly more than two cubic meters of gas at thermal power stations with gas generation. It is easy to calculate that from the fuel consumption perspective, the operation of electric cars appears to be twice as cost-effective as the operation of vehicles equipped with internal combustion engines.

Nevertheless, the majority of internal combustion engines in automobiles are currently designed for the use of petroleum-derived products, primarily gasoline and diesel fuel (Fomichev 2022c). Apparently, more complex calculations will be required to assess the economic impact of electrifying vehicles of this category. Particularly, it seems reasonable, when calculating the profitability of business projects related to the electrification of automotive transport, to base it on a comparative assessment of the cost expression of the energy efficiency of internal combustion engines and electric car engines.

$$P = \frac{\frac{Pf}{Elf \times Eice}}{\frac{Pe}{Eem}}$$

where:

Pf price of 1 L of traditional fuel, rubles;
EIf energy intensity of traditional fuel, kWh;
Eice efficiency of the internal combustion engine;
Pe price of 1 kWh of electricity, rubles;
Eem efficiency of electric motor.

The proposed methodology, subject to its wide practical application, will allow experts to carry out an objective assessment of the economic efficiency of green projects in the field of electrification of road transport, regardless of the type of fuel used by cars with internal combustion engines and the method of electricity generation for electric cars.

4 Conclusion

Based on the applied research conducted within the presented scientific work, the following key conclusions can be drawn:

1. Despite existing challenges and resistance from reactionary forces in business and society, the green economy has firmly integrated into our lives and continues to develop at an accelerated pace.
2. One of the primary and most crucial directions for developing the green economy is undeniably the energy sector, particularly the greening of energy supply for automotive transport.
3. The key direction to enhance the ecological safety of automotive transport is its electrification.
4. The ecological and social efficiency of green projects in the electrification of automotive transport raises no doubts, as it is meticulously calculated.
5. Simultaneously, there are certain white spots in evaluating the economic efficiency of green business projects in the automotive industry. Particularly, a unified methodology for calculating such efficiency is lacking.
6. Assessing the economic efficiency of electrifying automotive transport is easiest in cases where the type of automotive fuel and the source of electrical energy coincide, as in the gas industry. In such cases, the effect can be determined by finding the simple arithmetic ratio of fuel consumption by a vehicle with an internal combustion engine to its expenses for producing the electricity necessary for an electric car to cover a similar distance.
7. In other cases, it is necessary to apply calculations based on a comparative assessment of the cost expression of the energy efficiency of internal combustion and electric car engines.

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Green Economy and High-Rise Construction in Moscow: New Approaches or a View from the Past?

Andrey A. Boltaevskiy, Dmitry I. Valigursky, Elena L. Maslova, Olga Z. Matveeva, and Vera K. Romanovich

Abstract

Although high-rise construction was known several thousand years ago, its dawn came in the second half of the 20th and early twenty-first centuries. Using various examples, the authors illustrate the prospects of high-rise construction in Russia's capital, noting that Moscow's future lies precisely in vertical development. The work demonstrates that high-rise construction will facilitate a shift towards polycentrism in the city, reducing the burden on the transportation system and incorporating elements of the green economy. By the middle of the twenty-first century, Moscow will transform into an ultramodern city, emerging from the vision of the future born in the distant 1960s. Quiet low-rise buildings (transformations may await areas like Kuryanovo, where the Biryulevskaya metro line will reach) will be engulfed by high-rise construction. However, high-rise construction will also make it possible to preserve green enclaves in the capital, which serve as the city's "lungs." The future of the Moscow environment lies in the judicious combination of residential development and green areas.

Keywords

Urbanization · High-rise construction · Skyscrapers · Moscow · Polycentrism · Future

JEL Classification

R10 · R11 · R12

1 Introduction

Requirements for the quality of construction work have been incorporated into legislative acts from ancient times. For instance, one of the laws of the Babylonian king Hammurabi, who lived almost 4000 years ago, stated, "If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes the death of the owner of the house, that builder shall be put to death" (https://www.hist.msu.ru/ER/Etext/hammurap.htm). It is not surprising because health, comfort, and the well-being of a person are largely determined by their home. Moreover, in the last century, as V. G. Glazychev rightly notes, "it is evident that we have no other world except urban culture" (Glazychev et al. 1995, p. 11). Despite the seeming categoricity of reasoning in the spirit of the ideologues of perestroika, life confirms the validity of this conclusion. Thus, close attention will be focused on urban development in the conditions of growing urbanization.

2 Methodology

The research employs a systemic approach, the foundation of which involves considering the object as a holistic complex of interconnected elements. The authors also utilize a comparative method, enabling them to draw parallels between the concepts of horizontal and vertical cities.

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3 Results

Most of human history is characterized by low-rise construction (we should note that we do not consider structures of a cultic nature). Perhaps the legendary Tower of Babel could have been the first skyscraper. The city of Rome during its ancient heyday, with an estimated population of no less than 500,000, justified the construction of blocks with five or six-story buildings, which seemed enormous by the standards of those times (http://abuss.narod.ru/Biblio/AncientCities.htm). However, it was precisely in this case that the exception confirmed the rule.

The nineteenth century marked the initial steps in the accelerated urbanization of several Western European countries, primarily Britain and, subsequently, the USA. Previously, the small size of the city was conditioned, among other things, by security considerations (fortification walls). Later, the expansion of the city quickly seized the immediate surroundings and other territories.

The actual beginning of genuinely high-rise construction (buildings exceeding a hundred meters in height are considered skyscrapers, and those towering over 300 m are considered supertall) dates back to the end of the nineteenth century and is associated with Chicago (USA). The so-called Great Chicago Fire in October 1871 destroyed a large part of the city but contributed to rapid development, turning Chicago into the heart of the USA for a moment. Theodore Dreiser described this event: "The fire began on Saturday and continued apparently unabated until the following Wednesday. It destroyed the banks, the commercial houses, the shipping conveniences, and vast stretches of property" (Dreiser 1912). In the last third of the nineteenth century, high-rise construction began its first steps in North America, reaching massiveness in the early twentieth century. Belgian researcher F. Samyn is confident that architecture will invent a vertical micro-district that will offer a higher quality of life compared to the current horizontal micro-district (Samyn 2014, p. 113).

However, there were critics of such construction. For example, K. Alexander wrote, "There is abundant evidence to show that high buildings make people crazy. Therefore, in any urban area, no matter how dense, keep the majority of buildings four stories high or less. It is possible that certain buildings should exceed this limit, but they should never be buildings for human habitation" (Alexander et al. 1977, p. 177). Nevertheless, despite this, the first 50 supertall buildings in the world were built over 80 years (1930–2010). Then, 50 supertall buildings were constructed from 2010 to 2015 (Al-Kodmany 2017, p. 2). This is largely explained by the direct desire to limit the spatial growth of the city and the desire to preserve agricultural land (especially relevant for China).

Later recognized as a theorist of skyscraper construction, Louis Sullivan formulated the following requirements for skyscrapers ("tucherez" as they were called in pre-revolutionary Russia):

- The first two floors should have a large open space and are intended for banks and stores;
- The underground and top floors serve as technical rooms;
- Office spaces in the high-rise building should not differ in layout

"Louis Sullivan was an artist whose medium was building, a poet whose materials were stone, brick, and mortar" (Scanlon 1959; Sullivan 1924).

In Russia, the progenitor of civil high-rise construction was the famous Seven Sisters Stalinist skyscrapers, the tallest of which—the Main Building of Moscow State University on the Sparrow Hills—reached 240 m. Notably, contemporaries perceived the first high-rise buildings in the capital as symbols, just like the metro and the Moscow Canal (Vetoshkin 1952).

In post-Soviet Russia, except for the "Gazprom" building in Moscow, the construction of buildings exceeding a hundred meters resumed only in the early twenty-first century. Nowadays, excluding the solitary "Lahta Plaza" in St. Petersburg, there are only two centers of high-rise construction in Russia: Moscow and Yekaterinburg (where the "Iset Tower" is located, which is the tallest building in Russia outside Moscow and St. Petersburg).

Let us consider the prospects of high-rise construction in Moscow, the flagship of the Russian economy. It should be noted that the current focus of Moscow officials is on the concept of a city comfortable to live in. Thus, in addition to active residential construction, the transformation of the urban environment is underway, including compliance with green economy standards. In this regard, it is important to determine how the city should develop in the future: vertically or horizontally.

It is worth recalling that even Thomas More, in his "Utopia," proposed a project for a green city where gardens would separate houses. For the early sixteenth century, the idea was not just innovative; it was truly revolutionary. Nowadays, in the conditions of the gradual formation of ecological society, close attention is directed precisely at the development of green spaces in urban areas (Table 1).

As is known, the idea behind the construction of "Moscow City" as a complex of skyscrapers was the desire to create a new center of attraction beyond the historical space within the Garden Ring. However, as noted by S. A. Lunochkin, increasing the height of buildings, minimizing pedestrian and public spaces, including green spaces

Table 1 Area of green spaces in urban areas in Russia

	Moscow	Moscow region	Russian average
Thousand hectares	91.6	60.2	2332
% of total urban land area	35.8	15.7	24.7

Source Compiled by the authors based on (Gorlov 2023; https://www.mos.ru/eco/documents/view/271573220/?utm_source=search&utm_term=serp; Rosstat Regional Office of Moscow and Moscow Region 2023)

in favor of parking lots, abandoning a pedestrian street around the central core, low quality of landscaping elements, and other problems lead to a decline in the quality of the urban environment and reduce the quality of individual buildings, which are practically impossible to fully inspect (Lunochkin 2017, p. 21). Hence comes the understanding of the construction of tall buildings with consideration for the development of the surrounding space.

The expert community notes that, in addition to the idea of polycentrism, which implies the formation of new centers of attraction, urban development in the capital is following the Asian path, characterized by dense high-rise construction. While there is no documentary evidence for this, it is worth noting that Moscow Mayor S. S. Sobyanin not only visited Seoul but also showed interest in the experience of addressing urban issues in the capital of South Korea (Arefiev 2011).

Thus, this time, another area of the industrial zone near the Yuzhny Port [Southern Port] has been chosen as the new center of attraction. For a long time, this was a gloomy and depressive territory; the Yuzhny Port Street, with its numerous turns, was popularly called the "drunk road."

Specifically, the Yuzhny Port and the Pechatniki districts are characterized by not having the best car accessibility: the areas are squeezed between the Kursky railway line, the Moscow Central Circle, and the Moscow River. Projects to straighten the Yuzhny Port Street have been known for a long time. For instance, trolleybuses were planned to run along the street even in the "pre-electric transportation era." However, they have only just begun to receive actual implementation. It is planned to reconstruct the Yuzhny Port Street into a three- or four-lane thoroughfare, which will ultimately have an exit to the Moscow Central Diameters. As for the Yuzhny Port metro station, it is still in the design stage; its construction is complicated by the need to close a section of the Lyublinsko-Dmitrovskaya line.

Unlike Moscow City, the Yuzhny Port has the advantage of being situated by the river, which will also have transportation significance in addition to the recreational effect. River trams (poetically named "Sinichka") will connect Pechatniki with the Avtozavodsky district. Thus, the waterfront will become an additional asset for the new center.

Observers note that the transportation accessibility of the Yuzhny Port will be significantly worse than of the first one. Currently, Moscow City is served by three metro lines (Filyovskaya line, Solntsevskaya line, and a branch from the Bolshaya Koltsevaya line [Big Circle Line], which will eventually become part of the Rublyovo-Arkhangelskaya line), as well as the Moscow Central Circle (MCC) and the Moscow Central Diameters (MCD-1), to which MCD-4 will be added. Regarding roadways, Moscow City is close to the prestigious Kutuzovsky Prospekt, which is practically free of traffic lights. This is not the case for the Yuzhny Port, which is still ahead in development. According to plans, the new district's population will reach 40,000 people, and the number of jobs will be around 5000. The district is expected to have a certain tourist influx. Besides the yacht club, even floating bathhouses are anticipated (Archcouncil of Moscow 2023; Shchukin 2023).

However, besides the riverfront, the Yuzhny Port has another significant advantage: its proximity to the Dream Island amusement park. In the future, the recreational infrastructure in the Yuzhny Port and the Dream Island will complement each other, attracting significant flows of tenants and family homebuyers (Metrium 2023).

The issue of business activity cannot be ignored. It is unclear how much demand there will be for business spaces. This is compounded by the not-so-positive image of the area associated with industrial grayness. Moreover, the Southeastern Administrative District traditionally ranks low in real estate ratings. Nevertheless, successful gentrification experiences exist in Russian contexts, such as ZIL and VinZavod in Moscow and New Holland in St. Petersburg. Developers predict that Yuzhny Port will become a new landmark in Moscow (https://aif.ru/moscow/bolee_900_tys_kv_m_nedvizhimosti_postroyat_na_meste_promzony_yuzhnyy_port).

4 Conclusion

For over 11 years, construction has been planned on a territory of just over 40 hectares, totaling 1.5 million square meters, of which 2/3 will be dedicated to residential buildings. Sixteen residential high-rises, several apartment hotels, and an office skyscraper reaching a height of 350 m will be constructed along the waterfront (Gudoshnikov 2021).

However, the concept of a vertical city will not be limited to the southeast of Moscow. Moscow's Chief Architect, S. O. Kuznetsov, believes that an "efficient modern city is a high-density city, and such density is mainly achieved through height" (Kasyanikova 2021). As part of the project

"Northeast City – a driver for the development of Moscow's polycentrism and the redevelopment of territories," a comprehensive development of skyscrapers is planned for the Butyrsky district, and a high-rise structure will also be constructed in the 82nd quarter of Khoroshyovo-Mnyovniki district.

By the mid-twenty-first century, Moscow will transform into an ultramodern city from the futuristic vision born in the distant 1960s. Meanwhile, quiet low-rise buildings (transformations may await areas like Kuryanovo, where the Biryulevskaya metro line will reach) will be engulfed by high-rise construction. Simultaneously, high-rise construction will make it possible to preserve green spaces in Moscow, which serve as "lungs of the city." The future of Moscow's environment lies in the sensible combination of residential development and green areas.

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Retail Trade in Rural Areas as a Factor of Attractiveness of Green Business

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Abstract

Retail trade in rural areas is an integral component of the infrastructure and economy of such territories. It plays a pivotal role in providing the population of rural areas with essential goods and services such as food products, medical supplies, household and gardening goods, clothing and footwear, communication services, banking services, etc. This approach is foundational in developing green businesses because it enhances the attractiveness of the activities of various economic sectors in this direction. This trend significantly impacts individuals residing in remote rural areas where the absence of retail trade could substantially deteriorate their financial and social standing. The development of the retail sector contributes to the formation of green businesses and expands the sales geography, ultimately fostering an increase in agricultural production volumes in the region. This developmental cycle may lead to the creation of new job opportunities and support the growth of the local economy. Overall, retail trade within the green business framework is a key factor in developing rural areas and is considered a priority direction of state policy. The authors analyzed information regarding retail trade objects in rural territories in the Southern Federal District.

Keywords

Rural territories · Retail trade · Rural development · "green" business · Standard of living of the population · Green economy

JEL Classification

F18 · O13 · O18

1 Introduction

Retail trade in rural areas serves as a factor of attractiveness for green businesses, fulfilling a range of functions, from organizing markets for finished products to fostering regional development, including the standard of living for the population.

Given that improving the quality of life for residents involved in the development of green business is impossible without accessible retail trade facilities, the assessment of these facilities can be conducted based on the following criteria (Firulina and Veretennikov 2016; Kaurova et al. 2023; Skripnik 2023; Tkach et al. 2023; Vasilyeva al. 2023):

- Accessibility: the presence of retail facilities near populated areas and the possibility of delivering products to homes;
- Range and quality of goods: the availability of a variety of food products, including fresh products and everyday consumer goods;
- Prices: competitive prices for products offered in retail stores;
- Level of service: friendliness of staff, convenience, and comfort of the store;
- Availability of other services: presence of ATMs, pharmacies, post offices, and other services that enhance the quality of life for the population.

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Assessing and analyzing these criteria can help determine the need for rural area development, including constructing new retail facilities, expanding product assortments, and improving service levels. This can also contribute to attracting investments in the region and enhancing the quality of life for the local population.

The research aims to quantitatively and qualitatively analyze information on retail trade in rural areas from the perspective of green business development. Achieving this goal required addressing the following objectives:

- Understanding the role of retail trade in rural areas as a factor in increasing the attractiveness of green business;
- Identifying the characteristics of consumer demand in rural areas;
- Studying methods of organizing and managing retail trade in rural areas within the framework of green business;
- Assessing the impact of retail trade development on the socio-economic development of rural areas and the activities of the population in the green economic sector;
- Developing recommendations for the development of retail trade in rural areas.

2 Methodology

Methodological explanations and key agricultural indicators provided by the Federal State Statistics Service for the Krasnodar Territory and the Republic of Adygea were utilized (Voronkova et al. 2019).

Additionally, theoretical developments by Russian authors regarding the assessment of the level of development of rural territories and green business were referenced (Asanova and Afonin 2023; Asanova et al. 2023, 2022; Federal State Statistics Service of the Russian Federation 2024; Firulina and Veretennikov 2016; Grishina 2014).

The research employed the approach presented by I. I. Firulina and M. Yu. Veretennikov (Asanova and Afonin 2023) regarding the development of the ecological vector of economic activity in rural territories of the Russian Federation.

3 Results

The analysis of retail trade objects in rural areas of Russia may encompass several aspects, considering the specificity of rural districts. The following features of federal subjects should be distinguished:

1. Demographic characteristics:
   - Examine the population of rural areas, including its size, structure, income level, and consumer preferences;
   - Evaluate population dynamics, migration, and other factors influencing the demand for goods and services.
2. Infrastructure and accessibility:
   - Assess the level of accessibility of rural areas to retail trade objects and consider the presence of roads, transportation infrastructure, and other means of mobility;
   - Examine the availability of educational and medical institutions because this may also influence the development of retail trade.
3. Competitiveness analysis:
   - Identify key competitors in rural areas. These may include large retail chains as well as local enterprises;
   - Study their assortment, pricing, service quality, and other factors that may affect consumer attractiveness.
4. Specifics of consumer demand:
   - Examine the peculiarities of consumer demand in rural areas. This may include analyzing the popularity of certain goods, seasonal fluctuations, and other factors;
   - Apply the results of demand analysis to shape the assortment of goods in stores.
6. Marketing strategies: Develop marketing strategies considering the specifics of rural areas. This may include attracting attention through local events, using social networks, and other channels.
7. Collaboration with local suppliers: consider the possibility of collaboration with local manufacturers and suppliers of goods. This can contribute to the development of local businesses and meet consumer preferences.
8. Technological solutions: utilize technological solutions such as online sales and product delivery to expand the availability of goods for rural residents.
9. Legislative and tax analysis: assess the peculiarities of legislation and taxation related to retail trade in rural areas. This may affect business strategies and financial sustainability.
10. Social responsibility: consider the possibility of implementing social responsibility programs, such as supporting local initiatives and charity.

With the aforementioned steps, we will be able to better understand the characteristics of retail trade in rural areas of Russia and develop effective strategies for successful business in this area.

To accomplish the previously set tasks, we will assess the attractiveness of rural areas for conducting green business.

According to Table 1, the total number of stores across the Russian Federation amounted to 167,013 units as of the end of 2021.

As for department stores, they are represented in a smaller quantity—only 143 units throughout the Russian Federation. Pharmacies and pharmacy points comprise 6020 units, tents and kiosks—6631 units, and pharmacy kiosks—5006 units.

It should be noted that the Krasnodar Territory occupies a leading position in terms of the number of supermarkets, department stores, specialized food and non-food stores, minimarkets, other stores, shopping units, pharmacies, and pharmacy kiosks throughout the Southern Federal District. Only in terms of the presence of tents and kiosks does the Krasnodar Territory surpass the Republic of Crimea (which comprises five units). This indicates that locating these subjects within the territory of the Krasnodar Territory will be in demand.

It is worth noting that, according to data on the socio-economic development of rural territories, the Southern Federal District lags behind by 528,666.6 m^2 in terms of total trade areas, with only the Volga Federal District surpassing it with an area of 3,104,556.9 m^2.

In most other categories, the Southern Federal District and the Krasnodar Territory are leaders among the regions of Russia. Thus, the Krasnodar Territory and the Southern Federal District occupy leading positions in the number of retail trade objects in rural areas in the Russian Federation, indicating particularly favorable conditions for the development of green business in this region.

According to the conducted analysis, many rural settlements have shops and shopping units where one can purchase groceries, beverages, household chemicals, stationery, etc. Additionally, markets operate in villages and rural areas where one can purchase fresh fruits, vegetables, dairy products, meat, and fish. Overall, in the Krasnodar Territory, conditions were created in rural areas for convenient and accessible supply of the population with necessary goods.

To improve the situation in rural settlements, it is necessary to continue developing green businesses locally to reduce the costs of delivering products from other regions.

State programs for developing green businesses in rural areas should be created based on analyzing regional features and the successful experience of leading regions, such as the Southern Federal District and the Krasnodar Territory in the Russian Federation. The programs should consider infrastructure needs, ecological sustainability, support for entrepreneurship, and the introduction of new technologies to stimulate the development of green businesses in rural areas.

The proposed measures will help improve the economic situation in rural areas and provide the population with necessary goods at affordable prices.

4 Conclusion

In accordance with the research objectives, the following conclusions and recommendations were made.

Consumer demand in the rural areas of the Krasnodar Territory differs from that in urban areas, which can significantly impact the development of green businesses. Some features of consumer demand in the rural areas of the Krasnodar Territory may include the following:

- Low levels of income among the population. In most cases, incomes in rural areas are lower than those in urban areas. Additionally, the incomes of rural residents may be unstable because they depend on crop yields and seasonality;
- High proportion of expenditures on food. Due to low incomes, rural residents are forced to spend a significant portion of their income on food. This may influence their choice of products and their need for other goods and services;
- Limited access to stores and services. Rural areas may have fewer stores and limited access to other services, such as medical services, transportation, and entertainment, which can affect overall consumption levels in these areas;
- Unique preferences and needs. Rural areas may have different preferences and expenditure needs, often tied to regional traditions and culture. For example, most rural residents tend to choose local and more traditional products such as honey, milk, agricultural products, etc.;
- A significant portion of the population is at risk. Some rural areas may have a significant portion of the population in at-risk groups, such as the elderly, low-income families, large families, etc. This may mean that more accessible and affordable services and products, which can be purchased within their small budget, are needed in these areas.

To study the methods of organizing and managing retail trade in the rural areas of the Krasnodar Territory to enhance the attractiveness of green business, the following is recommended:

- To explore the experience of successful entrepreneurs. It is necessary to conduct interviews with successful entrepreneurs working in retail trade in the rural areas of the Krasnodar Territory and note their experience, strategies, and management methods;

Table 1 Information on the availability of retail trade facilities in rural areas, 2021

	Stores—total	Hypermarkets	Supermarkets	Department stores	Specialized food stores	Specialized non-food stores	Minimarkets	Other stores	Shopping units	Pharmacies and pharmacy stores	Tents, kiosks, units	Pharmacy kiosks and points, units
Russian Federation	167,013	42	2525	143	9922	21,278	100,548	32,555	15,106	6020	6631	5006
Central Federal District	21,360	15	435	13	1017	2202	14,065	3613	2318	591	1174	875
Northwestern Federal District	10,153	8	199	9	391	1255	6075	2216	782	260	265	406
Southern Federal District	34,079	9	441	28	2623	5938	17,716	7324	4481	1561	1561	484
North Caucasus Federal District	14,763	–	127	8	1781	1708	6758	4381	680	945	562	65
Volga Federal District	39,693	7	769	48	2077	4774	25,881	6137	2542	1388	1798	1052
Ural Federal District	9706	–	129	9	460	1293	5835	1980	977	325	180	234
Siberian Federal District	26,550	3	333	23	1138	3050	17,658	4345	2453	633	846	1537
Far Eastern Federal District	10,709	–	92	5	435	1058	6560	2559	873	317	245	353

Source Compiled by the authors based on (Federal State Statistics Service of the Russian Federation 2024)

- To assess the demand for goods and services in the rural areas of the Krasnodar Territory, identify the main needs of rural residents, and determine the characteristics of their consumer behavior.

The development of retail trade can positively affect the socio-economic development of rural areas. First, developing retail trade can create new jobs for local residents, primarily in the green business sector. This can help reduce the level of unemployment in rural areas and increase the incomes of local residents.

Second, developing retail trade can improve the quality of life for people living in rural areas. The diverse range of goods and services offered by retail stores can help address the problem of lack of access to necessary goods and services, which often occurs in sparsely populated areas.

Third, the development of retail trade can stimulate the development of other sectors of the economy. For example, the emergence of new stores can lead to the development of the manufacturing sector, transportation, and other related industries.

However, it should also be noted that the mass development of retail trade can lead to the emergence of large chain stores, which may squeeze out small entrepreneurs. This can lead to a reduction in the number of local jobs and have a negative impact on the region's economy. Additionally, the development of retail trade should be accompanied by social and environmental responsibility to preserve the environment and social sustainability of rural areas.

The following recommendations are presented for the development of green businesses in rural areas:

- Market analysis: study customer needs and requirements, market trends, competitive environment, and growth opportunities. Based on this analysis, it is recommended to determine specific directions for development;
- Expansion of product range: diversification can attract more customers and increase sales volumes;
- Location: Consider opportunities to open stores in areas with low competition and favorable rental conditions;
- Online trading, provision of order pickup points: the ability to order and pay for goods online can attract customers who cannot visit the store due to distance from the city.

At the state level, it is necessary to create special programs to develop rural trade and provide support to small entrepreneurs wishing to start businesses in rural areas. When creating such programs locally, it is necessary to consider the following:

- Socio-economic characteristics, including studying demographic data of rural population, income levels, and employment rates, and analyzing socio-cultural characteristics of consumers;
- Geographic research (determining the location and accessibility of retail outlets, analyzing transportation infrastructure, and logistics);
- Marketing research (determining demand for goods and services in rural areas, analyzing consumer preferences and popular product categories, studying market competition in retail trade);
- Assessment of the potential for green business (researching demand for environmentally friendly products and services, analyzing opportunities for the development of green retail trade).

The results of these studies can be used to develop and adapt government programs for the development of retail trade in rural areas, including programs for the development of green business.

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The Kazan Stearic and Soap Plant of the Krestovnikov Brothers as the First Large and Innovative Regional Enterprise

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Abstract

The relevance of the investigated problem is determined, first, by the understanding of the objective interconnection between the level of economic development and corresponding changes in the social sector. Second, it is determined by the fact that the creation and optimal development of innovative and knowledge-intensive industrial sectors are inconceivable without considering the existing adapted experience accumulated by pre-revolutionary industrialists and entrepreneurs. In the authors' view, the practical experience of the owners of the largest knowledge-intensive industrial enterprises of the Russian Empire is of particular research interest. The research aims to briefly examine the level of production development in a specific large and knowledge-intensive industrial enterprise to designate it as a city-forming enterprise, capable of exerting a decisive influence on the creation and subsequent improvement of the "all-class" urban environment during the modernization of Russia in the second half of the nineteenth century to the early twentieth centuries. The presented research is based on the principles of historicism, objectivity, a social approach, and a comprehensive study of history; on the understanding and practical application that history is an interdisciplinary science; on the fundamental theoretical positions of the scientific works of M. I. Tugan-Baranovsky, M. Weber, and D. Bell. The research establishes that the large, advanced, and knowledge-intensive chemical production in the city of Kazan, operating in the conditions of a market economy, served as a factor in the industrial development of the city and region and contributed to significant and qualitative changes in the social sector. It is natural that many objects of the "all-class" urban environment and urban infrastructure emerged precisely during the era of growing and then turbulent development of trade and industrial activities, conducted in the conditions of a market economy and corresponding changes in pre-revolutionary Russian legislation. Other researchers can use the materials and authors' conclusions presented within the research to explore further the peculiarities of the emergence, formation, and development of advanced industrial enterprises and their impact on regional social dynamics.

Keywords

Russian pre-revolutionary chemical industry · Kazan Chemical Factory of the Krestovnikov brothers · City-forming enterprise · Industrial and social development · Company's social policy · Enterprise of the Krestovnikov brothers · Russian pre-revolutionary legislation · "All-class" urban environment

JEL Classification

L65 · N73

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1 Introduction

1.1 Relevance of the Problem

One of the characteristic features of industrial development in Russia was the establishment of cities that served as the social infrastructure for one or two city-forming enterprises. A significant portion of the urban workforce was employed in these designated productions. The presence of a certain connection between the functioning of these productions and its specific impact on addressing certain social issues is undeniable. Such enterprises, whose industrial activities were carried out in market conditions and under the existence of legislatively formalized local self-government systems, performed a notably significant role (e.g., in shaping the revenue part of urban budgets) (Dolganova and Istomina 2019).

Global experience attests that the mere existence of advanced and knowledge-intensive city-forming productions had a decisive impact on social modernization. During the same historical period referred to as the "Industrial Revolution," urban infrastructure and an "all-class" urban environment emerged in British, German, French, Belgian, and North American industrial centers. In other words, when modern industrial production emerged in a certain territory, it led to a sharp local leap in the economic and social sectors. Conversely, the reverse process was observed when a large and knowledge-intensive production ceased its activities. The Industrial Revolution led to a change in the social structure of the population, the abandonment of many class prejudices, and the emergence of "all-class" legislation in the countries where it occurred. Therefore, the creation and further improvement of urban social infrastructure depended not on the will of the supreme authority but on the successful development of the productions operating in a particular territory.

The industrial development of Britain, as the first country to enter the industrial era, contributed to the transformation of archaic medieval towns into modern industrial centers (London, Edinburgh, Glasgow, Liverpool, Manchester, Bristol, and others). The objectively increasing demand for labor by large and knowledge-intensive industrial productions facilitated urbanization, defined as the growth in population and area of cities (Borkheim 1905). Rural areas allowed individuals to sustain themselves on their own plots of land. However, in the pre-industrial era, life in the village implied an extremely low level of commodity-money relations, compelling rural residents to engage in handicrafts or "odd jobs" and, sometimes, to work seasonally from late fall to spring for various enterprises. In other words, to earn a living, a peasant had to travel to the city. Market competition compelled forward-thinking entrepreneurs, known as "factory owners," to incorporate scientific advancements into production and strive to form a permanent workforce. It was natural that this became one of the key reasons for improving the forms and methods of social policy in advanced productions and at the level of urban governance, objectively contributing to the creation and shaping of an "all-class" urban environment, urban economy, and social infrastructure (Laugel 1874). In the end, the purpose of creating socially significant infrastructure was also to transform the wandering peasant into a settled urban resident (Tugan-Baranovsky 1922). Furthermore, the industrial revolution in the United Kingdom, involving the creation of advanced and knowledge-intensive industries, occurred in the presence of powerful democratic institutions, including Parliament, a multi-party system, and a free press. British workers could successfully and legally defend their rights and interests, fully utilizing all available potential. This naturally led to a significant improvement in their material conditions and transformed the British working class into a highly influential political force.

The eminent Russian historian A. A. Kiesewetter asserted, "…the history of Russia is not a solitary process and not an identical reproduction of the history of other countries" (Kiesewetter 1909). It is necessary to acknowledge the gradual nature and the overall unevenness of the mentioned development. The establishment of advanced and knowledge-intensive productions, acting as unique engines of local industrial revolutions, occurred not simultaneously in different parts of the country. For instance, in the Transcaucasia region, in the Tiflis Governorate, the first major mechanized factory (Mirzoyev Textile Manufactory) was founded only in 1865 (Rodonaya 1962).

V. I. Lenin claimed that the market-driven "…large-scale machine industry… creates population mobility" (Lenin 1971), influencing the emergence and further improvement of social infrastructure in rapidly developing industrial centers. Lenin noted that the "transition from manufacture to the factory marks a complete technical revolution…; the most radical transformation of social relations follow this technical revolution…" (Lenin 1971).

1.2 Importance of Studying the Problem

The comprehensive scientific study of the development of local industry contributes to understanding the place and role of advanced, large, and knowledge-intensive productions in a specific region of the country, making it possible to explore the general patterns of the Industrial Revolution in pre-revolutionary Russia and the regional peculiarities of this transformation.

It is essential to specify that the study of the socio-economic development of a particular territory requires the researcher to conduct meticulous and comprehensive analysis of the corresponding socio-economic processes that occurred in that historical era within the country and globally. The history of a specific region is part of the country's history, and the history of the country, despite individual features, is an integral and undeniable component of world history.

Therefore, by comparing the economic and social development of particular territories belonging to a unified legal and economic space, it is entirely possible to identify the peculiarities or level of development of a particular country and reveal the general patterns of the global historical process.

Indeed, information about the economic development of the Kazan Governorate is a part of the economic history of Russia, interconnected with a unified global-historical process, the foundation of which in the specified period is the scientific understanding of the Industrial Revolution. It is necessary to determine the place and role of the knowledge-intensive and large chemical production of the Krestovnikov brothers in the structure of the regional industry in the first decades of its existence.

1.3 Research Hypothesis

Through the analysis of a significant corpus of published and unpublished sources, including scholarly works, the authors concluded that the majority of industrial enterprises operating in the Kazan Governorate before the establishment of the mentioned stearic-soap, glycerin, and chemical plant in Kazan (1855) should be identified as "semi-craft" and "small-scale" productions, which cannot be classified as mechanized and advanced. A negligible portion of the provincial productions has been designated as so-called "capitalist manufactories," which, despite some technical innovations and certain mechanization of production processes, qualitatively lagged behind the advanced and knowledge-intensive enterprise of the Krestovnikov brothers in Kazan.

2 Methodology

To confirm and comprehensively validate the aforementioned hypothesis, the authors applied various general and specific methods.

The authors processed and examined a significant volume of source material, primarily consisting of reference and archival documents.

In the analysis of the literature and sources, the authors employed universal methods of scientific cognition, fundamental principles of scientific-historical understanding, and general and specific methods of historical research. For instance, the authors utilized empirical methods (comparison and description) and theoretical methods (analysis, synthesis, induction, deduction, modeling, etc.) as universal means of cognition.

The fundamental principle of historical understanding was the principle of historicism, making it possible to establish cause-and-effect relationships based on the awareness of the unity of processes and phenomena considered in their dynamics and in the context of objective realities. The principle of objectivity facilitated avoiding certain archaic ideologies and conducting a critical analysis of the source base. Special methods of systemic analysis and cause-and-effect analysis contributed to identifying the reasons for the successful development of the studied enterprise and understanding its role as a city-forming production.

The mentioned methods allowed the authors to present the research object as a unified whole and determine its specific features.

3 Results

Indirect evidence of the absence of large and advanced productions in Kazan before 1855, which could be designated as city-forming, is the evident decline in the urban economy and extremely low urban development. The Kazan local historian M. N. Pinegin complained that during this period, "the urban economy in Kazan… was not conducted entirely satisfactorily": there were no "proper pavements," cholera was a "frequent guest," and there was no normal water supply and adequate urban lighting (Pinegin 1890).

N. K. Krestovnikov, one of the seven brothers who were founders and owners of the first city-forming enterprise in Kazan, in turn, confirmed Pinegin's theses about the lack of urban development and proper sanitary conditions, stating that "…at that time in Kazan, they had no idea about it" (Krestovnikov 1903, 1904). The mentioned cholera was one of the most serious sanitary problems for the growing city because, due to the absence of a water supply system, citizens used water from Nizhny Kaban Lake, near which were the cattle market and slaughterhouses. The lack of urban chimney sweeps was also a problem in the conditions of exclusively stove heating. In the mid-nineteenth century, none of the cities in Russia could do without a significant number of chimney sweeps.

N. K. Krestovnikov wrote that traveling through Kazan, even in a carriage, was quite risky because "there were almost no pavements, and those that were marked on the

plan and called pavements were made of soft limestone, spreading caustic dust in dry weather … and contributing to the formation of wolf pits in rainy weather, in which the ordinary tarantasses and other simple carriages broke down" (Krestovnikov 1903, 1904).

Thus, there was an inherent correlation between the state of urban improvement, on the one hand, and the presence of large and high-tech city-forming industries in this city, on the other hand. In the authors' view, the absence of sidewalks, parks, squares, unsatisfactory sanitary conditions in the city, etc., also acted as an objective obstacle, for example, to the formation of a favorable investment climate.

The continuous production activity of the plant of the Krestovnikov brothers began in December 1855. The amount spent by the Krestovnikov brothers on the construction and commissioning of the designated plant was enormous for that time—one hundred and seventy-five thousand silver rubles. This significantly exceeded the amount envisaged by Professor M. Ya. Kittary's project of 104,378 silver rubles (Kittary et al. 1990). The uninterrupted influx of capital invested in this production was ensured through highly profitable trade operations of the plant owners with Central Asian cotton.

A specially adorned and beautifully decorated case, filled with samples of the main marginal products of the plant—stearic candles—produced at the first large urban enterprise, was ceremoniously presented to the admiring Kazan governor-general and his spouse (Krestovnikov 1903, 1904). The creation and launch of a modern industrial enterprise of that time sparked genuine interest among the residents of Kazan because it "…aroused the curiosity of the townspeople. Most believed that stearic candles would be made from potato flour" (Krestovnikov 1903, 1904). The aforementioned "live interest" did not stop at mere curiosity because the success of the brothers' enterprise, which established an advanced industrial production from scratch, became a kind of example for regional entrepreneurs to follow. "Looking at us, steam mills, cloth factories, sawmills, and others began to appear. Kazan… took on the character of a factory center in the Volga Region" (Krestovnikov 1903, 1904). From the very beginning (i.e., since 1855), the "new plant was a giant among the dwarf semi-craft enterprises in Kazan…" (Kluchevich 1950).

The enterprise of the Krestovnikov brothers in Kazan, significant for its time, became the first material symbol of the approaching industrial era in the region. Just fifteen years later, the plant took the lead in the overall volume of urban industrial production in monetary terms, producing 47% of all goods manufactured in the city. After the enactment of the Urban Regulation in 1870, the city began to utilize the revenues generated from the continuously growing industrial activities for urban improvement, optimizing the water supply system, etc. In Kazan, new places for public festivities, parks, squares, and smallpox vaccination offices emerged; a water supply system was ceremoniously inaugurated, among other developments. Consequently, during the "post-reform" era, the plant of the Krestovnikov brothers was a significant factor in shaping the "all-class" urban environment.

4 Discussions

In contemporary literature, there is a substantial body of work that analyzes the economic development of the Kazan Governorate in the nineteenth century from various perspectives. For instance, R. R. Khayrutdinov and R. R. Salikhov explored the activities of representatives of the Tatar bourgeoisie (Salikhov and Khairutdinov 2010), emphasizing the essential and highly relevant "return of names" (Salikhov et al. 2002).

L. M. Sverdlova pays significant attention to studying the activities of the multinational Kazan merchant class (Sverdlova 2011). She examined the trade and economic connections of Tatar merchants and the organization of various productions, specifically focusing on the emergence of large-scale factory industries. Sverdlova's works provide detailed biographies of individual members of the Kazan merchant class (Sverdlova 1998).

A collective study titled "Everyday Culture of a Provincial City: Kazan and Kazanites in the 19th–20th Centuries" delves into domestic and everyday life, although it does not hint at an attempt to pinpoint the date of the local industrial revolution (Vishlenkova et al. 2008).

Ruth Schwartz Cowan (Cowan 1997) studies the social issues present in the early stages of the Industrial Revolution in the USA. She extensively described production organization systems, the emergence and development of mass production, and various management initiatives on the East Coast, leading to the formation of a permanent workforce at all levels. This research allows the authors to draw certain parallels with the advanced and knowledge-intensive production of the Krestovnikov brothers in Kazan.

It is worth noting that only G. Yu. Fan-Yung's monograph (Fan-Yung 2020) concludes that the plant of the Krestovnikov brothers in Kazan became a true "locomotive" of the regional industrial "leap," defining the direction of the economic development of the region, at least until 1917.

5 Conclusion

The plant of the Krestovnikov brothers stood as the first large-scale and knowledge-intensive production, truly a city-forming industry. It avoided a gradual, evolutionary

development, a hypothetical transformation from a small shop into a major market holding. This plant kept pace with the times, evolving and modernizing alongside the advancements in chemical science and technology. This became the foundation for its commercial success. Already in the initial stage of its existence, four years before the legal abolition of serfdom in Russia, the enterprise ventured into the production of sulfuric and nitric acids using Tiss's technologies, which significantly surpassed their time. This fact places the plant not only within the stearic-soap subindustry but at the core of the Russian chemical industry. The plant of the Krestovnikov brothers operated year-round, halting only for equipment maintenance and boiler cleaning for two weeks each year. Consequently, the brief production stoppage had no connection to agricultural production cycles. Each year, an increasing number of workers, no longer engaged in seasonal agricultural labor, joined the ranks of the urban proletariat. This qualitative distinction set this enterprise apart from all other productions in the Kazan Governorate. Another undisputed achievement of the plant's owners was the establishment of an impressive trade and procurement network through which raw materials were sourced, and the produced goods were distributed. This categorically qualifies this advanced production as a city-forming enterprise.

6 Recommendations

This research may be of interest to those interested in the economic history of the Republic of Tatarstan and the Russian Federation and the development of advanced sectors within Russian industry. The successful development of the plant of the Krestovnikov brothers in Kazan, up to March-October 1917, attests to the existence of such sectors.

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Priorities of the Green Economy in the Russian Federation

Albina E. Zhminko, Valentina P. Leoshko, Victoria G. Bush, Irina G. Peshkova, and Evgeniya L. Chechetka

Abstract

The elimination of the global environmental crisis in a country or a specific region is humanity's most important issue. The solution to this issue is impossible without a fundamental change in the economic model of management, leading to the development of the green economy. To prevent an environmental catastrophe, it is necessary to increase the volume of waste utilization generated during industrial and economic activities, a task that cannot be achieved without attracting additional investments in environmental protection. A civilized program-targeted approach to objectively existing problems contributes to the complexity of forecasting and managing ongoing processes using various econometric methods, ensuring the interconnection of production processes across all indicators in the sectors of industry, agriculture, and transport. Extrapolation forecasts, based on the analysis of the initial state of the region and urgent issues, make it possible to identify accumulated problems conditioned by the expected state of the surrounding natural environment, orient the planning and management system, and define a set of activities aimed at achieving environmental goals. The specificity of the green economy lies in territorial orientation in management, making it possible to identify fundamental environmental actions, schemes of measures to protect a specific natural resource or component of the environment, and regional schemes for greening the territory, determining primary objects.

Keywords

Green economy · Greening · Forecasting · Investments · Waste disposal

JEL Classification

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1 Introduction

Environmental protection occupies a significant place in the system of Russian priorities. It is an essential component of the green economy and sustainable development for the country and its particular regions. Utilizing natural resources, humans inevitably cause harm to the environment to some extent, a fact that went unnoticed for a long time and inevitably led to the deterioration of the ecological situation, subsequently contributing to the increase of various diseases.

The erupted global environmental crisis has significantly impacted the change in the environmental situation throughout the economy, necessitating the greening of industrial and non-industrial sectors. This has predetermined the need for the development of a green economy.

Several factors cause the environmental crisis. It inevitably leads to irreversible ecological consequences.

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_72

2 Methodology

The new ideology of economic management is aimed at overcoming the environmental crisis and greening the entire production and economic sector of the Russian Federation.

The necessity of transitioning to a green economy and ensuring the efficiency of national activities, considering environmental measures, is becoming increasingly relevant, enabling a timely response to emerging environmental threats.

3 Results

The evolving green economy directs its development vector toward a balance between human well-being and nature conservation. This includes prioritizing creating green jobs and utilizing market mechanisms to promote sustainable development without harming the environment. A positive alignment of the green economy strategy with the concept of sustainable development in Russian regions will be the key to achieving the set goal. A comprehensive program for stimulating economic growth is necessary, considering the reduction of anthropogenic impact and transitioning to environmentally oriented development capable of supporting ecological modernization and fostering eco-economic opportunities.

The green economy should be oriented and applicable to specific regional conditions and resources, with a focus on improving their efficiency. Each region must develop its own methodological approaches, considering needs, peculiarities, and existing possibilities because the close interdependence of social and economic-production decisions influences the environment.

Most common diseases are caused by poor drinking water quality, contaminated food, and polluted air resulting from deforestation, protection of water conservation areas, and soil degradation. Halting these negative processes is only possible through a comprehensive approach to solving all accumulated environmental problems.

Let us analyze and examine indicators related to the generation and utilization of waste from various productions, according to data from the Federal State Statistics Service of the Russian Federation (Rosstat). Statistical data in the "Environmental protection" section over 20 years show a significant increase in the total amount of generated production and consumption waste, with a slight increase in utilization measures. Over the study period, waste generation growth increased by 3.5 times. The growth of utilization increased three times.

A detailed study of the utilized production and consumption waste revealed that the highest share in terms of utilization was in 2016, when 59.6% of production and consumption waste in the Russian Federation was destroyed. Similarly, 2007 was favorable for utilization, with a utilization rate of 57.9%.

Over the studied twenty-year period, the minimum share of utilization of production and consumption waste is observed in 2006 and 2013, accounting for only 39.7% of the total amount of generated waste.

From 2016 to 2022, this indicator tends to decrease, which is an unfavorable factor for the environment, requiring further investigation of the reasons for the reduction to prevent an environmental catastrophe.

Based on the available data, the authors will conduct a detailed analysis of the proportion of production and consumption waste utilization from the total volume of their generation. An effective and sufficiently precise method is constructing a forecasting function using the exponential smoothing method. The essence of this method is that older data have less weight than newer data in the indicator's change. This results in constructing an avalanche-like exponential curve, meaning that the newer the data, the greater the weight they receive in the forecast, and vice versa.

The developed forecast of the proportion of utilization of production and consumption waste, based on existing retrospective data with a 95.0% probability, allows us to state that under the most favorable conditions, the proportion of utilization of generated production and consumption waste may reach 67.0% by 2027. In an unfavorable development forecast, the proportion of waste utilization will be only 44.4%, which is below the level of 2022, when this indicator was at 45.7%.

Using trend methods in econometric modeling to develop a forecast of the studied indicators makes it possible to determine the optimal mathematical model (with sufficient probability) describing the necessary indicator. Various types of linear and nonlinear functions will be employed, with the quality of the mathematical models characterized by the coefficient of determination (the higher it is, the better the quality of the mathematical model, and, accordingly, the more reliable the forecast for the future).

The forecasted indicators of the generation of production and consumption waste in the Russian Federation in the near future have a stable tendency to increase, which is described by the most reliable polynomial function.

The developed forecast of the proportion of utilization of generated waste revealed that with a 95% probability, it can be asserted that the total volume of generated waste will increase to almost 12,000 million tons by 2027. In 2022, this indicator was 9017 million tons.

Quantitative expression of dependencies, together with qualitative analysis, makes it possible to conduct a deeper economic analysis of waste generation and disposal processes, using the obtained models for analysis, planning, and forecasting in terms of improving the environmental situation.

The strategy of effective and environmentally non-destructive waste utilization and neutralization activities dictates a scientifically grounded approach and forecasting, in which mathematical modeling, monitoring, and prediction play a significant role.

Using the trend econometric method with various functions for forecasting indicators has revealed a high probability that the forecast of the studied actual indicator will follow a polynomial function (Fig. 1).

Accordingly, it is possible to forecast an increase in overall waste utilization across the country to a level of 5800 million tons, considering that the utilization in the reporting year was 4125 million tons, although it is fair to note a significant growth in waste generation.

The green economy of the production sector should be based on the implementation of progressive technologies and the full utilization of raw materials and fuels, with mandatory consideration of water and air purification schemes, as well as a comprehensive environmental assessment of the damage inflicted on the environment, detailing the nature conservation assessment by types of production and technological processes.

Improving the efficiency of wastewater treatment is a crucial measure to address the water pollution problem and a profitable long-term investment because it helps prevent adverse effects on the environment and maintain the quality of water resources (The Official Internet Portal of Legal Information, (n.d.)). The construction of contemporary wastewater treatment plants is an important step in the green economy, making it possible to improve wastewater treatment systems to achieve high-quality standards and enhance water quality control systems.

The atmospheric air performs several important functions, such as providing breathing for living organisms, participating in the absorption and reflection of solar radiation, and regulating the Earth's thermal balance in coordination with outer space. It regulates the Earth's climate, as the concentration of greenhouse gases affects the planet's surface temperature, creating conditions for global warming. Additionally, atmospheric air acts as a protective shield against excessive ultraviolet radiation.

It is essential to note that human activities, such as industrial production, burning fossil fuels, and deforestation, inevitably lead to air pollution and changes in its composition.

Being an integral part of the planet, atmospheric air plays a crucial role in sustaining life and regulating climate. The purification of atmospheric air is a pressing environmental issue, the solution to which is impossible without developing a green economy.

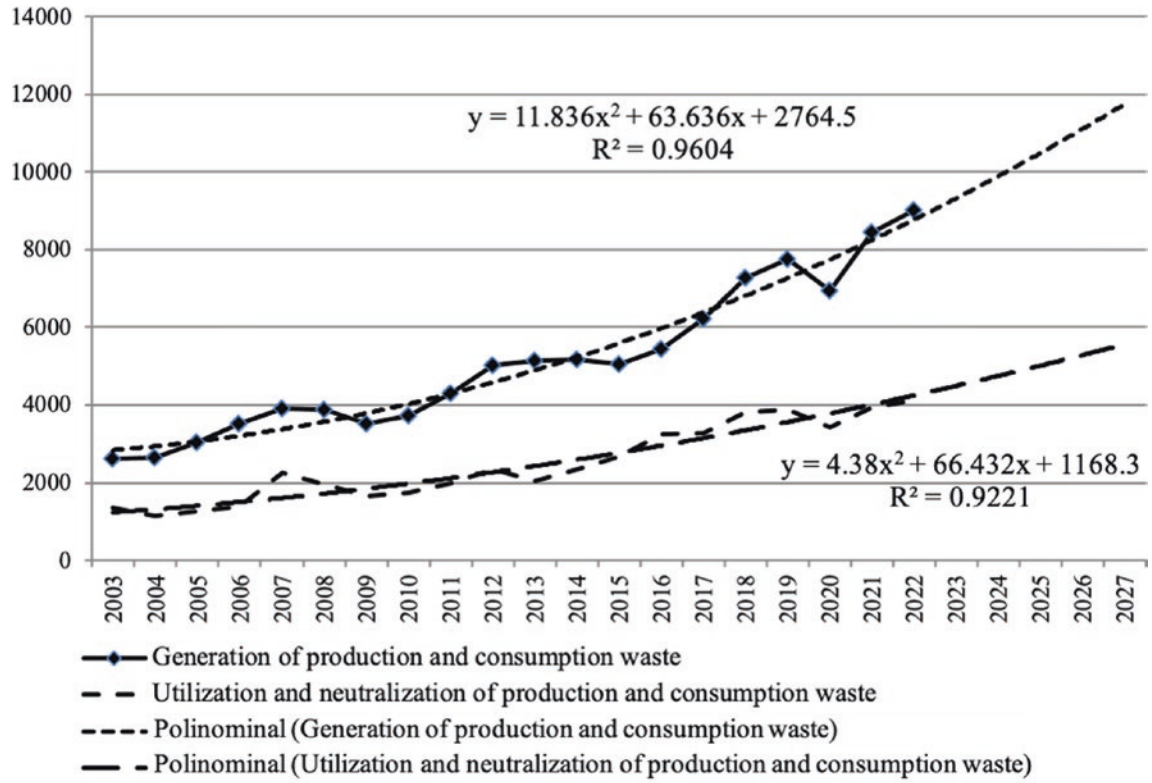

Fig. 1 Trends in generation, utilization, and neutralization of production and consumption wastes. *Source* Developed by the authors based on (Federal State Statistics Service of the Russian Federation (Rosstat), n.d.)

Thus, addressing environmental issues must be comprehensive, involving implementing green technologies that will improve the environmental situation in all regions of Russia without exception.

To mitigate the anthropogenic impact during intensive reproduction, a crucial role is played by the volume of investments in fixed capital directed toward environmental protection and the rational use of natural resources. This will elevate the overall level of the ecological situation in the Russian Federation (Klimova et al. 2015). The increased infusion of monetary resources into the environmental sphere has the potential to steer the situation in the right direction.

The environmental policy of the Russian Federation concerning environmental protection and the implementation of standards and priorities of the green economy plays a vital role in stabilizing the ecological process. In this case, primary attention is given to the rational use of resources, pollution reduction, and, consequently, the mitigation of adverse environmental impacts. Several concepts for developing the green economy aim to facilitate capital investment in environmental activities and reduce the negative impact of human activities.

Promoting sustainable agriculture methods and organic farming and reducing the use of chemical fertilizers and pesticides will contribute to preserving soil fertility. Rational use of natural resources will inevitably lead to ecosystem restoration (Kovalevskaya 2020). The reduction of harmful substance emissions is addressed through the use of electric vehicles.

Despite the ever-increasing volumes of capital investments directed towards environmental protection and substantial reinforcement of the material-technical base, the efficiency in this sphere is increasing at an extremely sluggish pace.

Investments with specific purposes directed towards safeguarding the atmospheric air, protecting water and land resources in dynamics, as presented in Fig. 2, exhibit a sustainable growth trend, which is a positive factor (Federal State Statistics Service of the Russian Federation (Rosstat), n.d.). Even accounting for inflationary processes, there is a noticeable increase in monetary investments to prevent an ecological crisis in the Russian Federation.

Until 2020, an insufficient amount of financial resources was allocated for safeguarding the atmospheric air. However, starting from 2021, there has been a notable influx of investment assets. In 2022, almost equal investments, amounting to more than 139 million rubles, are earmarked for the aforementioned purposes.

The transition to a green economic model, based on waste reduction, material reuse, and recycling, as well as the promotion of green technologies and innovations, is intended to foster the development and implementation of environmentally friendly technologies and innovations across various sectors of the economy.

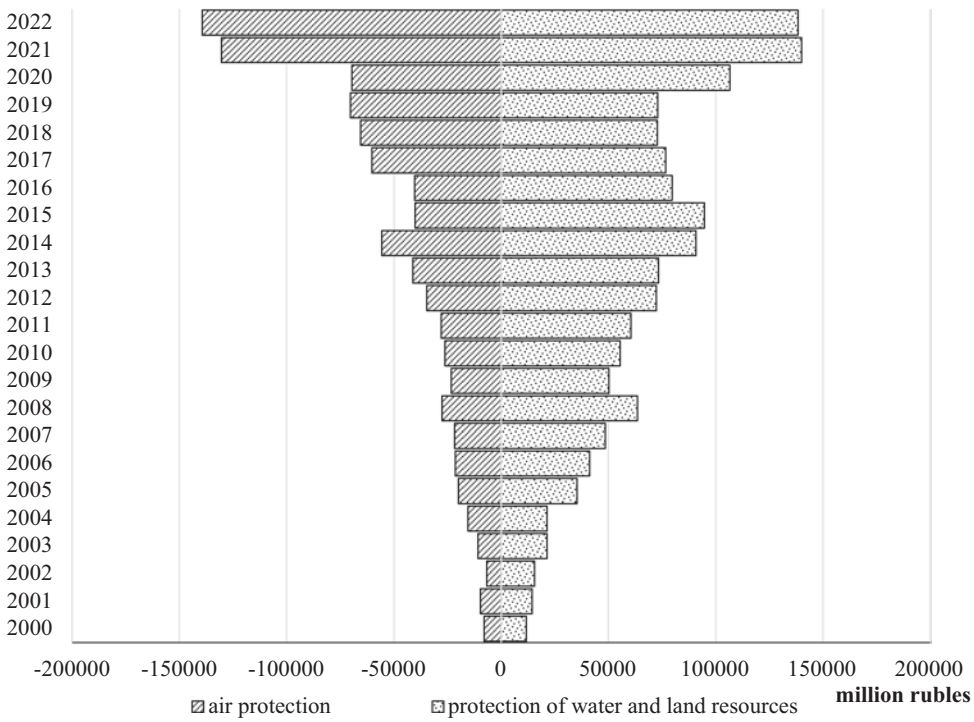

Fig. 2 Volume of investments allocated to the environmental sector, million rubles. *Source* Compiled by the authors

4 Conclusion

In implementing the green economy, adhering to a targeted strategy and formulating and addressing emerging environmental issues is essential. These issues will encompass principles and measures aimed at stabilizing conservation activities.

First and foremost, a shift to renewable energy sources, such as solar, wind, hydro, and other sustainable energy sources, is necessary. This transition will help reduce greenhouse gas emissions and decrease dependence on fossil fuels. Taking measures to enhance energy efficiency will further mitigate their negative environmental impact.

In agriculture, transitioning to environmentally friendly production methods while reducing the use of fertilizers and pesticides will protect biodiversity, water, and land resources.

The sequence of addressing environmental problems and the ideology of natural resource management must deviate from the previously established norms. This shift will lead to balanced development, meeting the needs of the current generation without compromising the ability of future generations to enjoy a clean and healthy environment.

Developing low-waste and resource-efficient technologies is a key aspect and a global challenge in addressing environmental issues. This will regulate the quantity of generated and utilized waste, contributing to the ecological improvement of natural resource utilization.

A programmatic and targeted approach in the green economy, coupled with assessing the quantitative characteristics of the comprehensive impact of various factors on the key indicators of the effectiveness of environmental initiatives, and extrapolating waste generation volumes with a specified probability for specific regions and Russia as a whole, will inevitably lead to an improvement in the currently unfavorable situation. In turn, this will enable effective solutions to the escalating environmental pollution problems.

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Green Energy. Development of Nuclear Energy

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Abstract

The topic of ecology is now in significant demand worldwide. It is gaining more supporters in many countries, including the Russian Federation. We live in a period of ecological boom when the popularity of goods and services with the prefix "eco" grows daily. The primary advantage of eco-friendly fuels, advocated by green energy proponents, is to reduce the environmental damage that is inevitably inflicted on nature during the extraction of traditional oil and gas. Additionally, renewable energy sources (i.e., solar, water, wind, and nuclear energy) possess characteristics such as infinity and harmlessness, unlike energy obtained from limited natural resources. In recent decades, several countries have actively participated in preparing strategies and plans to replace traditional energy sources with renewable ones. The research presents alternative energy sources and analyzes and develops schedules for their consumption, production, and accumulation. The authors consider green energy and its development in Russia in more detail. Additionally, the authors present the ways of transitioning to eco-friendly energy sources. The relationship between the obtained energy and the expended resources is discussed. Methods for storing accumulated energy are also presented.

Keywords

Green energy · Alternative energy sources · Wind · Consumption · Accumulation · Solar modules · Sales market · Growth and consumption dynamics

JEL Classification

Q42

1 Introduction

Nowadays, significant attention is directed towards alternative energy. This research showcases current facts from the extraction and accumulation aspects of electrical power. The authors delve into the reasons why Russia hesitates to transition to eco-friendly energy sources known as green energy. Green energy is currently popular and expanding rapidly. However, its consumption is exceedingly high. Therefore, a premature shift to purely green energy is impractical. This form of energy cannot adequately meet consumer demand, thus leading to the escalation of coal, gas, and oil sector volumes. Table 1 illustrates the production and consumption of various energy resources.

According to Table 1, energy production does not favor green energy.

2 Materials and Methods

The degree of reliability is confirmed by articles of Russian and international scientists in the field of alternative energy sources, particularly green energy, as well as the EROI indicator (energy return on investment).

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E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9_73

Table 1 Production and consumption of main types of energy resources

Total production	2014	2015	2016	2017	2018	2019	2020
Oil	11,495	12,704	12,913	13,058	12,992	13,304	13,838
Gas	3999	4129	4223	4353	4368	4380	4474
Coal	2410	3978	3966	3861	3661	3755	3917
Hydroelectric power stations (HPP)	737	858	879	879	909	920	949
Nuclear power plants (NPP)	620	564	575	583	592	597	611
Renewable energy sources (RES)	124	263	320	369	419	490	561
Consumption	11,708	12,820	12,940	13,047	13,229	13,475	13,865

Source Compiled by the authors

3 Results

Let us consider the ratio of the obtained energy to the expended energy. Energy experts assert that the cost of green energy is lower than that of all other forms of energy, although the production of coal and fossil gas still surpasses that of green energy. The assessment and comparative analysis of the cost of electricity can be made using the EROI (energy return on investment) indicator, which makes it possible to evaluate the development prospects of various energy sources based on theoretical efficiency. The EROI for each type of generation changes over time, depending on technology, extraction complexity, geographical location, prices, etc. Oil was very accessible at the beginning of the century. Over time, its availability slowly declined. In turn, coal extraction increased due to lower extraction costs compared to oil (Malykh 2022).

Let us examine the energy derived from hydroelectric power plants (HPPs). The construction of HPPs is costly, but we are currently discussing operational hydroelectric power stations in Russia. Such stations are currently highly popular as a renewable energy source in Russia and internationally. The percentage of energy generation in Russia is only about 20% of the installed capacity. The capacity in 2022 was 52,754 MW. Although energy generation is calculated using a formula, the actual generation does not entirely correspond to reality. A photo of a hydroelectric power station is presented in Fig. 1.

The next alternative energy source is coal, the dirtiest form of fuel. When evaluating the EROI indicator by country, we see that Germany is the leader in consumption volume. This is evidenced by the purchases of anthracite (61%) and brown coal (93%) used for electricity generation. In Germany, the production of green energy has

Fig. 1 Photo of the hydroelectric power plant. *Source* Photographed by the authors

surpassed the production of energy from fossil sources. Towards the end of 2019, Germany decided to phase out coal energy and intended to ban nuclear energy despite it constituting a quarter of the energy output. The country opted for a complete transition to green energy production. Despite considerable efforts, these initiatives were not entirely successful. Natural disasters played a role in this; abundant precipitation and floods left consumers without electricity. As a result, energy prices increased, leading the major German energy supply company (Rheinische Elektrizitäts und Gasversorgungsgesellschaft) to terminate contracts with significant consumers (Pchelintsev 2016).

The next fuel type is gas, which is more environmentally friendly and is considered a promising form of fuel. Its EROI in importing countries ranges from 20–30:1. The supply of Russian gas is increasing with each passing time. Figure 2 illustrates the gas supply for February 2023. Even over a short period, it can be concluded that the dynamics of the Russian gas supply are increasing and are expected to continue growing.

Let us turn to green energy. Many countries write about and attempt to increase its volume. The challenge with renewable energy sources lies in their dependence on geography and weather conditions.

An alternative to the Northern delivery of diesel fuel is the installation of solar panels in the Far North regions. Currently, over 50 billion rubles are spent annually on the Northern delivery. The largest solar-diesel power plant in Russia has been introduced in the village of Tura in Evenkia. The total capacity of the power station exceeded 14 MW.

Solar-powered stations operate effectively in regions with abundant sunlight, not limited to the southern parts of the country. Solar energy stations are actively used in Yakutia, which is one of the sunniest regions in Russia. The suburbs of Yakutsk, such as the settlements of Zhatay and Batagay in the Verkhoyansk district, known as the pole of cold, actively utilize solar equipment. The power of the Batagay solar station is 1 MW. In this region, the significance goes beyond solar activity; the fuel in Yakutia is delivered only by river and only in the summer. Consequently, it is very expensive. Another factor contributing to the use of this source is environmental protection. Currently, 21 solar stations operate successfully in the territory of Yakutia. The dynamics of the development indicators of solar energy in the Russian Federation are presented in Table 2.

Green energy encompasses not only solar energy but also wind and geothermal energy. This serves as an alternative to solar power stations, as solar energy production significantly decreases during the night. The advantages of wind energy lie in its cost-effectiveness and low development costs; wind farms can be constructed in almost all regions of Russia. However, wind energy has certain drawbacks, including citizens' reluctance to have wind turbines near their homes and strict regulations governing wind turbine construction. An analysis of the global market shows that investments in wind energy have remained almost unchanged over the past decade, although some sources indicate a decrease. In contrast, wind energy in Russia increased in 2022, with 75 new installations commissioned and a capacity increase of 230 MW. This growth was primarily driven by the Zelenogradsk Wind Power Plant in the Kaliningrad Region. New wind turbines were also constructed in the Rostov, Volgograd, and Kalmykia Regions. According to the survey, wind projects with a total capacity of 3.2 GW are planned to be commissioned in Russia by 2035. Central Asia and the South Caucasus are considered the most promising regions.

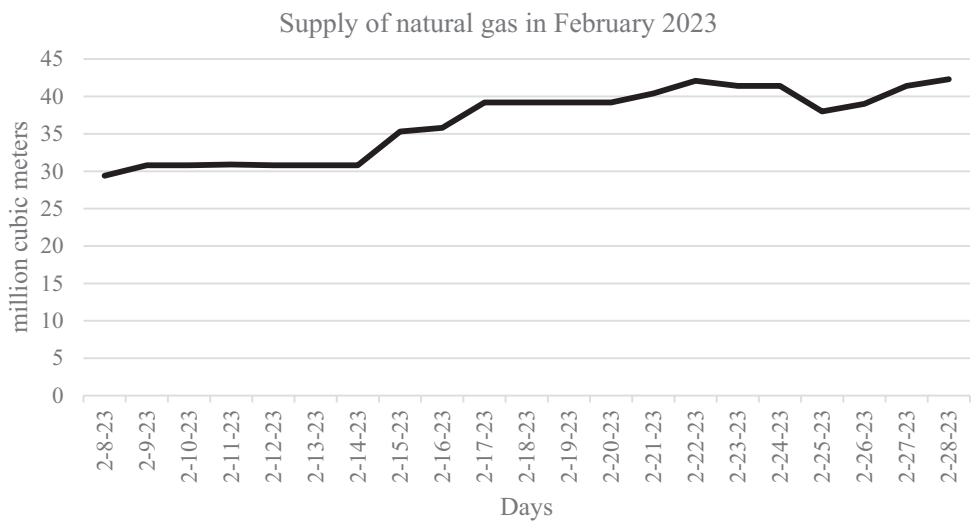

Fig. 2 Gas supply schedule for February 2023. *Source* Developed by the authors

Table 2 Indicators of solar energy development in the Russian Federation for 2014–2022

Years	Dynamics of the number of commissioned solar generation facilities (over 1 MW) (JSC "System Operator of the Unified Energy System" 2022)		Dynamics of capacity of commissioned solar generation facilities (MW) (JSC "System Operator of the Unified Energy System" 2022)		Dynamics of the capacity of solar power plants of the Unified Energy System of the Russian Federation (GW)	Dynamics of electricity generation at solar power plants of the Unified Energy System of the Russian Federation (billion kWh)
	Unified energy system	Others	Unified energy system	Others		
2014	1	–	5	–	0.01	–
2015	6	1	55.2	1	0.06	0.005
2016	3	–	15	–	0.08	0.07
2017	15		159	–	0.54	0.57
2018	11		300	–	0.84	0.76
2019	28	3	528.5	3.3	1.36	1.28
2020	16	2	364	10.1	1.73	1.97
2021	9	1	232.9	2.5	1.96	2.24
2022	9	6	152.6	11.8	2.12	2.5

Source Developed by the authors

Despite the long existence of solar panels, solar energy is still considered a universal source of electricity. For example, in the city of Novocheboksarsk, a full-cycle solar module production plant was opened, covering an extensive area of around 27,180 m^2 and operating around the clock with approximately 600 employees. Construction of the solar module production plant began in 2009. Production using thin-film technology was initiated in 2015. In 2016, the plant underwent technological line modernization for heterostructure technology. The production capacity of the plant reached 180 MW/year in 2018. Currently, the capacity continues to increase, producing highly efficient modules and cells in high demand in Russia and internationally. The plant's advantage is the production of two-sided solar modules with a capacity of up to 380 W. The production of "Hevel" solar cells reaches 24.5% and 6.72 W. The production of one-sided solar modules is at the level of 19.4% (325 W); the production of two-sided modules is at the level of 22.5% (450 W).

The next type of green energy is hydrogen energy. The big disadvantage of this type of energy is that it takes a long time to produce, which makes the EROI of fuel cells lower than 2:1.

It is important to remember the need for electricity storage.

Wind and solar energy are unstable sources of electricity generation. However, their production is not time-dependent and can operate round the clock if there is wind or sunlight. The generated energy can be stored, unlike fossil fuels, making batteries the most accessible means of electricity storage (Spiridonov 2022). Each type of electricity has its own method or means of storage; there is no universal solution. Wind stations use lithium-ion batteries or lithium-cobalt accumulators (120 Wh/kg). However, storage solutions such as accumulator stations and small hydroelectric power stations are expensive and may not be suitable for all terrains, making them less cost-effective for energy storage.

Let us consider another scenario. An electric vehicle battery losing 20% of its capacity requires replacement; otherwise, the vehicle's range decreases. Recycling is an option, but it is expensive. Thus, these batteries can be repurposed for storing green energy. For instance, solar panels were installed on the roof to accumulate energy in batteries with expired lifespans in Amsterdam. This allowed the stadium to disconnect from the city grid. Another advantage of such batteries is their ability to help smooth out the load during evening events when active stadium lighting is required. Energy storage is a critical task. Nevertheless, it does not reduce the cost of energy storage itself.

Relying solely on solar panels cannot supply an entire stadium with electricity because it depends on the number of sunny days in a year and other factors. To address this issue, surplus energy can be sold or distributed among nearby consumers in need (small businesses, private homes, saunas, etc.). In this way, the energy-selling enterprise operates as a small virtual station, allowing consumers to access cheaper energy and sell a portion of it. Tesla Powerwall home batteries, powered by solar panels, with a good capacity of 6.4–13.5 kWh, can be used as a virtual station. The stored energy can be sold through online exchanges, specifying supplier and consumer guarantees, price adjustments, procedures for technological connection to electrical networks, etc. Selling excess energy helps reduce the cost of consuming green energy. However, not every small business can afford to purchase the required number of batteries. Moreover, their cost is not very low; the payback period is around ten years. Moreover, no one proposes a complete transition to green energy as an alternative to costly oil. Gas is not available everywhere, depending on the location of extraction. Coal mining is also a dirty and challenging undertaking. One hopes to develop nuclear fusion, which may bring about significant changes.

To improve the environmental situation on the planet, it will be necessary to develop further research in the field of solar, wind, and geothermal energy, making it more accessible, although this is an economic, technological, and social challenge. One hopes that soon, all enterprises and organizations will abandon fossil fuels. Such opinions are held by prominent figures in this field, one of which is Dr. Igor N. Ostretsov, a professor and chief specialist in the field of atomic and nuclear energy. This progressive thinker, philosopher, and patriot has long been engaged in energy issues and has already taken a significant step in this direction. He asserts that nuclear energy is doomed because its safety cannot be increased indefinitely (Obukhova 2015). Alternative paths for the development of atomic technologies need to be explored. These thoughts came to him after several major accidents, leading to a rejection of nuclear power. In the current global situation, no country has entered into a contract on nuclear technologies in recent times. It may be possible to return to previous developments in Russia and address the implementation of new atomic technologies, thereby interesting countries that are currently not rejecting collaboration. Problems may arise because Russia signed a contract "Inspection of Unauthorized Transportation of Nuclear Materials" with the USA. However, Russian scientists are already working on next-generation atomic and nuclear technologies to apply them in creating safe atomic power plants. This issue has been repeatedly raised by the President of the Russian Federation, who emphasized the need to abandon enriched uranium and plutonium, supporting Russian scientists in the development of new technologies, as the existing technological base is outdated and doomed. It is unprofitable and impractical to build atomic power plants using existing

technologies. Many countries are reducing the construction of atomic and nuclear power plants, although energy needs are increasing annually.

Currently, Russia is constructing four power units of the Akkuyu Nuclear Power Plant in Turkey, with a total capacity of 4800 MW.

Many countries (e.g., France, the UK, and Japan) are experiencing an energy crisis caused by political cataclysms and environmental dependence. Due to a governmental upheaval in Nigeria, France lost about a quarter of its used radioactive raw materials. In this connection, President Macron was forced to seek the missing reserves in Kazakhstan. Prices for energy resources in European countries have sharply increased; some countries are relying on military reserves. The situation with nuclear fuel in the USA is very challenging. If this situation does not improve, nuclear power plants will be left without raw materials.

4 Conclusion

Thus, the future does lean towards green energy, despite the existence of a wide variety of alternative, more accessible, but environmentally disruptive energy sources. For further effective development, cutting-edge technologies for obtaining green energy are necessary, although atomic and hydroenergy can also be classified as green energy sources if provided with low-carbon production. Russia, China, and the Middle East are actively engaged in the development of environmentally friendly energy and the expansion of low-carbon directions in the energy sector.

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Future Trends of Corporate Social Responsibility in Support of the Green Agenda of the Economy and Business by 2050 (Conclusion)

The green agenda is complemented and revised as environmental awareness evolves and global environmental issues change. This necessitates a reassessment of corporate social responsibility practices. As demonstrated by this book, in the current stage of the development of the green economy, whose temporal boundary is set around 2030, the target areas for environmental protection are diversified. Therefore, corporate social responsibility must be maximally flexible and implemented through broad-profile mechanisms such as ESG.

The importance of advanced technologies and innovations for implementing the green agenda in business activities through corporate social responsibility is growing. There are all reasons to believe that their significance will continue to increase in the coming decades. The contours of the green economic and business agenda until 2050 are already discernible today and are associated with the narrowing of this agenda, the key area of which will be the decarbonization of the economy.

To prepare businesses for implementing the long-term green economic and business agenda until 2050, scientific research into future trends of corporate social responsibility in support of this agenda is necessary. One of these trends may be the popularization of climate change action in the promotion and sale of environmentally responsible business products. The need for more active involvement of the general population in the activities of environmental communities and environmentally responsible businesses is already recognized. The level of this involvement is continuously increasing. In the future, this level will reach new heights.

Another trend of corporate social responsibility in support of the green economic and business agenda until 2050 may be related to the establishment of global green supply and distribution chains for systemic and coordinated climate change mitigation efforts at all levels of these chains and extract synergistic effects for economic decarbonization. Signs of this trend are already observed. However, it has not yet become widespread.

From 2030 to 2050, globalization is anticipated to reach a new level, wherein developing countries will be intricately involved in global economic processes as never before. The boundaries between categories of nations will be notably blurred. This will make it possible to optimize global green supply and distribution chains, rendering them more inclusive and efficient. Consequently, the global fight against climate change will assume a greater scale.

The forthcoming trends of corporate social responsibility in support of the green economic and business agenda until 2050 include the integration of Industry 5.0 technologies into the practice of this responsibility aimed at combating climate change. Innovations in automation continue to captivate the imagination with each passing year. The most promising technologies of the future include robots engaged in ecological sorting of production and consumption waste, artificial intelligence providing intellectual support for climate change mitigation, and the Internet of Things facilitating environmental monitoring and decarbonization control.

The identified future trends of corporate social responsibility in support of the green economic and business agenda until 2050 warrant further in-depth study. It is advisable to dedicate further scientific research to this topic.

E. Popkova (ed.), *Corporate Social Responsibility to the Green Growth of Business and Economy,*
Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-031-83041-9