INTEGRATION OF SUSTAINABLE DEVELOPMENT PRACTICES INTO BUSINESS MODELS OF ECONOMIC SYSTEMS: PRINCIPLES OF THE GREEN ECONOMY

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Abstract

This article discusses the fundamental principles, directions and priorities for incorporating the green economy ideology and sustainable development practices into the operational processes of major Russian corporations. This study is relevant because it is necessary to introduce sustainable business practices into modern economic models of Industry 5.0. The methodology combines theoretical and empirical methods, including an analytical review of literature on the research topic, statistical and comparative analysis, and elements of SWOT analysis. The study aims to provide empirical evidence of the growth of corporate responsibility in terms of the adoption of green economy ideology and management practices within large companies. To achieve this goal, the activities of Russian companies such as Sber, Yandex, Lukoil, Rostec, Norilsk Nickel, Mail.Ru Group (VK), Beluga Group and X5 Group were reviewed. The main practices of Russian companies in terms of digitalization, sustainability, brand development and innovation were summarized. Conclusions were drawn about the growth of corporate responsibility in terms of achieving sustainable development goals. The prospects for the further integration of green economy models into modern business ecosystems were identified.

Keywords: sustainable development, green economy, green investments, innovation, digitalization, ecosystem, business model

I. Introduction

In the context of evolving geopolitical conditions and "some imbalance in global economic dynamics, reflected in a steady decline in economic growth" [1], Russian companies are increasingly required to implement innovative strategies to maintain competitiveness and foster long-term economic growth. Economic development under these new conditions is a creative process that "integrates all economic sectors to develop innovative products and services" [2]

Flexibility in responding to market shifts, combined with a focus on digitalization, innovation, and sustainable development, is crucial. The development vector of many Russian

companies includes creating "ecosystems to foster community engagement and social ties" [3], integrating new technologies, "promoting sustainable human capital development" [4] and adopting "advanced corporate management and planning practices" [5]. These efforts enable companies not only to secure strong positions in the domestic market, but also compete globally. This underscores the relevance of this research, as well as the need and novelty of introducing sustainable business practices into modern Industry 5.0 economic models.

II. Literature Review

The implementation of Sustainable Development Goals in business has become a central topic in economic scientific discourse. Therefore, all literature can be categorized into several thematic blocks. The general issues of market transformation amid shifting economic paradigms are being explored by leading Russian and foreign scientists (I. Gladkov, S. Glazyev, S. Tronin, M. Epstein et al.). Digitalization of economic processes, markets, and businesses has drawn special attention of Russian scientists following the adoption of the Digital Economy of the Russian Federation program. Scholars from the Financial University under the Government of the Russian Federation and the Russian Academy of National Economy and Public Administration (O. Brizhak, M. Buyanova, A. Kalinina, I. Averina, E. Kochetkov, D. Vasiliev, A. Sapozhnikov, and others). Further research of A. Sysolyatin, I. Kushova, L. Rudenko highlights ecosystem development, energy-efficient solutions, branding, and the enhancement of intellectual capital.

Environmental and green finance topics – such as green technology funding and environmental project investments – are addressed by Siedschlag, I. Eyraud L., Clements B., Wane A., S. Kodaneva. The role of economic and socio-cultural institutions in the transition to a green economy is a key area of interdisciplinary focus confirming the timeliness and relevance of this study (L. Terzić, A. Strizhak, T. Butova, V. Reutov).

III. Methods

This research employs the combination of theoretical and empirical methods. The theoretical component includes and analytical literature review. Empirical methods involve statistical and comparative analysis, along with elements of SWOT analysis.

IV. Results

Russian companies actively adopt digital and sustainable practices to enhance competitiveness through increasing efficiency, minimizing costs and improving the quality of services provided. PJSC "Sber" exemplifies the successful shift from traditional banking to a multiservice digital ecosystem, including e-commerce, logistics, healthcare and education. Leveraging artificial intelligence and big data management, Sber offers personalized solutions, which expands its customer base, and improves operational efficiency. Such approach has allowed Sber PJSC to integrate into the daily lives of customers, thereby strengthening audience loyalty and conquering new market segments [6].

One more example of successful application of modern practices is Yandex. Initially a search engine, it has evolved into a large ecosystem and has become a leader in various sectors of the Russian market. The success of this company is due to a combination of several factors: innovative use of technology, deep data analysis and integration of services. Yandex.Go combines ride-hailing, carsharing and delivery services. The most important component of gaining success was the introduction of machine learning and artificial intelligence algorithms through which the company optimized logistics and enhanced user experience. In an increasingly competitive

environment, this allows Yandex to exceed consumer needs and provide tools that greatly simplify their daily lives. Tis complex of measures makes a significant difference to a company's competitive advantage.

An important aspect of the modern competitive strategy is the commitment to environmental responsibility. A great example is the activity of the oil and gas company PJSC Lukoil. In recent years, the company has been actively working to reduce the environmental impact of its operations by introducing energy-efficient technologies and optimizing production processes. Significant investments in renewable energy, including the construction of solar and wind power plants, allow the company to meet environmental standards and maintain a positive reputation as a responsible market player. Such a strategy contributes to the formation of a long-term competitive position against the increasing interest in environmentally friendly technologies in the international market [7].

Rostec, a high-tech conglomerate, produces innovative defense and civilian technologies. It successfully uses innovative technologies and scientific developments to achieve sustainable development. Rostec actively invests in research and development, drives unique high-tech solutions and materials. One of the examples is the production of innovative aviation technology, which is used in both civil and military spheres, enhancing Russia’s global competitiveness in high-tech sectors [8].

Important trends in achieving competitive advantage through the corporate social responsibility (CSR) mechanism are of particular significance. Companies that integrate sustainable development into their strategy not only strengthen their socio-economic development, but also create additional value for consumers and partners. Norilsk Nickel, the largest producer of platinum group metals, implements large-scale projects and CSR practices to reduce its carbon footprint and improve the environmental situation in the regions where it operates. The use of advanced waste treatment and recycling technologies allows the company not only to meet the requirements of international environmental standards, but also to maintain a positive reputation, which strengthens investor confidence and market position [9].

As for the technology sector, the company VK (formerly Mail.ru Group) highlights the importance of diversification and continuous innovation of digital products in strengthening a company's competitive position. In addition to social networks such as VKontakte and Odnoklassniki, its digital ecosystem also spans online education, cloud platforms, and solutions for businesses. These initiatives are aimed at creating a broad ecosystem that unites millions of users, companies and developers, forming a stable customer base and ensuring a high level of interaction between its participants [10,11, 23-25].

In addition, the export potential of Russian companies plays an important role in modern practices. Thus, the Beluga Group’s (a premium alcoholic beverages producer) commercial success is associated with the strong brand development, investments in marketing campaigns in international markets and maintaining high quality standards. Owing to its effective work with a foreign audience, the Beluga Group has achieved success in the markets of Europe, China, and North America, which indicates the effectiveness of the chosen strategy with the focus on the authenticity of the brand and compliance with international quality standards.

In modern Russia, the raising awareness of using data and analytics for making managerial decisions has also become an important source of competitive advantage. Companies such as X5 Group focus on large-scale retail digitalization projects, introducing AI-driven inventory and logistics systems to analyze customer needs and personalize offers in outlets. Platforms based on the principles of big data help companies adapt to local demand, reduce costs and retain customers through a point-to-point approach to their needs.

Table 1 summarizes the main practices across Russian companies, emphasizing digitalization, sustainability, brand development, and innovation. Amid the key methods are: the creation of ecosystems, the implementation of energy-efficient solutions, brand strengthening, the

development of intellectual capital and the digitalization of business processes [12, 26-27]. This allows Russian companies to adapt successfully to the changing conditions of the domestic and global markets.

Thus, many Russian companies demonstrate successful examples of implementing modern practices for achieving competitive advantage. These practices range from the introduction of digital technologies into operational processes to the contribution to the environmental responsibility and brand strengthening, which enables companies to compete both domestically and internationally. Obviously, the key factor in their success is not only the ability to adapt to changing market conditions, but also a strategic focus on long-term development, where innovation, knowledge and integration of latest management tools become the main source of sustainability. It is precisely such practices that allow Russian companies to gain a strong credible position in the context of high technology, environmental transformation and global competition.

Table 1: *Trends in the formation of conditions for the sustainable development of companies*

Company	The practice of moving towards sustainable development	Key achievements and effects
Sber	Digitalization of business and creation of an ecosystem of services; the transition from the traditional banking model to a multiservice platform, including e-commerce, logistics, educational and medical services; active use of big data technologies, artificial intelligence and personalization.	Increasing customer loyalty and significantly expanding the audience by integrating multiple services; speeding up operational processes, reducing costs; strengthening its position as a key player in the domestic market and expanding market segments.
Yandex	Innovative use of technologies; development of an ecosystem; integration of transport, logistics and digital tools; using machine learning and analytics algorithms to optimize services such as Yandex.Go.	Providing leadership in the segments of e-commerce, logistics and transport services; faster order processing, lower costs, and increased user loyalty; creating a high-tech platform that adapts to the needs of customers.
Lukoil	Focus on sustainable development and environmental responsibility; implementation of energy-efficient technologies; optimization of production processes; investments in renewable energy.	Reduction of the carbon footprint, compliance with international environmental standards; maintaining the company's positive reputation in foreign markets; attracting strategic investors and new partners focused on environmental principles.
Rostec	Investments in research and development, specialization in the creation of high-tech products; production of innovative solutions for the civil and defense sectors, including automation and new materials; development of institutions that ensure the inflow of investments.	Development of unique products with high added value, maintenance of global competitiveness in high-tech segments, development of institutions that ensure the conversion of savings into investments; access to international markets through innovative technologies.
Norilsk Nickel	Implementation of corporate social responsibility, focus on environmental projects; development of technologies for production purification, waste recycling and emission reduction.	Improving the environmental situation in the areas of presence; formation of a positive image in the international arena; compliance with the standards of the "green" economy provides access to new partners and markets focused on responsible production.
Mail.ru Group (VK)	Continuous product renewal and diversification: development of platform solutions, including online education, cloud technologies, social networks and business platforms.	Expanding the audience through comprehensive services, strengthening interaction between users and companies; formation of a large-scale ecosystem that makes the company's internal relations more stable in the face of market changes.
Beluga Group	Strengthening the brand and its promotion in the international arena; investments in marketing campaigns, maintaining global standards of quality and uniqueness of products.	The brand's popularity is growing in the European and Asian markets, and its export potential is strengthening; compliance with international quality standards, which attracts customers in the premium segment of alcoholic beverages.
X5 Group	Digitalization of management processes in retail trade; the introduction of automated inventory management systems, the use of artificial intelligence to personalize product ranges.	Increased the efficiency of logistics and inventory management; reduced costs by optimizing the supply chain; strengthened the customer base by precisely adapting the product range and service to the needs of local markets.

The transition to a sustainable economy requires substantial public and private investment in green technologies and social-environmental projects [13]. Green investments contribute to environmental protection, job creation and long-term economic resilience. The pace of green capital accumulation has accelerated in recent years, following the technological progress, economies of scale, strong political support, and favorable public opinion. Green investments have become a key driver of the energy industry growth [14,28]. At the micro level, green investments positively correlate with financial performance: an increase in green investments contributes to an improvement in the economic performance of enterprises [15].

In recent years, green investments in Russia have drawn increasing attention of researchers and practitioners, especially within the context of global climate change and gradual shift towards sustainable development. Key projects include investments in the following sectors:

Renewable energy –solar, wind, and hydro power;

Energy efficiency – infrastructure upgrades to reduce energy consumption;

Waste management –recycling and waste sorting systems;

Ecological transport – electric vehicles and cycling infrastructure;

Green bonds – instruments for financing green projects.

The Government is active in this area through various initiatives and programs aimed at supporting the green transition.

In 2023, global clean energy investments reached $1.9 trillion, which is 10% more than in 2022 and significantly exceeds the $1.1 trillion invested in fossil fuels. Between 2024 and 2030, projected annual growth is 10% for renewable (solar and wind) installations, 25% for energy storage, and 17% for electric vehicles (all this significantly exceeds the expected growth rates of the global economy and demand for fossil fuels during this period) (Green Investment Group's Progress Report 2024).

However, the Morgan Stanley Capital International World Index data shows that renewable energy investments yield more consistent returns than oil and gas post-2016. Investment multipliers for all withdrawn assets in renewable energy sources and oil and gas, which demonstrate the level of actual income received by investors from the withdrawn assets, are shown in Fig. 1. (MSCI Private Capital).

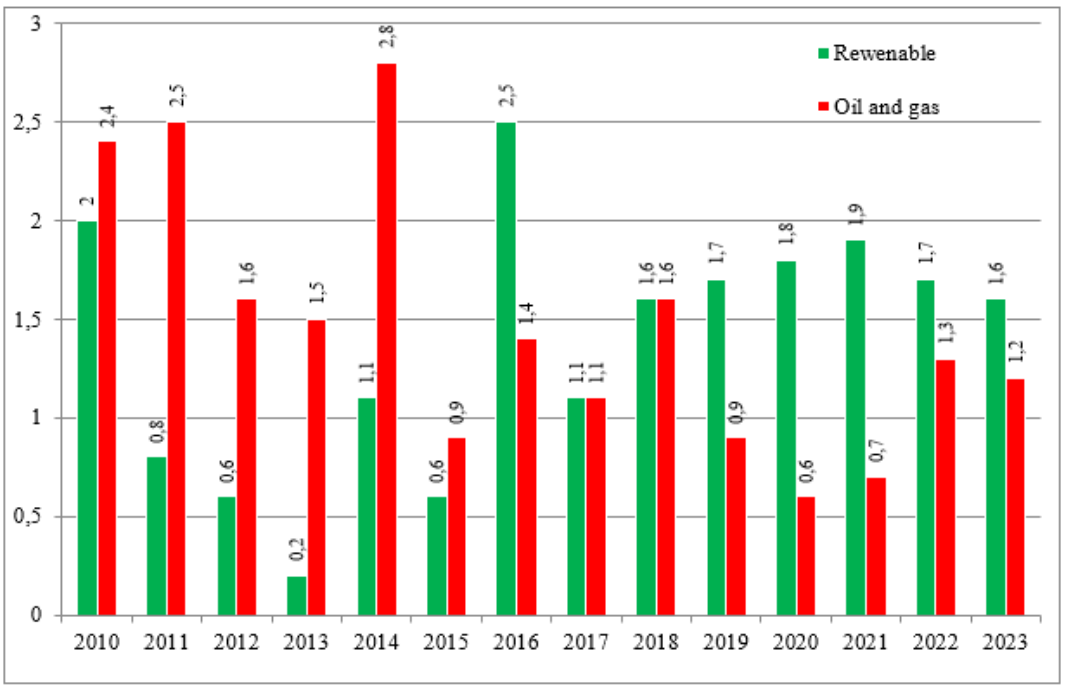

Figure 1: *Pooled investment multipliers for exited holdings*
Source: MSCI Private Capital; Green Investment Group's Progress Report 2024

Renewable energy outputs have shown positive returns (excluding fees) in all years since 2016, compared with only two years of positive returns between 2010 and 2015. Since 2016 (excluding 2018), the profitability of released assets in renewable energy sources has exceeded the profitability of oil and gas. This is in stark contrast to the period before 2016, when oil and gas outperformed renewable energy between 2010 and 2015. However, challenges remain, including the exit of private funds and short-term profitability concerns.

According to the Global Green Finance Index 12 (2023), ESG analytics, energy efficiency, and renewables are top areas of investor interest. The least attractive areas of green financing are: Climate Risk Stress Testing, Green Loans, Greentech Venture Capital (Fig. 2).

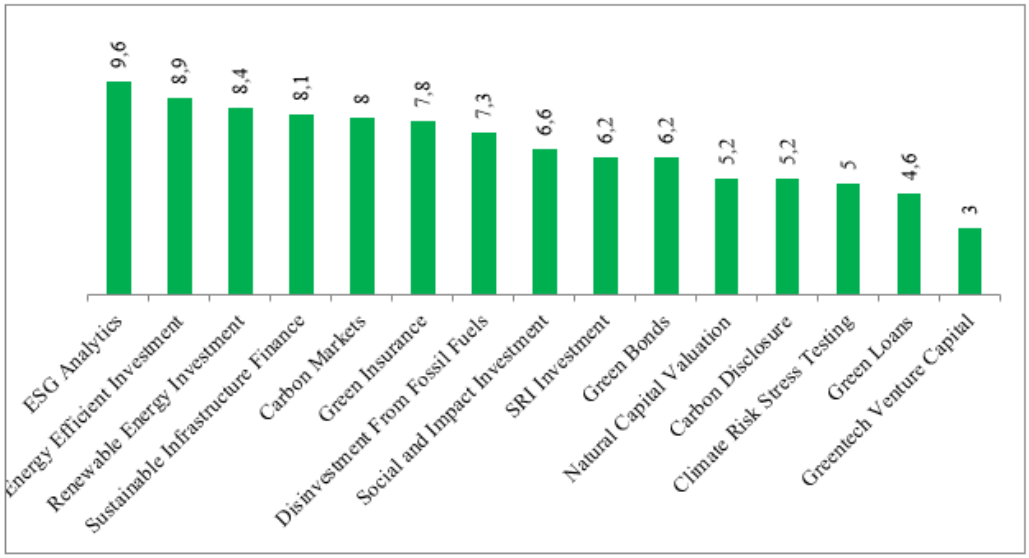

Figure 2: *Areas Of Green Finance Of Most Interest To Respondents, Percentage Of Total Mentions*
Source: Global Green Finance Index 12

The areas of green finance that, according to the results of this study, have the greatest impact on sustainable development are shown in Fig. 3.

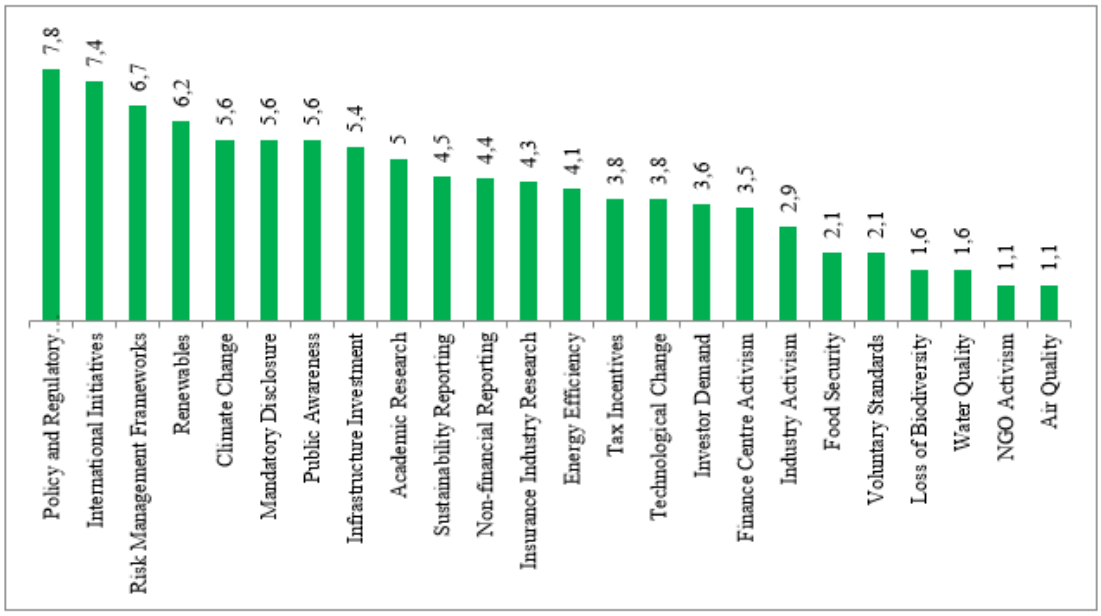

Figure 3: *Drivers Of Green Finance, Percentage Of Total Mentions*
Source: Global Green Finance Index 12

Key drivers that have the greatest impact on sustainable development are: Policy and Regulatory Frameworks, International Initiatives, and Risk Management Frameworks. Drivers as air quality, NGO activity, and loss of biodiversity are the least frequently mentioned by respondents. These results highlight the continuing importance of policy, regulation, and international cooperation in the development of green finance.

The leading centers of green financing are large cities: London, New York, Geneva, Zurich, Luxembourg, Stockholm, Washington, Los Angeles, Singapore, Copenhagen, Amsterdam, Montreal, San Francisco, Sydney, Chicago.

As for the Russian financial market, as of June 2025, the volume of sustainable bond debt reached 405 billion rubles, with green bonds accounting for 223 billion (Bank of Russia, Securities Statistics). As the analysis of debt securities issued on the domestic market sector shows (Fig. 4), a notable spike in occurred in 2022, amounting to 133660 million rubles (i.e. more than 10 times compared to 2020) and confirming increased interest in green finance [16-19].

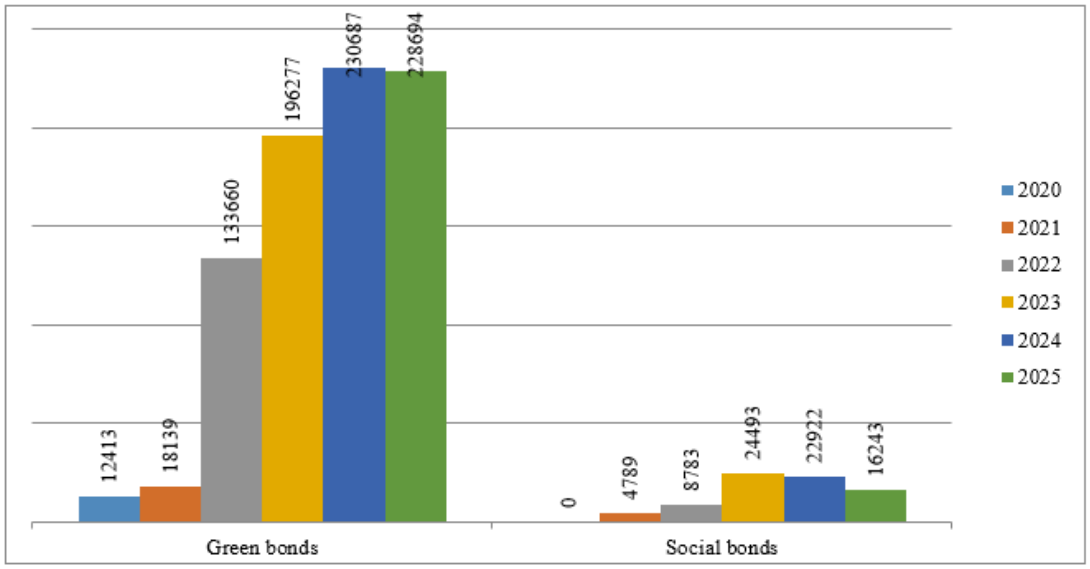

Figure 4: *Amount outstanding of debt securities issued in domestic market and included in sustainable development at nominal value (taking into account redemption), Millions of Rubles*
Source: Bank of Russia, Securities Statistics.

In 2024, the figure reached 230687 million rubles, having slightly decreased to 2286.94 million rubles in 2025. The peak growth in the issue of social bonds occurred in 2023, reaching 24493 million rubles. Since 2024, the social bonds issuance has decreased by 1571 million rubles, and in 2025 – by 8250 million rubles, compared to 2023, reaching 16243 million. The rapid growth in the issuance of green and social bonds indicates an increased investor interest in sustainable development, support of social projects and green initiatives. Investing in such projects contributes to the environmental responsibility, social justice, and creates incentives for sustainable economic growth.

V. Discussion

The study confirms that Russian public and private companies are actively adopting eco-friendly innovative business models and practices in order to achieve sustainable development goals.

However, our overview did not cover the existing barriers such as insufficient investment, weak infrastructure, and administrative hurdles that impede the full realization of "green

transformation" [20]. There is a significant need in specific institutions aimed at developing green investment in Russia. The transition of Russian society from a model of total consumerism to a model of responsible consumption plays the key role in the implementation of the concept of sustainable development [21-22,29].

Additionally, cultural and ethical attitudes toward sustainability remain inconsistent, affecting the pace of progress.

VI. Conclusion

Technological transformation and breakthroughs have created opportunities for deeper integration between nature and society. Yet, over the past decades, humanity has been facing the problem of climate change, continuous reliance on outdated practices in the energy sector, slowly raising responsibility for damage made to nature by economic activity, and continual exploitation of natural resources. Humanity must shift from extractive to regenerative economic behavior.

However, the potential to quickly reverse environmental degradation should not be overestimated. The balance of influence still favors those who continue ignoring the greenhouse effect, water scarcity, and waste issues. The longer it takes to ignore the inadequate attitude towards the environment, where we extract vital resources from, the more challenging it will be to solve the problems accumulated in it.

CONFLICT OF INTEREST.

Authors declare that they do not have any conflict of interest.

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