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M. Polehenka,

PhD in Economics, Associate Professor of Economics,

Dnipro State Agrarian and Economic University

ORCID ID: <https://orcid.org/0000-0001-5866-668X>

Ye. Kobets,

PhD in Economics, Associate Professor of Economics,

Dnipro State Agrarian and Economic University

ORCID ID: <https://orcid.org/0000-0003-4195-2502>

FORMATION OF INVESTMENT AND INNOVATION DEVELOPMENT OF AGRIBUSINESS ENTERPRISES IN THE CONDITIONS OF ESG INTEGRATION

M. A. Полегенька,

к. е. н., доцент кафедри економіки,

Дніпровський державний аграрно-економічний університет

Є. А. Кобець,

к. е. н., доцент кафедри економіки,

Дніпровський державний аграрно-економічний університет

ФОРМУВАННЯ ІНВЕСТИЦІЙНО-ІННОВАЦІЙНОГО РОЗВИТКУ ПІДПРИЄМСТВ АГРОБІЗНЕСУ В УМОВАХ ESG ІНТЕГРАЦІЇ

The article examines the theoretical and practical foundations of the formation of investment and innovation development of agribusiness in the conditions of integration of ESG principles. It was found that over the past two decades, the role of non-financial determinants of enterprise activity, which have acquired an institutionalized form in the form of ESG principles, has increased significantly in the world economy. For the agricultural sector of Ukraine, which is in a state of deep transformation and adaptation to European regulatory requirements, the integration of environmental, social and management parameters becomes a key condition for ensuring sustainability and increasing investment attractiveness. The work characterizes the specifics of the environmental, social and management dimensions of ESG in the functioning of agricultural enterprises, as well as outlines their impact on strategic and operational production planning.

Special attention is paid to the importance of the institutional environment, access to financial resources, the level of investment risks and the state of infrastructure for the innovative development of agrarian business. Based on the analysis of scientific research and international experience, it was established that the implementation of ESG-oriented technologies - precision agriculture, bioenergy, water-saving solutions, digital monitoring systems - contributes to reducing production costs, increasing productivity and compliance with international sustainability standards. It is shown that the activities of international institutions, in particular IFC and GIZ, form new opportunities for the transformation of the agricultural sector through support for infrastructure modernization, development of logistics clusters, restoration of irrigation systems and implementation of climate-oriented innovations.

The key role of innovative business models - cooperatives, clusters, short supply chains and integrated agro-food systems - as factors in reducing investment risks, optimizing logistics and intensifying the attraction of external financing is determined. It is substantiated that the development of modern management systems, including strategic planning, financial management, controlling and risk

management, is a necessary condition for accelerating the innovative development of enterprises and increasing their investment attractiveness in the context of ESG requirements.

It has been proven that the comprehensive integration of ESG principles into the production and management processes of agricultural enterprises ensures the formation of a new investment environment focused on increasing sustainability, environmental responsibility, social cohesion and long-term competitiveness of agribusiness.

У статті досліджено теоретичні та практичні засади формування інвестиційно-інноваційного розвитку агробізнесу в умовах інтеграції принципів ESG. Виявлено, що за останні два десятиліття у світовій економіці значно зросла роль нефінансових детермінант діяльності підприємств, які набули інституціоналізованої форми у вигляді ESG-принципів. Для аграрного сектору України, що перебуває у стані глибокої трансформації та адаптації до європейських регуляторних вимог, інтеграція екологічних, соціальних та управлінських параметрів стає ключовою умовою забезпечення стійкості та підвищення інвестиційної привабливості. У роботі охарактеризовано специфіку екологічного, соціального та управлінського вимірів ESG у функціонуванні підприємств аграрної сфери, а також окреслено їхній вплив на стратегічне та операційне планування виробництва.

Особливу увагу приділено значенню інституційного середовища, доступу до фінансових ресурсів, рівня інвестиційних ризиків і стану інфраструктури для інноваційного розвитку аграрного бізнесу. На основі аналізу наукових досліджень та міжнародного досвіду встановлено, що впровадження ESG-орієнтованих технологій – точного землеробства, біоенергетики, водоощадних рішень, цифрових систем моніторингу – сприяє зниженню виробничих витрат, підвищенню продуктивності та відповідності міжнародним стандартам сталості. Показано, що діяльність

міжнародних інституцій, зокрема IFC та GIZ, формує нові можливості для трансформації аграрного сектору через підтримку модернізації інфраструктури, розвитку логістичних кластерів, відновлення зрошувальних систем і впровадження кліматоорієнтованих інновацій.

Визначено ключову роль інноваційних бізнес-моделей – кооперативів, кластерів, коротких ланцюгів постачання та інтегрованих агропродовольчих систем – як чинників зниження інвестиційних ризиків, оптимізації логістики та активізації залучення зовнішнього фінансування. Обґрунтовано, що розвиток сучасних управлінських систем, включаючи стратегічне планування, фінансовий менеджмент, контролінг та ризик-менеджмент, є необхідною умовою прискорення інноваційного розвитку підприємств та підвищення їхньої інвестиційної привабливості в контексті ESG-вимог.

Доведено, що комплексна інтеграція ESG-принципів у виробничі та управлінські процеси аграрних підприємств забезпечує формування нового інвестиційного середовища, орієнтованого на підвищення стійкості, екологічної відповідальності, соціальної згуртованості та довгострокової конкурентоспроможності агробізнесу.

Keywords: ESG principles, investment and innovation development, agribusiness, sustainable development, institutional environment, resource efficiency.

Ключові слова: ESG-принципи, інвестиційно-інноваційний розвиток, агробізнес, сталий розвиток, інституційне середовище, ресурсоефективність.

Introduction. In today's conditions of global turbulence, the agricultural sector appears as one of the key drivers of the state's economic stability, food security and ensuring export potential. At the same time, the transformational processes taking place in the world economy lead to a change in traditional

approaches to the organization of agribusiness and the formation of investment policy of enterprises, for which the integration of ESG principles is not only desirable, but strategically necessary. For Ukraine, this need is strengthened by the action of internal and external factors: the consequences of military aggression, significant losses of infrastructure, the growth of investment risks, the need to restore and modernize production on the basis of climate stability and resource efficiency. At the same time, the state's course towards European integration involves gradual approximation to the EU regulatory framework, in particular regarding corporate sustainability, non-financial reporting, decarbonization and responsible management of supply chains.

In the conditions of such a transformation, the formation of investment and innovation development of agribusiness enterprises, focused on long-term stability and competitiveness, is of particular importance. The use of ESG approaches in the enterprise management system contributes to the attraction of financial resources, risk reduction, improvement of the efficiency of production processes, formation of a positive reputation and access to international capital markets. This leads to the need for a deep scientific justification of the mechanisms of ESG integration into the strategic development of agricultural enterprises [10].

In the context of increasing the instability of the external environment, wartime risks and structural transformations of the market, there is a need for new conceptual approaches to managing the investment and innovation development of agricultural enterprises. The integration of ESG principles into the strategic management system can be a key mechanism for the transition of agribusiness from a traditional raw material model to a model of creating added value, innovation, social responsibility and environmental sustainability.

Аналіз ключових досліджень і публікацій. The problem of innovative provision of the agricultural sector, the formation of a favorable investment climate and the transition of agribusiness to a model of sustainable development occupies an important place in the modern scientific discourse. In particular, in the works of T. Korniychuk, O. Honcharenko, O. Lucii, V. Ogorodnikova, P. Putsenteilo, M.

Kisil, N. Chornoi, S. Melnyk, O. Zakharchuk, N. Trusova, O. Popova and other researchers consider the impact of ESG factors on investment decisions, transparency of reporting, management of environmental and social risks, formation of a reputation of responsible business and increasing attractiveness for international investors. Researchers highlight that integrating ESG into the enterprise management system contributes to their long-term stability, adaptability to global challenges and compliance with the requirements of international financial institutions.

A significant layer of scientific research is devoted to issues of sustainable development of the agricultural sphere, implementation of the principles of circular economy, greening of production, development of green energy, increasing resource efficiency and reducing the negative impact of agricultural activity on the environment. Considerable attention is focused on the need to implement technologies of energy saving, bioenergy, organic production, closed processing cycles and other solutions that ensure increasing the environmental sustainability of the agricultural sector. At the same time, the majority of such studies do not take into account the context of military threats and increased risks inherent in the current state of the Ukrainian economy, which determines the need for a scientific justification of the concept of the formation of investment and innovative development of agribusiness enterprises in the conditions of ESG integration, taking into account military challenges, transformations of global financial markets and the growing importance of environmental and social standards.

Метою статті there is a justification of the theoretical and methodological foundations and determination of the key directions of the formation of investment and innovative development of agribusiness in the conditions of ESG integration, as well as the identification of institutional, technological, managerial and financial factors that ensure the transformation of the agricultural sector on the basis of sustainability, increasing its competitiveness and strengthening investment attractiveness in modern global and national conditions.

Результати дослідження. Over the past two decades, the role of non-financial factors in business development, which were reflected in the formation in 2005, under the auspices of the UN, of the ESG principles currently followed by the world's leading corporations, has been significantly strengthened in the world economy. These principles cover: environmental responsibility (E - Environment), corporate social responsibility (S - Social) and high quality corporate governance (G - Governance). ESG principles are increasingly considered as key criteria for evaluating enterprises from the standpoint of investors, creditors, partners and regulatory bodies [2].

For the agricultural sector, both in Ukraine and in the world, ESG moves into the plane of strategic development, determining the priorities of greening production, increasing social sustainability and improving management practices. Ukrainian agricultural enterprises, primarily those with a significant scale of activity (turnover of more than 150 million euros) and present on the markets of the European Union, are already actively adapting to the requirements of the *acquis communautaire*, which provide for the introduction of ESG reporting and the integration of sustainability principles into corporate processes.

The implementation of ESG approaches in the management system of agribusiness enterprises ensures the formation of a sustainable development trajectory, expands opportunities for access to financial resources, strengthens investment attractiveness and increases competitiveness in the long term. That is why the study of ESG integration mechanisms and their impact on the investment and innovation development of agricultural enterprises is relevant and important in the context of the transformation of the national economy, European integration processes and global trends in sustainable development.

The agro-industrial complex (APC) system covers three main areas. The first includes industries that provide the agricultural industry with means of production: tractor construction and agricultural engineering, mechanical engineering for food and light industry, production of mineral fertilizers and chemical plant protection products, repair of equipment and machinery, agricultural construction. The second

area is represented by agriculture, which receives production resources from 80 industries and supplies products to 60 industries. The third includes a set of industries and enterprises that ensure the procurement, transportation, storage, processing of agricultural raw materials, as well as the sale of final products. This area covers the food (dairy and meat) and compound feed industries [4].

The function of the agricultural sector is to produce a sufficient number of high-quality food products that support the health of the population. The agricultural system uses environmental resources. Land and water are key for agriculture, while it creates many products with ecological value. Given the limited number of these resources, it is necessary to minimize the negative impact on the environment during the business planning of agricultural projects.

Production planning in the agricultural sector requires taking into account the complex impact of economic activity on the ESG-metric system, taking into account territorial, natural-climatic and resource specifics. Within the framework of strategic and production plans, it is necessary to reflect natural changes that occur as a direct result of the functioning of agricultural enterprises and may cause short- or long-term environmental and socio-economic consequences that require additional costs and adjustments to management decisions [7].

The ecological dimension (E - Environment) covers a group of parameters characterizing the influence of the enterprise on the state of the environment and natural resources. In agriculture in particular, the key indicators are: greenhouse gas emissions and contribution to climate change; pollution levels of water and air resources; volume and structure of freshwater consumption; rates of soil degradation and loss of biodiversity; generation and management of production waste; efficiency of energy use, including energy intensity of technological processes and energy efficiency of buildings and equipment. Additional components are logistical environmental friendliness, introduction of renewable energy sources, decarbonization measures, achievement of carbon neutrality and compliance with environmental criteria for raw materials and products. Ensuring

proper management of environmental risks is a decisive component of the environmental sustainability of an agricultural enterprise [10].

The social dimension (S - Social) concentrates on managing the impact of the enterprise on employees, local communities and society as a whole. Key aspects include: respect for human rights, the creation of safe and decent working conditions, ensuring equal opportunities and social inclusion, the demographic profile and structure of employment, social security of workers, the level of wages and their compliance with the subsistence minimum, as well as the participation of workers in the processes of improving the working environment. This becomes especially important in the conditions of military aggression against Ukraine, when security requirements (availability of shelters, adaptation of production facilities to risks) and inclusiveness become critically important elements of social stability. In the context of agribusiness, social factors also include improving the quality of life of farmers, workers and rural communities, developing local infrastructure and supporting micro and small producers [10].

The management dimension (G - Governance) determines the quality of corporate governance and the effectiveness of management processes, in particular the organizational structure, control mechanisms and communication practices. This group of indicators includes: management of industry and operational risks; protection of the rights of employees, shareholders and consumers; availability and implementation of ethical policy; combating corruption, tax evasion and money laundering; quality of corporate reporting and openness of data, including disclosure of information about environmental and social risks. These also include supply chain sustainability, internal and external audit performance, diversity and inclusion policies, corporate social responsibility, and the use of benchmarking and competitive analysis mechanisms [10].

An important prerequisite for the formation of an investment and innovation model of development is the quality of the institutional environment, access to financial resources and the level of investment risks. In countries with a sustainable investment environment, the determining factors are the transparency of rules, the

availability of incentives for innovative activities, effective state support and developed infrastructure.

The global trend towards the implementation of ESG-oriented approaches has a significant impact on the transformation of the agricultural sector. According to the researchers, the ESG model in agriculture forms a new investment logic, in which environmental sustainability, risk management, social responsibility, digitalization of monitoring processes and reduction of the carbon footprint become key. Enterprises integrating ESG principles demonstrate higher investment attractiveness, as they meet the requirements of international financial institutions and funds focused on “green” financing, green finance and impact investing [5, 6].

International studies show that agricultural enterprises that implement innovative ESG-oriented strategies (precision farming, bioenergy, optimization of water use, quality control systems) are able to significantly reduce production costs, increase productivity and reduce operational risks. Practical models of ESG integration into agribusiness - such as those proposed in GIZ reports and publications on ESG models of sustainable agriculture - demonstrate the relationship between investment in innovation, climate-oriented technologies and increasing the competitiveness of agricultural enterprises in international markets.

The analysis of sources also confirms that the investment and innovation development of agribusiness largely depends on the access of enterprises to state support mechanisms and external financing. In particular, the role of the state is strengthened in creating favorable conditions for investments: tax incentives, leasing programs, lending, guarantee instruments, development of agricultural infrastructure. At the same time, the intensification of international cooperation aimed at sustainable development enables agricultural enterprises to access grant financing, technical assistance programs, ESG-oriented credit products and special investment instruments [1].

Modern international programs for the development of the agricultural sector, in particular the initiatives of the International Finance Corporation (IFC) and GIZ, are aimed at the complex transformation of agricultural production in

accordance with the principles of energy saving, resource efficiency, climate sustainability and the formation of integrated value chains. Within these programs, the key areas of investment are the modernization and reconstruction of irrigation infrastructure, the introduction of precision agriculture technologies, the development of bioenergy solutions, the digitalization of production and management processes, as well as the creation of logistics clusters and the renewal of capacities for storage and processing of agricultural products.

Analytical studies of ESG-oriented farm practices in the countries of the European Union and Asia show that investments in such areas ensure not only productivity growth and increased efficiency of resource use, but also form compliance with international standards of sustainable development. Thanks to this, agricultural enterprises get the opportunity to enter premium market segments - in particular, organic products and goods with a certified low carbon footprint, which significantly expands their export potential and increases long-term investment attractiveness [3, 8].

The development of innovative business models, such as agricultural cooperatives, production and logistics clusters, short supply chains and integrated agro-food systems, plays a key role in shaping the modern investment environment of the agricultural sector. These models provide structural changes in the organization of production and sales, contributing to increasing the efficiency of resource use, scaling innovations and diversifying market risks.

Scientific studies confirm that the clustering of agricultural areas is one of the most effective mechanisms for reducing investment risks, as it involves the coordination of the activities of enterprises, scientific institutions, authorities and infrastructure operators within a single spatial entity. The presence of clusters helps to optimize logistics processes, reduce transaction costs, increase the efficiency of information exchange and speed up the introduction of technological innovations. In addition, the clusters create favorable conditions for attracting external investors and integrating international technical assistance, as they ensure transparency, manageability and systematicity of regional investment processes.

Empirical evidence shows that regions with developed cluster infrastructure, modern logistics hubs and specialized service centers demonstrate higher investment attractiveness. Synergistic effects are formed in such territorial entities, which strengthen the competitive position of enterprises and ensure faster adaptation to market changes, in particular to the requirements of sustainability, digitalization and ESG-oriented management. Thus, the development of cluster and cooperative models appears as an important prerequisite for the transformation of the investment environment and the formation of an innovatively oriented agro-food system. Another strategic direction for the formation of a high-quality investment environment is the green modernization of production - biogas and biomethane projects, organic production, circular business models, environmentally appropriate storage and processing technologies. According to the conclusions of international financial institutions, bioenergy and the organic sector are among the most attractive for ESG-oriented investments, as they ensure decarbonization, increase resource efficiency and create added value at the local level. Such projects strengthen the stability of enterprises and form long-term advantages in domestic and foreign markets.

The development of modern management systems, which ensure the strategic orientation of business, increase the transparency of decision-making and contribute to the effective use of resources, plays a significant role in the formation of the investment and innovation potential of agricultural enterprises. Key management components that determine the company's ability to innovative development include strategic planning, financial management, controlling systems, risk management, logistics management and internal audit mechanisms. Scientific studies show that enterprises with developed management tools demonstrate increased adaptability to market fluctuations, the ability to quickly respond to changes in the situation and implement technological innovations. Systemic risk management makes it possible to reduce the uncertainty of investment processes, increase the predictability of results and reduce transaction

costs, which is especially important in conditions of instability and high external challenges [9].

It is also important to emphasize that the formation of effective management systems is closely related to compliance with ESG principles. Enterprises that have implemented standards of responsible management, transparent reporting, social responsibility and environmental sustainability are proving more attractive to external investors, in particular those targeting sustainable financing strategies and green investment instruments. Thus, the improvement of corporate governance not only optimizes internal processes, but also acts as a catalyst for attracting investments and accelerates the innovative development of agricultural enterprises.

Thus, the generalization of the results of the analysis of scientific sources gives grounds for asserting that the formation of investment and innovation development of agribusiness in the conditions of ESG integration is a multi-component and systemic process. Its implementation requires simultaneous influence on the institutional, technological, managerial and financial parameters of the functioning of enterprises. The key directions of such development are the modernization of the institutional environment and the minimization of investment risks; active introduction of innovative technologies, including climate-oriented solutions; departure from the raw material management model in favor of the production of products with high added value; development of cluster structures and improvement of logistics infrastructure; integration of ESG principles into the system of strategic management of enterprises; expanding access to international financial, technical and expert resources; as well as support for “greens” investment and implementation of environmentally friendly business models [8].

The comprehensive implementation of these directions is able to ensure a deep transformation of the agricultural sector, contributing to its transition to a more sustainable, innovative and competitive development model. The integration of ESG principles into all levels of management and production processes forms the basis for creating a stable investment environment focused on long-term

growth, increasing the efficiency of resource use, environmental responsibility and social sustainability of agricultural enterprises.

Conclusions. The conducted research gives grounds for asserting that the formation of investment and innovation development of agribusiness enterprises in the conditions of ESG integration is a multidimensional process that covers the modernization of the institutional environment, the renewal of the technological base and the improvement of corporate governance. ESG principles focused on environmental responsibility, social sustainability and quality of management are gradually turning into key criteria of investment attractiveness and determine the directions of transformation of the agricultural sector. The implementation of innovative technologies, the development of bioenergy projects, the digitalization of production processes, the formation of cluster models and the modernization of logistics infrastructure create a basis for increasing the productivity and competitiveness of agricultural enterprises. At the same time, access to international support programs (IFC, GIZ, etc.) provides a resource and expert base for implementing climate-oriented solutions and strengthening the investment sustainability of the industry. Modern systems of strategic and financial management, which increase the transparency of investment processes and the ability of enterprises to adapt to risks, are of great importance in the formation of innovative potential. Enterprises that integrate ESG into their management models show higher levels of efficiency, reduced riskiness of operations and improved access to “green” financial instruments.

Therefore, ESG integration is an effective mechanism for modernization and restoration of the agricultural sector. Its comprehensive implementation will contribute to the formation of a stable investment environment, strengthening the competitive positions of Ukrainian enterprises and the transition of agribusiness to a model of long-term sustainable development. In the future, further scientific research should be aimed at substantiating the applied mechanisms of ESG integration into the business processes of agricultural enterprises, developing methodological tools for assessing their investment and innovation potential, as

well as analyzing the effectiveness of the application of ESG-oriented models in the processes of post-war reconstruction and green transition of the agricultural sector of Ukraine.

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