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PROSPECTS FOR THE DEVELOPMENT OF THE ESG CONCEPT IN THE FACE OF NEW CHALLENGES

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ABSTRACT

Regulators and businesses worldwide are gradually understanding the importance of climate change adaptation and mitigation measures. Therefore, decision-makers - national regulators, regional authorities, and heads of corporations - need an appropriate toolkit that ensures adequate decision-making based on quantitative assessments of various decarbonization and adaptation scenarios. The most promising tools for the decarbonization of the economy are analyzed. It was noted that technological modernization and structural transformation of the industry within the framework of decarbonization are necessary for the positive effect of the transition to low-carbon development. It was emphasized that enterprises should independently form their ESG strategies to adapt to climate change. Applying an ESG strategy in the long term means increasing business competitiveness and profitability. ESG analysis can help identify several potential long-term financial risks and opportunities, including the possible impact of future carbon regulations and cost savings associated with more efficient use of resources. It was noted that the decarbonization of the economy creates new opportunities for developing green finance and low-carbon technologies. Still, at the same time, it is necessary to remember about possible risks of different nature. The transition to sustainable development is perceived as an objective requirement of time, determining the future of any country. This is not only a problem of the contradiction between the development of economic potential and the limited possibilities of technogenic load on the environment but also a contradiction between the moral principles that a large part of society adheres to and the axioms of social justice.

Keywords: *ESG, decarbonization, environmental factor, rational use of resources, sustainable development, climate change, climate policy priorities*

1. INTRODUCTION

A modern challenge for enterprises worldwide is ensuring the sustainable development of both enterprises and the economic system. Unfavorable climatic and social events force representatives of society (clients, owners, regulators) to focus on environmental and social aspects of the functioning of enterprises, proposing appropriate requirements.

Once considered an “environmental problem, “ climate change is increasingly being included as an integral element in national and international security agendas. Climate change is seen as a “threat multiplier”, exacerbating existing security threats, increasing environmental stress, and amplifying pressures that can affect the ability of governments to respond to climate change.

Climate change can affect security in several ways. Increased competition for access to natural resources can lead to conflict without effective dispute resolution mechanisms. An increase in the frequency of extreme weather events and natural disasters caused by climate change may increase political instability and threaten livelihoods, pushing populations to migrate or turn to illegal sourc-

es of income. Undermining food production and rising food prices can lead to social instability, protests, and unrest. Impacts on energy production caused by rising temperatures, reduced precipitation, and threats to power generation and transmission infrastructure from extreme weather events undermine supply chains and energy security. Growing demand for water resources and irregular water supply are increasing pressure on existing water management mechanisms and may complicate political relations.

Extraordinary measures have been taken in recent years to reduce greenhouse gas emissions to counteract the climate threat at the global level. Back in 2015, the Paris Agreement (Paris Agreement 2015) was adopted, aimed at keeping the average temperature increase at a level no higher than 1.5°C, increasing the ability to adapt to the consequences of climate change, and transitioning to low-carbon development with the goal of achieving zero-carbon economy emissions by 2050. As of May 2021, 189 countries have joined the agreement. All participating countries voluntarily set themselves the goal of reducing the net emissions of CO2 and other greenhouse gases into the atmosphere until 2030. Still, many have gone further - to date, more than 60 leading countries of the world have declared their desire for complete carbon neutrality (that is, zero emissions of CO2 into the atmosphere) by 2050. (Official website of the UNFCCC).

Many countries that have joined the Paris Agreement have launched CO25 emissions trading systems or other forms of carbon pricing and "carbon fees" or plan to do so soon. Many introduce a ban on internal combustion engines (Wappelhorst S., 2020), set target shares of renewable energy sources in the national energy balance, or select a percentage of low-carbon fuels.

In December 2019, the European Union announced a comprehensive strategy for the development of a sustainable economy, "Green Course" (Communication from the Commission 2019), the goal of which is to achieve climate neutrality (i.e., zero emissions of all greenhouse gases) by 2050. It also set an ambitious intermediate goal - reducing emissions of greenhouse gases by 2030 compared to 1990, which assumes a share of renewable energy sources of 38-40% in the energy balance and its 65% share in electricity production. At the same time, by 2030, compared to 2015, it is expected to reduce energy consumption by 39-40%, coal consumption by 70%, and oil and gas consumption by 30% and 25%, respectively. The EU consistently creates comprehensive regulations forcing market participants and national governments to meet these overambitious goals.

Achieving these tasks requires a systematic approach to implementing ESG practices in business activities. At the same time, problems of a fragmented movement toward sustainable development are often observed today, which requires further research to find practical tools for implementing the ESG management concept (Amaradasa, 2018).

2.LITERATURE REVEW.

The abbreviation ESG is formed from the English words Environmental, Social, Corporate Governance, or ecological, social, and corporate management. The development of this direction at the enterprise or in a particular industry implies a more responsible fulfillment of environmental requirements and using resource-saving technologies to reduce the negative environmental impact. Observance of environmental standards in this concept can be seen as additional social obligations since voluntary willingness to preserve a favorable ecological environment satisfies current needs without harming future generations. The idea of ESG is considered either in the context of the transition to "green" growth - economic growth that ensures the support of biodiversity, the preservation and rational use of natural resources and the environment, and the reduction of negative climate changes, or in terms of compliance with the requirements of social responsibility, both externally and internally contour Actualization of the problems of climate change and maintaining biodiversity stimulated a surge of interest of the scientific and expert community in issues related to various aspects of the "green" agenda.

Scientific works use many different interpretations of ESG. For example, it can include not only the apparent components of the acronym but also concepts such as sustainable development, responsible investment, social acceptance, public relations and social responsibility, supply and procurement chains, human rights, labor issues, transparency, control, renewable energy, and climate change.

The theoretical framework of ESG research is mainly focused on institutional theory. From the perspective of institutional theory, Chatterji and Toffel explained the impact of ESG rating on improving environmental performance (Chatterji, Toffel, 2010), Jayachandran et al. demonstrated the influence of social indicators on corporate indicators (Jayachandran et al., 2013), Koch et al. studied the risk prevention role played by ESG (Koh et al., 2014) and Flammer et al. studied the binding effect of contracts on the social responsibility of managers (Flammer et al., 2019).

ESG research shows that businesses most responsive to ESG stakeholder demands will outperform irresponsible ones. Interest in socially responsible investments arose 50 years ago (Sparkes, Cowton, 2004). And already in the period from 2000 to 2010, the number of studies on the causes and consequences of applying ESG criteria in making investment decisions has increased significantly (Chelawat, Trivedi, 2013). The application of ESG criteria has firmly entered the practice of investors in developed countries and is gradually finding its supporters in developing markets (Celani et al., 2020).

The further development of the concept of "green finance" acquired a dualism: representatives of scientific research circles concentrated on studying the issues of assessing the impact of responsible business behavior on the sustainable development of the markets of its presence and the country's economy as a whole; representatives of business and government regulators - on the application of the concept of "green finance" to acquire market power and lobby for their interests ESG research shows that companies that respond best to the demands of stakeholders on ESG will perform better than irresponsible companies.

Participants in the movements for the decarbonization of the world economy strive to reduce and ideally eliminate emissions of greenhouse gases into the atmosphere by 2050. Various programs and technologies are proposed to achieve the set goal with the help of the production of new types of energy, technologies for capturing and injecting carbon dioxide into the earth's crust for slowing the accumulation of CO2 in the atmosphere, etc., which requires huge investments.

The financial plane of "green" management solutions is actively supplemented with "green" marketing tools. Today, socially responsible business management policies largely determine products' competitiveness and brand popularity (Jafar et al., 2019).

In the book "How to Avoid a Climate Catastrophes," Bill Gates calls on governments to focus on two numbers in environmental policy: 51 billion tons - the number of greenhouse gases emitted into the atmosphere, and 0 - the number of emissions that should be achieved by 2050. For this, he suggests awarding a "green" premium for the minimum gap between the price covered by greening programs and the price of abandoning dirty industries and reducing greenhouse gas emissions to zero, since in Europe, many of the largest industrial enterprises, being the largest polluters, use free credits when obtaining permits for greenhouse gas emissions gases. They have no motivation to reduce emissions.

3.AIM OF THE RESEARCH

The article aims to study the growing trend and importance of implementing the ESG concept.

4.METHODS

The research materials are reports and reports of domestic and international organizations, government orders, and scientific and practical manuals in ESG, economic and financial spheres. Research methods are analysis, comparison, and classification.

The dynamics of ESG-bond development are pretty high, which requires the development of forecasts for their different dynamics. One of the most straightforward forecasting tools is trend building. Trends involve considering the previous trends in the change of the indicator over time, and by constructing a dependence equation of various types, a formula is calculated that reflects this dependence in dynamics. A trend line is a line that approximates the original data based on a regression equation or moving average. Approximation takes place by the method of least squares. Options for forming a trend line are presented in table 1.

Table 1. Types of trend line approximation functions

Name	Type	Description
Linear	$Y = mx + b$	m – the tangent of the angle of inclination of the straight line;
Logarithmic	$Y = clnx + b$	b – displacement;
Polynomial	$Y = b + c_1x + c_2x^2 + c_3x^3 + c_4x^4 + c_5x^5 + c_6x^6$	c and b – constants;
Degree	$Y = cx^b$	c_1, c_2, c_3, c_4, c_5, c_6 – constants;
Exponential	$Y = ce^{bx}$	c and b – constants;
Linear filtering	$F_t = \frac{(A_t + A_{(t-1)} + \cdots + A_{(t-n+1)}}{n}$	e – the base of the natural logarithm; c and b – constants;

Source: (Soshnykova, L., Tamashevych, V., Uebe, H., Sheffer, M. ,1999)

The approximation coefficient is calculated as follows:

$$R^2 = 1 - \frac{\Sigma(Y_i - \widehat{Y})^2}{(\Sigma Y_i^2) - \frac{(\Sigma Y_i)^2}{n}} \quad (1)$$

Analyzing indicators that reflect the volume of air emissions by European countries, it is advisable to determine the presence or absence of dependence between these indicators and the value of "green" bonds issued in European countries. It is advisable to construct a multiple regression equation to solve this problem.

The general multiple regression model looks like this:

$$y = f(x_1, x_2 \ldots x_p) + \varepsilon \quad (2)$$

y - dependent variable;

$x_1, x_2, \ldots x_p$ - factors (independent changes);

If the multiple regression is linear, then it is presented as follows:

$$y = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_p x_{ip} + \varepsilon_i \ , \ i = \overline{1,n}$$

Or in matrix form:

$$y = X\beta + \varepsilon \quad (3)$$

where, $y = [y_1, y_2, \ldots y_p]^T$ – vector of values of the dependent variable;

$\beta = [\beta_1, \beta_2, \ldots \beta_p]^T$ – vector of regression model coefficients;

$\varepsilon = [\varepsilon_1, \varepsilon_2, \ldots \varepsilon_n]$ – error vector.

$X = \begin{bmatrix} 1\, x_{11} x_{12} x_{13} \ldots x_{1p} \\ 1\, x_{21} x_{22} x_{23} \ldots x_{2p} \\ \\ 1\, x_{n1} x_{n2} x_{n3} \ldots x_{np} \end{bmatrix}$ – matrix of factor values.

The regression equation is the sample model estimate:

$$\hat{y} = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_p x_p \quad (4)$$

where y – estimation of the mathematical expectation of the dependent variable

$b_i (i = \overline{0,p})$ - estimation of coefficients $\beta_i (i = \overline{0,p})$ - regression model

The least squares method is used for estimation:

$$S(b_0, b_1, .. b_p) = \sum_{i=1}^{n}(y_i - b_0 - b_1 x_{i1} - b_2 x_{i2} - \cdots - b_p x_{ip})^2 \to min \quad (5)$$

After solving the system of normal equations

$$\begin{cases} \frac{\delta S}{\delta b_0} = -2\sum_{i=1}^{n}(y_i - b_0 - b_1 x_{i1} - b_2 x_{i2} - \cdots - b_p x_{ip}) = 0 \\ \frac{\delta S}{\delta b_1} = -2\sum_{i=1}^{n} x_{i1}(y_i - b_0 - b_1 x_{i1} - b_2 x_{i2} - \cdots - b_p x_{ip}) = 0 \\ \vdots \\ \frac{\delta S}{\delta b_p} = -2\sum_{i=1}^{n} x_{ip}(y_i - b_0 - b_1 x_{i1} - b_2 x_{i2} - \cdots - b_p x_{ip}) = 0 \end{cases} \quad (6)$$

After that, we will get the values of the coefficients of the regression equation, which in matrix form have the following form:

$$b = (X^T X)^{-1} X^T y \quad (7)$$

where $b = [b_1, b_2, \ldots b_p]^T$ vector of regression equation coefficients.

The coefficient (index) of multiple correlation R is used to assess the closeness of the joint influence of factors on the dependent variable:

$$R = \sqrt{1 - \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}} = \sqrt{\frac{\sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}} \quad (8)$$

Coefficient (index) of multiple determination R^2:

$$R^2 = \frac{\sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2} \quad (9)$$

The coefficient of determination is one of the most important indicators of the quality of the constructed model, as it determines the degree of adequacy of the model, and the closer the value is to "1", the better the calculated model describes the set of initial data. In addition, the statistical significance of the coefficient of the equation is calculated using the Student's t-test. Accordingly, only those independent variables whose value is less than 0,05 remain in the model.

5. RESULTS

At the beginning of the 2020s, humanity faced serious climatic and ecological challenges caused by climate change and environmental degradation. The most common understanding of climate change is a transformation of the climate system that occurs independently of cause over decades or more extended periods (Houghton, 2001). But in recent decades, this concept has been increasingly used to define climate change caused by human activity.

Climate change and environmental degradation remain one of the most severe challenges of the current century. As part of the 27th UN International Climate Conference (November 2022), world leaders and representatives of international organizations called the fight against climate change a battle for the survival of humanity. The risks caused by climate change, in terms of probability of occurrence and the expected magnitude of damage, are unprecedented and threaten the world already.

The economic activity of people is mainly responsible for climate change and environmental pollution. Since the 19th century, the increase in average global temperatures and the saturation of the atmosphere with such greenhouse gases as CO_2 and methane (CH_4) has been caused precisely by burning fossil fuels and deforestation (Climate Change 2021). The ecological footprint indicator (Ecological Footprint), which compares the resources consumed by households, corporations, and government structures with the possibilities of biological regeneration of the Earth, has already increased to 1.7 (Global Footprint Network).

The critical points of strengthening human influence on the environment are related to the understanding that:

- climate change is a global problem, but each of us is capable of changing the situation;

- even small changes in our behavior can prevent greenhouse gas emissions without harming the quality of life;
- measures to protect the climate must be taken by all people at all levels of life organization (Bird, E 2008.)

The EU strategy is focused on developing and implementing adaptation solutions that will help reduce the risk of the impact of existing climate development trends, increase its protection, and ensure the availability of freshwater (Forging a Climate, 2021). Acceleration of the processes of adaptation to climate change is a sign of increasing responsible attitudes towards life among people and organizations. Essentially, it is a more profound and severe interpretation of a sustainable lifestyle, corresponding to the idea of "common responsibility" and care for the community of all living things. The attention of people and organizational structures here is focused not only on knowledge and their conscious application but also on the actual manifestation of activity, directly or indirectly aimed at improving the quality of life of other people to improve the quality of one's life without harming the quality of life of others.

Given that almost every resident of Europe already feels the consequences of climate change, it is necessary to organize operational support and assistance in the processes of faster and more comprehensive adaptation to climate change.

The countries' measures to decarbonize the world economy create new risks - transitional climate risks. The losses associated with them arise not as a result of climate change but as a result of the actions of the public and private sectors aimed at curbing these changes (introduction of cross-border carbon regulation (TRC), the introduction of new technologies, changes in the structure of energy consumption, etc.).

The European Union (EU) has practiced internal carbon regulation through carbon taxes for about 30 years. The average size of such a tax in Europe is about 50 euros per ton of CO2. As a result of strict internal regulation, the European Union faced the phenomenon of "carbon leakage" - the transfer of carbon production to countries with loyal environmental rules and more favorable conditions for doing business, which reduces the flow of a certain amount of income to the EU economy, and reduces the number of jobs. Moreover, goods produced in countries with lower environmental requirements are cheaper and more competitive, pushing European producers out of the market. Therefore, the "Green European Course" was adopted to neutralize these EU risks.

Presented to the public in 2019, the European Green Deal envisages making Europe the first climate-neutral continent by 2050 and aims to develop a modern, resource-efficient, and competitive economy. Its activities are financed within the framework of the InvestEU program, on the implementation of which EU member states will spend 1 trillion euros over the next decade. Prepared by the European Commission in 2021, the large-scale Fit for 55 packages of measures is aimed at a legally binding reduction of greenhouse gas emissions by 55% by 2030 (compared to 1990), provides mechanisms for pricing greenhouse gas emissions and border carbon regulation, as well as increasing the production of renewable energy, stimulating the sustainable development of transport and limiting the import of products that contribute to deforestation (European Green Deal... 2021).

A cross-border carbon tax (TCT) is proposed as a critical tool to protect against "carbon leakage", which would tax carbon-intensive products according to the amount of greenhouse gas emissions associated with their production. Currently, the size of the TPE has not been established; according to preliminary estimates, it will range from 25 to 75 euros per ton of CO2. In addition, the European Commission has developed a plan to bring the EU economy out of the crisis caused by the coronavirus pandemic, where TVE will be a significant source of income (€5-14 billion per year (until 2027).

Considering current trends, the UN Environment Program predicts a 10.6% increase in greenhouse gas emissions. By 2030 compared to 2010 and a global temperature increase of 2.5-2.8% by the end of the century. To prevent these negative consequences, countries in the medium term will have to step up measures to transition to a low-carbon economy. At the same time, the current high price of hydrocarbons contributes to an increase in investments in renewable energy sources (RES), which will stimulate the energy transition.

The problem of greening is related to issues of social responsibility of business. While there are active discussions about the causes and consequences of global climate change, the impact of greenhouse gas emissions and pollutants on the population's quality of life in areas of industrial localization or high urbanization is a generally recognized fact. The world's leading countries that provide the maximum contribution to CO2 emissions (million tons per year) are China (10,357); the USA (5414); India (2274); Japan (1237); Germany (798); Iran (698); Saudi Arabia (601); South Korea (598); Canada (557)

In the world, a mechanism that will provide the necessary assessment of various scenarios of adaptation to changes is in demand by several stakeholders. Among the main ones, the following can be distinguished (Hare, 2018; UN official site):

- regulators and executive authorities at the national level – it is essential for them to understand how to organize regulation within the country, as well as to understand which of the support measures or which restrictions will help to achieve the set goals in the climate and sustainable development field.
- regulators at the international level – this group of stakeholders solves tasks related to negotiations at the international level.
- the financial sector is also an important stakeholder: depending on the prospects of a particular business, financial flows will be redistributed. For example, large investors are already beginning to abandon coal and oil and gas investments, including Norway's sovereign wealth fund and the World Bank. They are refocusing on green energy and other assets less vulnerable to decarbonization scenarios.
- the business community needs to understand what awaits them in the short and long term to build their business strategies. At the same time, this business requires reliable, clear, and understandable signals from regulators and executive authorities.
- climate activists. For this category of stakeholders, transparent and accessible information about business activities and government regulators is essential to timely focus on what has not yet been done on their part.
- people. This category of stakeholders is the most numerous and, at the same time, the most diverse. The population needs clear signals and accessible information about what the rest of the stakeholders are doing and how it will be helpful and essential for society - what benefits it will receive since such large-scale changes will necessarily lead to an additional tax or other financial burdens on the population.

For all the described stakeholders, such information is essential because it provides quantitative assessments of energy demand, greenhouse gas emissions, energy prices, public welfare, GDP level, necessary infrastructure investments, and state support, as well as evaluations of the degree of impact of regulatory measures.

Today it is evident that the problem of the green economy has a systemic nature. The sustainable development theory is based on the idea put forward by Academician V.I. Vernadsky's view of transformation (under the influence of scientific thought and human activity) of the biosphere into the noosphere - the sphere of the mind. The further development of civilization depends to a large extent on the level of education of the population, which is faced with the issues of resource conservation, overpopulation of the planet, etc., at the threshold of the 21st century.

The term "sustainable development" has a relatively long history, dating back to the Declaration of the first U.N. Conference on the Environment (Stockholm, 1972) and the works of the Club of Rome in the early 1970s, when the connection between environmental problems, economic and social development was realized. Sustainable development can be characterized as stable socio-economic development that does not destroy its biological basis and ensures the continuous progress of society.

The transition to sustainable development is perceived as an objective requirement of time, determining the future of any country. This is not only a problem of the contradiction between the development of economic potential and the limited possibilities of technogenic load on the envi-

ronment but also a contradiction between the moral principles of most societies and the axioms of social justice.

Climate challenges are global but linked to the local ecology. Environmental factors are considered broader in the sustainable development of each specific country/region, including climatic factors. Environmental factors affect society and are largely determined by the nature of business management. Therefore, social and governance factors are mandatory components of sustainable development. The materials of the European Commission emphasized that the specificity of sustainable financing consists of the compulsory consideration of environmental, social, and management factors when making financial decisions (European Commission. Overview). Such an approach ensures more excellent long-term investment and stability of individual projects, programs, and the entire economy. In the last few years, a responsible attitude to the environment, high social responsibility, and high quality of corporate management have become the basis of transforming enterprise strategies from purely economic indicators to indicators of long-term sustainability (Wesselink et al., 2020).

The principles of sustainable economic activity are that only those activities can be considered sustainable:

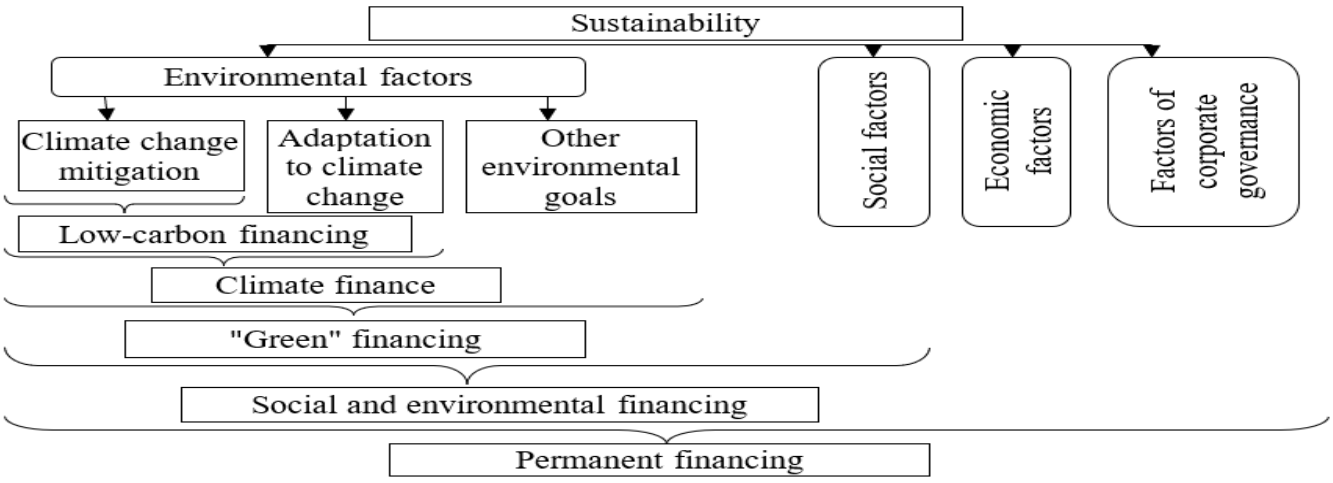
1) has a significant contribution to the achievement of one or more of the six environmental goals. The definition of a substantial contribution depends on the specific ecological objective. For example, according to the Paris Agreement, to mitigate the consequences of climate change is to stabilize the concentration of greenhouse gases during the activities of renewable energy, energy efficiency, eco-transport, etc. Technical criteria establish specific definitions of a significant contribution;

2) does not cause significant damage to any other environmental objective. A significant contribution to the achievement of an environmental goal should not be achieved at the cost of substantial damage to another plan. Technical criteria establish specific definitions of considerable damage;

3) is carried out in compliance with minimum social guarantees (OECD Recommendations on TNCs, UN Guiding Principles on Business and Human Rights, documents of the International Labor Organization, International Charter of Human Rights).

The problem of sustainable development for agribusiness enterprises is particularly relevant due to the dual nature of their functioning. This is manifested in the fact that, firstly, the activity of agricultural producers is a large-scale source of greenhouse gases in the atmosphere and, at the same time, is a large consumer of natural resources (water, land), without which the functioning of the agricultural sector itself is impossible. Secondly, agricultural enterprises provide the population with products and contribute to the development of rural areas. Based on this, an essential aspect of the activities of agro-industrial complex enterprises is the need to find various sources of financing that would allow the full implementation of environmental and social projects (Fig. 1).

Figure 1. Interrelationship of the components of sustainable development and sustainable finance



Source: (Design of Sustainable Financial System, 2016)

The development of supranational and national legislation, requirements for standardization, and the expansion of producer responsibility have led to the formation of a new approach to enterprise goal setting with an orientation not only on short-term, purely commercial purposes but on long-term sustainability. This is how the concept of ESG principles of the enterprise was formed, which orients the company to the high efficiency of corporate management and the achievement of social and environmental business goals (Gillan et al., 2021). What is the role of the ESG concept? It is one of the main elements of the corporate strategy, which is focused on achieving the company's corporate goals, which are ensured by releasing new products, transforming business models, and a compelling value creation chain with reduced risk. At the same time, compliance with ESG principles is an indicator that banks, investors, and the state are guided by when deciding on financing or allocation of subsidies. For agricultural producers,

the strategic development of the agro-industrial complex relates to the priority implementation of ESG principles, which is caused by the spread of "green" and "climate-oriented" agriculture. In this situation, the ability and readiness of the agricultural industry for climate change are of great importance. Implementing ESG principles in the conditions of the agro-industrial complex will create all the opportunities to ensure sustainable development and development in its industries.

For organizations, the challenges of the green economy have led to significant changes in the management system. Adherence to the principles of "green economy" and social responsibility become new factors of competitiveness, forming a positive image of the company and positively affecting the interactions of the organization and society. The critical challenge is balancing the necessary investment costs for creating new infrastructure, developing, and implementing green technologies, and the expected results. Companies strive to optimally organize the financing of relevant programs, including using green finance tools - unique financial products that provide an inflow of capital for implementing environmental and social programs. Adherence to ESG principles in several cases can improve the quality of risk management and allow income that can be compared with the profitability of traditional investments in financial markets. More and more companies in various sectors of the economy are ready to give up receiving a high share of profit in the short term in favor of ensuring the long-term sustainability of investment indicators and compliance with social values within the framework of responsible environmental and socially oriented management.

Medium and small businesses face the most significant difficulties in implementing the ESG agenda since the participants' efforts to develop appropriate methodological approaches have yet to result in the emergence of single agreed standards for regulating corporate ESG practices globally.

Analyzing the main trends in the development of the ESG agenda, the following trends can be concluded:

- the emergence of carbon regulation: new carbon regulation standards are gradually being introduced in the world;
- development of green and responsible financing tools: the gradual introduction of new regulation leads to the need to classify what is considered environmentally sustainable activity, as well as business motivation to support such projects;
- ESG disclosure obligations: the development of the ESG agenda and the introduction of additional regulation in turn form new reporting requirements;
- risk management: emerging trends lead to the need to improve financial organizations' approaches to managing ESG-related risks.

The need for ESG transformation is because, during investment analysis, potential investors increasingly use tools for identifying risks and opportunities for sustainable development, focusing not only on financial criteria but also on factors directly related to environmental, social, and managerial aspects, in including obtaining positive environmental or social effects.

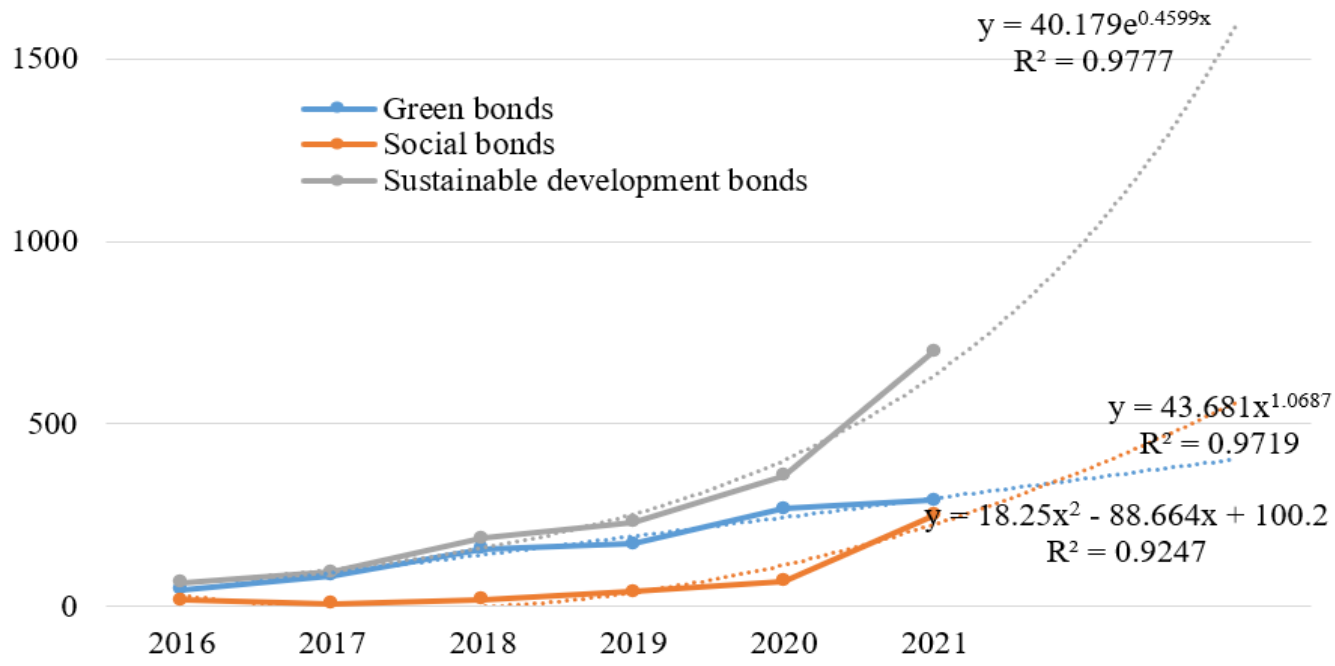
Thus, in making investment decisions, along with financial indicators, social, environmental, and ethical principles of the company's activity are increasingly considered, which requires the disclosure of corporate information in the field of ESG.

The COVID-19 pandemic has become a catalyst for ESG investments. According to the American financial company MSCI, the pandemic has created a powerful narrative around ESG investing, and investment in ESG funds has reached a record level. Yes, 78% of American investors are ready to increase ESG investments in response to COVID-19. At the same time, 55% of investors with assets over 200 billion dollars. have already significantly increased them (MSCI Investment... 2021).

According to the Global Sustainable Investment Association, ESG assets exceeded $35 trillion in 2020, up from $30.6 trillion in 2018 and $22.8 trillion in 2016. The total value of ESG assets is expected to exceed $50 trillion by 2025, accounting for more than a third of the projected $140.5 trillion of total global assets under management (AUM) (ESG Assets, 2020).

Among the widespread ESG investment instruments, ESG bonds can be singled out. Otherwise, they are called "green" social bonds or sustainable development bonds. If we analyze the results of the functioning of the ESG bond market, it can be noted that in recent years, the volume of their placement has increased more than ten times (Fig. 2).

Figure. 2. Dynamics of ESG bonds in terms of the global economic system, $ billion



Source: (Agriculture Criteria ...)

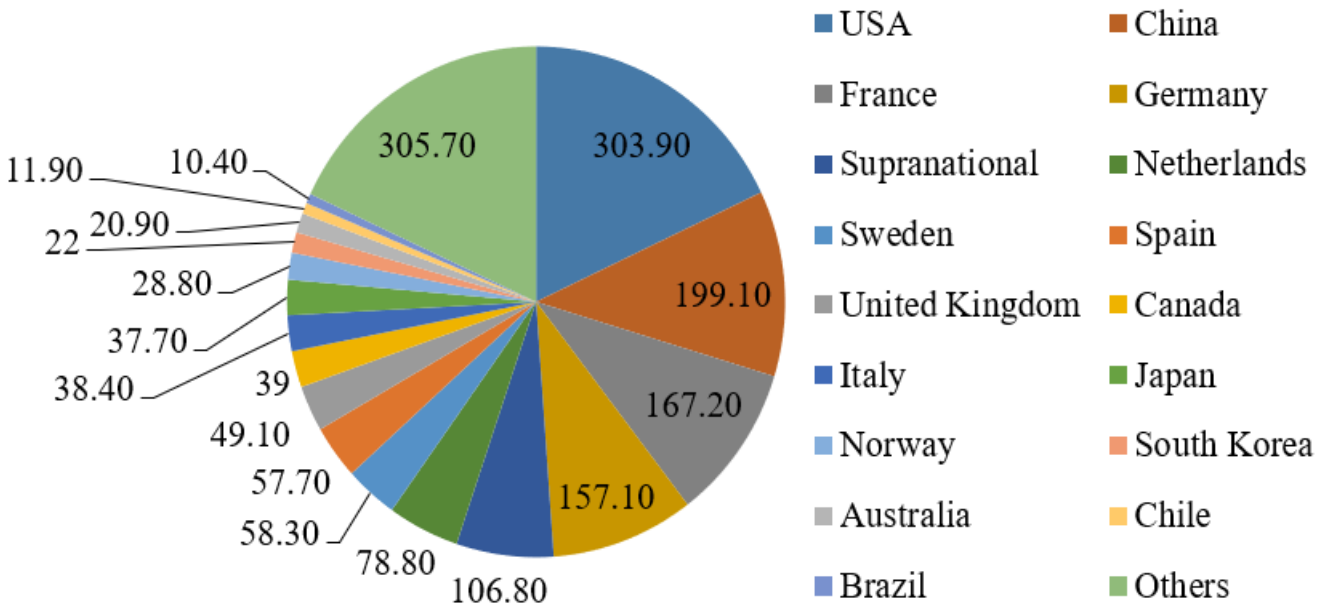
Analyzing the dynamics of changes in the volumes of the respective bonds and based on the constructed trend models, it is worth noting that the most significant growth is predicted for sustainable development bonds. On the other hand, in the future, due to the reduction in the issuance of green bonds, social bonds will surpass them in terms of growth. The best approximation for the three types of bonds under consideration was chosen accordingly: for green bonds – graded; for social bonds – polynomial; for sustainable development bonds – exponential.

"Green" bonds are the most popular instrument for financial support of sustainable projects. At first, green bonds were issued mainly by the USA, Japan, and France; then, they were joined by other European Union states, China, and Southeast Asian countries. The key players in the "green" bond market, along with the USA and China, were European countries, whose total volume of such bonds issued reached almost $300 billion. About 40% of this volume is accounted for by Germany, France, and Great Britain (Fig. 3).

The World Bank Group is solving global problems involving states and various organizations. Solving the problem of depletion of natural resources and negative human impact on the environment became one of the World Bank's priority areas of activity in 2008. The pioneer of "green" bonds is the European Investment Bank, which in 2007 issued Climate Awareness Bonds to finance projects

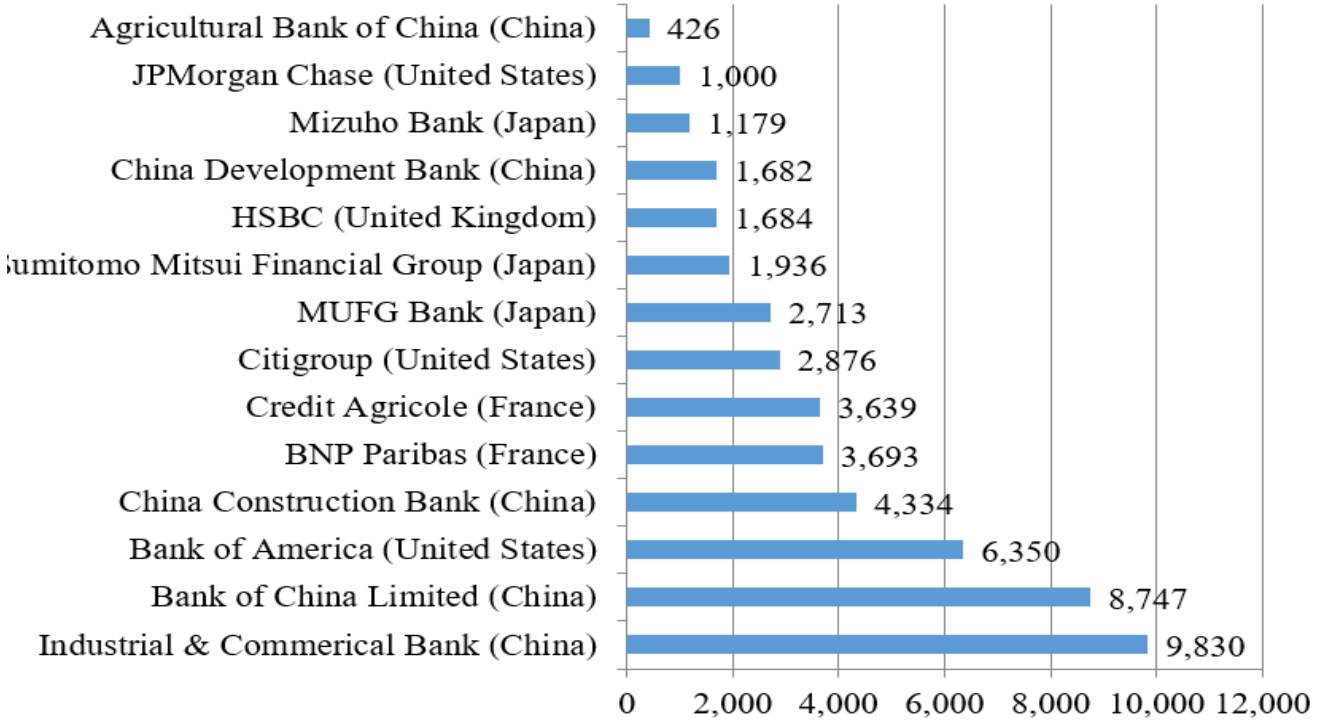
in the field of alternative energy sources and efficiency improvement. From 2007 to 2013, "green" bonds were issued only by supranational international financial organizations - the European Investment Bank, the International Bank for Reconstruction and Development, the International Finance Corporation, the European Bank for Reconstruction and Development, and the Asian Development Bank. They are still large issuers of "green" bonds. In 2020, the leaders in issuing "green" bonds were the banks of China, the United States, and France (Fig. 4).

Figure 3. Cumulative value of green bonds issued worldwide between 2014 and 2021, by country (in billion U.S. dollars)



Source: (STATISTA, 2023)

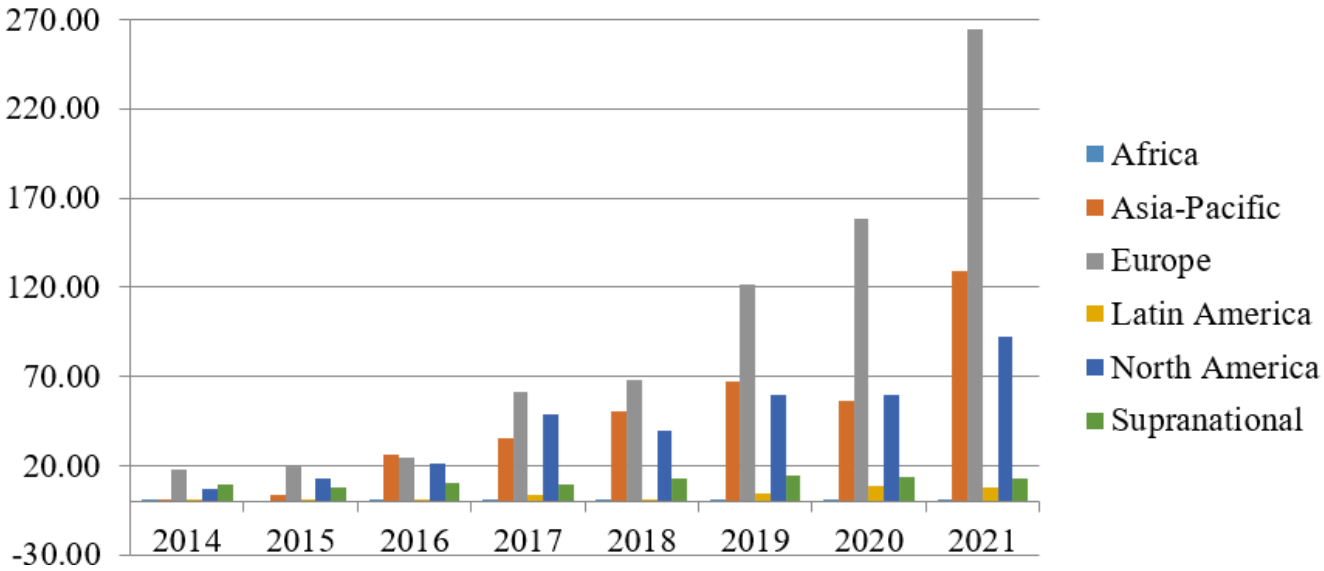
Figure 4. Value of green bond issuance of the largest banks worldwide in 2020 (in million U.S. dollars)



Source: (STATISTA, 2023)

European issuers are driving the development of the world market of "green" bonds. They occupy 45% of the market. As you know, the European Union countries pay active attention to environmental issues. "Green" investment has dramatically developed in France and the Scandinavian countries. A distinctive feature of the French market is a high degree of transparency and large volumes of assets. In the Scandinavian countries, on the contrary, a significant number of such issuers carry small emissions of "green" bonds. Also, a substantial share of the world market of "green" bonds belongs to Asian countries - about 25% (Fig. 5).

Figure 5. Value of green bonds issued worldwide from 2014 to 2021, by region (in billion U.S. dollars)

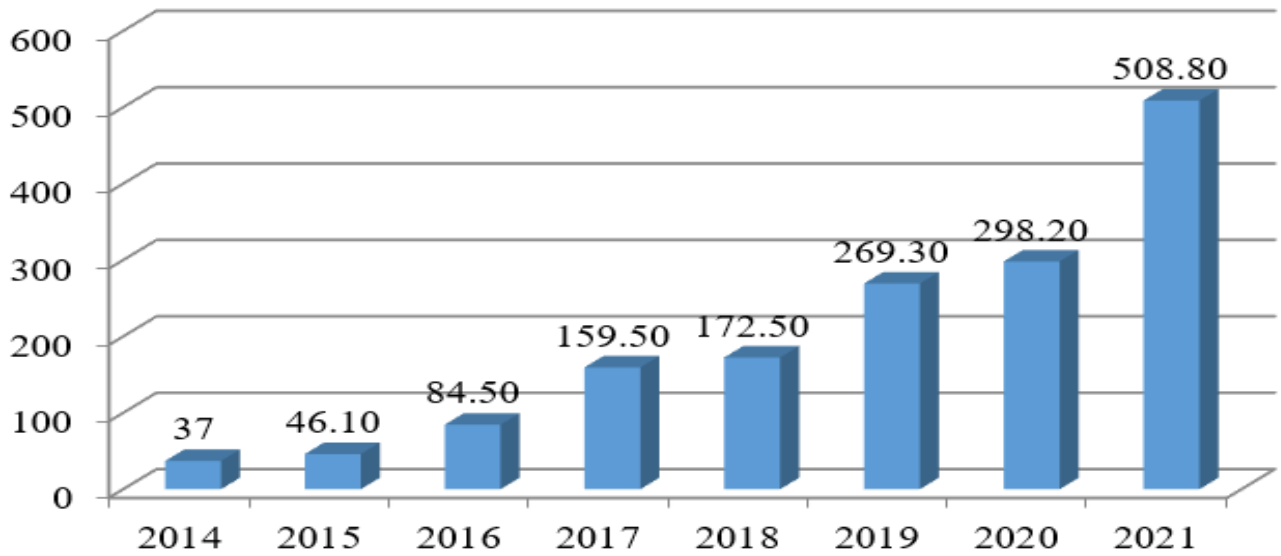


Source: (STATISTA, 2023)

ESG financing is developing in the direction of greater flexibility. If, when issuing classic bonds, the issuer had to indicate the goals for which the raised funds will be directed, ESG bonds allow the issuers to allocate finances at their discretion.

As we can see, the world market of "green" bonds is actively developing, in which more and more participants are involved. This market has gained relevance now, in the "post-war" era, when sustainable development has become one way to restore various countries' economies. According to forecasts, the capacity of the "green" bond market will grow to $5-6 trillion by 2035, with a simultaneous increase in its geographic and industry coverage (Fig. 6).

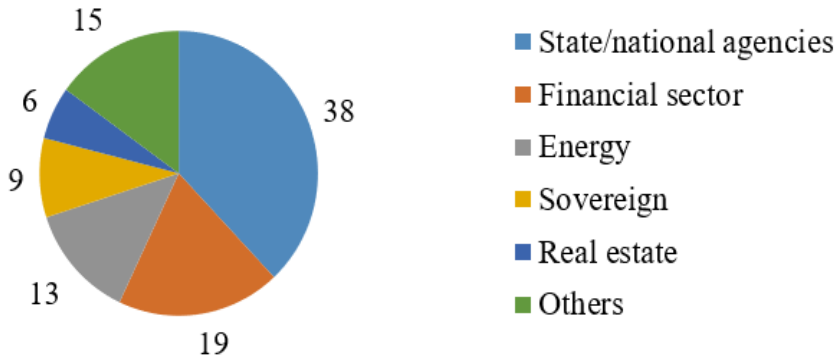
Figure 6. Value of green bonds issued worldwide from 2014 to 2021 (in billion U.S. dollars)



Source: (STATISTA, 2023)

The structure of the sustainable development bond market depends on the country's economy and the state's role. In the US, a large share of ESG bonds belongs to municipal authorities, utility companies, and real estate companies. China dominates the region's banking and ESG bonds. In Europe, almost 35% of all ESG bond issues are accounted for by public ESG agencies, development banks, and the Ministry of Finance. Gradually, the leading market issuers will not be banks and investment companies but transport, industrial, including agro-industrial, energy companies, and developers.

Figure 7. Structure of ESG bonds by sector (%)



Source: (Bloomberg ,2023)

Many investors believe investing in ESG is less profitable than investing in companies that need to consider responsible investing principles. But studies show the opposite (Boffo et al., 2019).

The mentioned studies provide convincing evidence that in Western financial markets, the securities of companies with a higher ESG rating are less volatile and more profitable than those with a lower rating. At the same time, the high profitability of green bonds is ensured by tax benefits for both issuers and investors, such as: providing investors with a tax credit in the amount of 70% of the coupon income (Qualified Energy Conservation Bond - QECB, USA); direct subsidization of investors (bonds with direct subsidization); exemption from income tax, which allows reducing interest rates. At the same time, the number of issuers of such "green" securities in the corporate sector is limited by the inconsistency of business structures with the acceptable level of ESG risk.

According to the results of the analysis of the consulting company Sustainability Consulting Group (Sustainability Consulting...), the four most practical and valuable ratings were identified, which are advisable to use when forming investment portfolios focused on the goals of sustainable development:

- S&P Global Scores (SAM);
- Sustainalytics ESG Risk Rating;
- MSCI ESG Rating;
- CDP Climate, Water & Forest Scores.

A linear model of the dependence between predictors and the resulting change was built to determine the impact of indicators that reflect the degree of environmental pollution in Europe on the issuance of green bonds. The indicator was used as the resulting variable – cumulative value of green bonds issued in Europe between 2014 and 2021 by country (in billion U.S. dollars).

As predictors:

- Net greenhouse gas emissions (source: EEA);
- Greenhouse gas emissions intensity of energy consumption;
- Average co2 emissions per km from new passenger cars;
- Generation of waste by waste category;
- Generation of waste by economic activity;
- Waste generated by households by year and waste category.

The correlation coefficient is ***0.843***, and the coefficient of determination is ***0.712***, which indicates the sufficient quality of the model to establish the influence of the predictor on the dependent variable.

As a result, only one indicator was statistically significant: Table 2.

Table 2. Regression coefficients

Variables	Standardized regression coefficients	Error of standardized regression coefficients	Error of standardized regression coefficients	Error of unstandardized regression coefficients	Student's criterion	Level of significance
Intercept			2,684499	5,330723	0,503590	0,618634
Generation of waste by waste category	***0,843727***	***0,103302***	***0,000000***	***0,000000***	***8,167599***	***0,000000***

Source: calculated by the authors

The most important conclusion that can be drawn from this analysis is that the activity of countries regarding the issue of green bonds does not depend on their level of environmental pollution. This requires a review of the standard European policy regarding issuing these bonds and increasing countries' interest in their distribution.

ESG-oriented investing is more than just a short-term desire to please the public. A company that acts responsibly is managed for strategic development. This means that it can be a reliable object for investment. The impact of ESG factors on the value of companies is likely to increase. The more investors and analysts monitor companies' corporate responsibility, the more critical ESG factors will play. Currently, ESG investments typically result in lower returns because the investor is limited in their choice of instruments. However, in the long term, the attractiveness of investing in companies that are not focused on ESG criteria will decrease. Thus, in the future, the application of ESG criteria will become an aspect of the survival of companies on the world market, and the degree of influence of ESG principles on investment decisions will only increase.

The lack of a transparent regulatory system for the disclosure of non-financial information by the business community, a high need for institutional ESG investors, and a low level of market awareness of environmental, social, and management factors in the investment decision-making system is seen as the fundamental problems holding back the development of ESG investing in the economy.

6.DISCUSSION

The advantages of the studied concept for each side of the financial market, namely for the producer, consumer, and investor, are highlighted. The influence of ESG investments on the economy of the European Union countries has been studied. Information on trends and forecasts for developing the green economy and ESG directions is given. Features of financial support of the investment process demonstrate a high level of budgetary and banking participation. The need to expand the resource base has been confirmed, reinforced by the deterioration of the ecological situation and the growth of social tensions, requiring the search for new approaches to the formation of the necessary and sufficient level of social responsibility of the business community. The development of ESG-principles implementation processes in the global investment practice can be ensured in the context of scaling the instrumental provision of responsible investment processes and increasing the degree of significance of reputational business characteristics. The most significant aspects characterizing the impact of the ESG transition on the "greening" of the global economy and finance are analyzed, and the readiness to function following ESG principles is assessed.

The authors will analyze the advantages of the concept considered for each side of the financial market, namely for the producer, consumer, and investor, and the impact of ESG investments on the economy of the European Union countries. Information on trends and forecasts for developing the green economy and ESG directions is given.

Companies worldwide are forced to modernize and rethink their business models, considering climate factors, which is confirmed by the scientific work of Wesselink A., Fritsch O., and Paavola J. (2020). Adherence to

the principles of "green economy" and social responsibility become new factors of competitiveness, forming a positive image of the company, and positively affecting the interactions of the organization and society. The critical challenge is balancing the necessary investment costs for creating new infrastructure, developing, and implementing green technologies, and the expected results. The development of ESG-principles implementation processes in the global investment practice can be ensured by scaling the instrumental provision of responsible investment processes and increasing the significance of reputational business characteristics. Decarbonization, as a condition of sustainable development, is becoming an essential component of ESG principles. This is also facilitated by increasing regulatory pressure regarding implementing ESG practices.

The world market of "green" bonds is actively developing, and more and more participants are involved. This market has gained relevance now, in the "post-war" era, when sustainable development has become one way to restore various countries' economies.

Based on research conducted by Boffo R., Patalano R., Antoncic M, Bekaert G., Rothenberg R., Noguer M., and Ferrarini G. (2020), we agree with the thesis that ESG investments are more profitable than company investments because they are not considered the principles of responsible investment. Accounting for ESG criteria allows for improved portfolio profitability, which creates good long-term prospects for the ESG investment segment.

The situation in our country showed how fragile the world is and constantly needs unity and partnership to face global challenges to humanity and ensure the goals of sustainable development.

7. CONCLUSIONS

Technological innovations have made the energy transition and decarbonization of the global economy economically achievable – thanks to the declining cost of renewable energy. In turn, climate change has accelerated the transformation of social values and habits toward responsible consumption and care for the environment. At the same time, all this leads to the spread of the concept of responsible investment. ESG investing further improves the quality of life and working conditions, increasing the ethics of business methods.

The concept of ESG provides for the company's implementation of environmental, social, and managerial responsibility in its activities. The performance of this concept has a significant impact on the functioning of enterprises, and in the future, this trend will become more and more meaningful. ESG is integral to investment decisions, brand image, and building trust between stakeholders, the public, and businesses. It is worth seriously approaching the study and implementation of the ESG concept to ensure financial stability. If a company is not environmentally and socially oriented, it may lose potential investments and be limited in entering specific communities. The presence or absence of commitment to the concept helps investors identify companies to invest in and weed out those companies that represent financial risks due to the possibility of an environmental accident or disaster resulting from their activities. The increase in demand for ESG investments will be facilitated by concrete measures and actions to implement the ecological agenda of companies, a clean regulatory environment, and systematic government support.

Currently, ESG investing usually brings lower returns: the investor limits his choice of instruments. On the other hand, the ESG trend can lead to the fact that the securities of companies that are not in demand among socially responsible investors will be undervalued. For other investors, this is an opportunity to make money. Suppose businesses do not adhere to ESG principles in their activities. In that case, they will likely face significant risks of being eliminated from the global investment pool and hurting their market capitalization.

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