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THE ROLE OF DIGITAL TECHNOLOGIES IN ADDRESSING TODAY'S GLOBAL CHALLENGES

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Abstract. The *significance of the study* is due to the crucial role that technology plays in solving many of the global problems faced by the modern world. The impact of technology in addressing these issues not only provides insight into current and future challenges, but also offers viable solutions to overcome them. Harnessing technology can create a more sustainable, just and prosperous world for all. The aim of the study is to conceptualise how digital technologies can be used to address the world's pressing global issues. The *study focuses* on international experience in tackling these global issues through the use of digital technologies by business leaders. Specifically, the research examines digital technologies as a powerful tool for addressing global challenges, while emphasising the need for careful and balanced implementation that takes into account environmental, social and economic factors. *Study objectives include the following*: (1) to study the role of digital technologies in solving modern global problems; (2) to identify ways to accelerate technological innovation in the field of environmental protection; and (3) to justify the responsibility of business leaders for environmental protection and solving modern global challenges. Digital technologies such as artificial intelligence, blockchain, the Internet of Things (IoT) and big data have become an integral part of modern society and have a significant impact on solving global problems such as combating climate change. Artificial intelligence, in particular, is crucial for predicting climate change, optimising the use of resources and improving the efficiency of energy production. The study highlights the experiences of leading countries that are using technology as a key element in addressing global challenges, offering innovative solutions to problems that once seemed insurmountable. The *paper concludes* that the potential of modern technologies is key to addressing today's global challenges, emphasising the need to integrate innovative solutions into national policies and development strategies. The study offers recommendations for further integration of digital technologies into various spheres of public life to effectively address these issues.

Keywords: digital technologies, global issues of our time, sustainable development, technological innovation, artificial intelligence, environmental protection, environmental sustainability.

JEL Classifications: O14, O33, Q56

1. Introduction

Through technological innovation, potential environmental pollution caused by all aspects of production activities can be reduced, while at the same time energy consumption can be reduced, resources can be conserved, and the company's production costs can be lowered, allowing it to competitively increase the price of its products. Companies can also work with communities to build environmental protection facilities through community enterprises to clean up the environment and protect the interests of communities and other citizens. This will help to reduce the tension between economic development in cities, especially those with a concentration of industrial enterprises, and serious pollution and degradation of the living environment. This study presents a thorough analysis of modern technologies and their potential to address pressing global challenges, emphasising the need to integrate innovative solutions into national policies and development strategies. Collaboration between

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governments, academia, business and civil society is key to harnessing technological progress to create a better future – a socially inclusive, equitable digital society, including the future of governance, economy and society (Chandran, 2020).

Digital technologies provide a platform for innovation and start-ups aimed at solving environmental problems. They provide an opportunity to test and implement new environmentally friendly technologies, thereby reducing barriers to their development and implementation. Digital technologies are a key tool for achieving environmental sustainability. They not only help to solve existing environmental problems, but also contribute to creating the conditions for sustainable development in the future. The integration of these technologies into different sectors of activity is essential to ensure ecological balance and to preserve the planet for future generations. Based on the study's findings, the following recommendations can be made to stakeholders: implementation of national digitalisation strategies aimed at developing infrastructure, increasing digital literacy and supporting innovation, implementation of modern digital solutions to optimise business processes, increase productivity and competitiveness, and use of digital platforms to implement social projects aimed at improving community life.

The purpose of the study is to conceptualise the impact of digital technologies on solving global problems of today.

Objectives of the study: 1) to study the role of digital technologies in solving global problems of today; 2) to reveal the directions of accelerating technological innovations in the field of environmental technologies; 3) to substantiate the responsibility of business leaders for environmental protection and solving global problems of today.

2. Analysis of Recent Research and Publications

Conceptualising the Impact of Digital Technologies on Solving Global Problems

This article explores the crucial role of digital technologies in shaping environmental sustainability and building an environmentally friendly society focused on biodiversity conservation. Addressing these issues is a complex task that requires overcoming significant challenges. Achieving an environmentally sustainable society requires coordinated efforts at all levels – from local communities to international organisations – and the involvement of all sectors of society, including governments, businesses, NGOs and individuals. Only by working together can these challenges be overcome and truly sustainable development be achieved.

The study is based on various research works, including "Ukraine in the Context of the World Organic Production of Agricultural Products" by Oleksenko R., Kolokolchykova I., and Syzonenko O. (2019), and "State Regulation of Investment in Agriculture" by Lysa O., Oleksenko R., Azhazha M., Venger O., Sergiienko T. (2022). The authors focus on the applied aspects of digital technologies, examining elements of the social content of agroecology and the latest principles and approaches to ecological agriculture. They also consider the positive and negative consequences of accelerating technological innovation in environmental technologies. Additional references include "The Sustainable State: The Future of Government, Economy, and Society" by Chandran N. (2020) and "In Search of Goodwill. Managing Economic Development to Reduce Unemployment, Inequality and Climate Change" by Maxton G., Randers J. (2017). This analysis shows that producing food without harmful chemicals can improve product quality and safety, thereby contributing to human health.

Although the concept of environmental sustainability offers numerous benefits, society faces significant challenges to achieving it, including economic problems, political and administrative barriers, social issues, technological obstacles, global inequality and environmental injustice.

The book "Limits to Growth: The 30-Year Update" revisits the original 1972 Club of Rome-sponsored publication that became a seminal work in environmental economics. The authors used the World3 computer model to examine the links between global population growth, industrialisation, pollution, food production and resource depletion. They showed that unchecked growth of the global economy could lead to resource depletion and severe economic and social crises. The updated edition assesses new data from the early 21st century, confirming many of the original predictions. The book presents scenarios ranging from the collapse of civilisation to optimistic forecasts of a successful transition to sustainable development.

Naomi Klein's influential book This Changes Everything: Capitalism vs. the Climate examines the relationship between climate change and capitalism, arguing that the modern economic system is exacerbating climate change. Klein argues that addressing climate change will require transformative changes in economic development and resource management. Since much of the current economy is based on fossil fuels, the primary source of greenhouse gas emissions, she argues for a transition to renewable energy sources, reduced consumption and policies that promote environmental sustainability.

"New Thinking: From Einstein to Artificial Intelligence" offers an in-depth exploration of the history of science and technology, examining how groundbreaking ideas and innovations have shaped and continue to influence the world. Special emphasis is placed on the development of artificial intelligence, its capabilities and its potential to transform many aspects of life, from medicine to business.

In conclusion, digital technologies such as artificial intelligence, blockchain, the Internet of Things (IoT) and big data have become an integral part of modern society. They have a significant impact on tackling global challenges, including climate change, by optimising resources and improving the efficiency of energy production. This study highlights the experiences of countries that are using technology to address global issues, offering innovative solutions to previously insurmountable challenges. The potential of modern technologies is central to addressing today's global challenges, underscoring the need to integrate these solutions into national development policies and strategies. The study also provides recommendations for further integrating digital technologies into various aspects of public life to effectively address these challenges.

*Methodology***.** Studying the role of technology in solving global problems requires an interdisciplinary approach that combines knowledge from different fields such as engineering, social sciences, economics, ecology and others. This helps to develop integrated solutions that take into account different aspects of the problems. By analysing current technological trends and their impact on global issues, it is possible to anticipate and prepare for future changes. This is important for strategic planning both at the level of individual organisations and at the level of states.

1) A method of systematic analysis and synthesis that helps to bring all the disparate global problems of our time into a system of preserving ecological balance. Systemic analysis is a comprehensive approach to studying the relationship between digital technologies and global issues, including the analysis of their structural components, functions and interrelationships, identifying the potential of modern technologies in solving pressing global problems, and focusing on the need to integrate innovative solutions into the policies and strategies of countries' development.

2) Meta-analysis, which includes a systematic review and statistical analysis of the results of numerous previous studies to identify general trends and the impact of digital technologies on solving global problems.

3) Agile methodology, which is about adapting the environment and bringing it into balance between cultures and the environment.

4) Synergistic method, which is based on self-organisation processes and the possibility of finding an attractor that can lead to synergy and overcoming global problems of today, which can be an important step towards the sustainable development of a society of environmental sustainability.

5) Modelling and forecasting are important research methods used to analyse, understand and predict the future of the world. They are used in various fields of science, technology, economics and management. Modelling is the process of creating abstract, mathematical or computer models to represent the behaviour of real systems. Models provide a way to conduct experiments and analyse results without the risk and expense associated with real experiments. Forecasting is the process of predicting future values or states of a system based on the analysis of available data and models.

6) The cross-cultural method was used to identify common patterns in solving global problems of modernity and the introduction of digital technologies in the activities of business managers. General philosophical methods such as analysis and synthesis, generalisation and comparison were used to formulate the concept of digital technologies as a powerful tool for solving global problems of the present, as well as to explore the use of big data for forecasting and managing natural disasters. Thanks to the methods and approaches used, it was proved that digital technologies play a crucial role in solving many global problems of this time, due to their wide capabilities in various fields, including corporate responsibility management in the business environment (Dmytrenko, Nesterenko, Oleksenko, Yeremenko, & Vasylchenko, 2021).

3. Results and Discussions

3.1 Studying the Role of Digital Technologies in Solving Global Challenges

The study of the role of digital technologies in solving global problems of today is a comprehensive scientific approach that includes an analysis of the impact of various digital tools and technologies on key social, economic and environmental challenges aimed at consumer perception of organic products (Kolokolchykova, Oleksenko, Rybalchenko, Yefimenko, & Ortina, 2021). The study of the role of digital technologies in solving today's global problems covers many aspects, such as:

1) economic development, which includes analysis of how digital technologies contribute to economic growth, increase productivity, stimulate innovation and create new jobs;

2) healthcare, which includes research into the impact of digital health technologies such as

telemedicine, electronic health records, mobile health apps and the use of artificial intelligence in diagnosis and treatment;
3) environment and sustainable development, which includes analysis of how digital technologies such as the Internet of Things (IoT), big data and artificial intelligence can help monitor, analyse and address environmental issues such as climate change, pollution and resource management. Studying the role of digital technologies in solving global problems of modern times is an interdisciplinary task that requires a comprehensive approach and the use of various research methods. This allows to understand the potential and limitations of digital technologies in creating a sustainable and inclusive future.

3.2 Directions for Accelerating Technological Innovation in the Field of Environmental Technologies

Accelerating technological innovation in environmental protection technologies, clean energy technologies, etc. can help industries achieve sustainable development and accelerate the green transformation of industry. The active development of new and emerging industries is an important manifestation of the advanced nature of the industrial system and an important basis for the transformation and upgrading of the modern industrial system. Digital technologies, such as artificial intelligence, blockchain, the Internet of Things (IoT) and big data, are becoming an integral part of modern society and have a significant impact on solving global problems. The authors of the article try to analyse how these technologies help to combat challenges such as climate change, inequality, healthcare, access to education and sustainable development. Artificial intelligence plays an important role in predicting climate change, optimising resource use and improving energy production efficiency (Meadows Donella, Randers Jorgen, Meadows Dennis, 2018). Environmental pollution is one of the main issues addressed by the authors. They show how the growth of production and consumption leads to the accumulation of pollutants that can have long-term and often unpredictable effects on ecosystems and human health. The book presents several scenarios based on different assumptions about technological progress, resource management policies and social change.

Using the Internet of Things to create smart cities helps reduce CO2 emissions, improve urban infrastructure and enhance the quality of life for citizens. In recent years, emerging industries such as the digital economy, new energy, new materials and high-end equipment have boomed. Future industries such as artificial intelligence, low carbon economy, bio-manufacturing and quantum information are poised for development, and cutting-edge innovations continue to break through and emerge. However, it should also be noted that in some industries there is still a gap between the innovation capabilities of the industry and the world's leading level. It is necessary to accelerate the development of the industrial system by strengthening scientific and technological innovation. In the new strategic plan, digitalisation is also one of the three main means by which UNDP will help achieve its core objectives.

Digital technologies can promote equality and fairness by facilitating citizen participation and political engagement, and reducing corruption through authentication, data exchange and payments. Artificial intelligence and digital technologies are estimated to reduce global carbon dioxide emissions by 10-20% by 2030. Digital technologies are opening up new ways of working and thinking, as well as opportunities that were never before imagined. For example, digital technologies can help policymakers better understand the natural environment. The world – like forests, coral reefs and glaciers – is changing, and there is a need to take action, such as the UNDP Future Data Platform, which provides policymakers with the latest data and analysis that sheds light on key areas such as environmental protection, biodiversity conservation and sustainable development.

3.3 Responsibility of Business Leaders for Environmental Protection, Sustainability and Building a Sustainable Society

Business leaders should assume and fulfil their digital responsibilities and play their due role in shaping environmental sustainability, which affects the sustainable development of the national economy. Business leaders should lead by example in complying with laws and regulations, including environmental, consumer and labour laws, honouring all contractual obligations, leading by example in operating with integrity and honouring warranties. Ethical responsibility is the expectation of society from business, which should strive to prevent negative impacts on society from its activities, products and services. At the same time, business leaders should accelerate the modernisation of industrial technologies and optimisation of the industrial structure, actively develop green enterprises, increase the ability of enterprises to attract jobs, and fulfil their responsibilities for environmental protection and social stability. Finally, corporate philanthropic responsibility is an important task in preserving the environment and building a sustainable society.

To maintain order in the market and protect the interests of people, businesses must assume social responsibility for ensuring that their products are

genuine and honest. The mission of enterprises is to develop and make a profit, to be responsible for increasing tax revenues and the development of the country. Enterprises should assume responsibility for development and make progress in economic development, take development as a necessary condition, continuously expand the scale of the enterprise, increase the proportion of tax payments, fulfil tax payment obligations and make a great contribution to national development. However, this concept of development must be scientific. No business can focus only on the present and ignore the long-term perspective, no business can focus only on the local area and ignore the overall situation, no business can take care of itself and ignore its future. Business leaders must attach great importance to the impact of digital technologies on solving global problems and shaping environmental sustainability, and develop new thinking based on the development of artificial intelligence, science and technology that have changed the world (Oltrade Dagogo, 2021).

Environmental resilience (or sustainability) is a concept that defines the ability of environmental systems, such as ecosystems or the planet as a whole, to maintain their structure and functioning even under the influence of external pressures or changes. It refers to the ability of the environment to self-regulate, recover and adapt to changes in the environment without significant changes in its functioning. The main aspects of environmental sustainability include the following:

1) Biodiversity, which is based on the ability of ecosystems to support a variety of species and genetic diversity, which ensures resilience to various stresses and environmental changes.

2) Functional resilience, which includes the ability of an ecosystem to maintain its functions and services, such as air and water purification, soil fertility, climate regulation, and others, even under changed conditions.

3) Resilience to environmental change, which is based on the ability of ecosystems to adapt to environmental changes, such as climate change, pollution, biodiversity loss, etc.

4) The ability of ecosystems to conserve and use their resources (water, soil, biomass) in a way that prevents their depletion or degradation.

5) The ability of ecosystems to maintain their structure and functions even in the face of negative impacts, such as natural disasters or human activity. Environmental sustainability is a key concept for achieving sustainable development, as it determines the ability of natural systems to ensure the life and well-being of people and other organisms on the planet in the long term (China's Progress Report on

Table 1

Key advantages and disadvantages of environmental sustainability

Content of the direction	Advantages of environmental sustainability	Disadvantages of environmental sustainability
Biodiversity conservation	Ecological sustainability contributes to the conservation of species and genetic diversity, which is important for the provision of ecosystem services and ecosystem resilience.	Building sustainable ecological systems can take time, especially when restoring depleted ecosystems.
Reduced environmental impact	Environmental sustainability helps to reduce the negative impact of human activity on nature, such as air, water and soil pollution.	The high costs of environmental sustainability can be costly, especially in the initial phase of implementation.
Ecosystem sustainability	Environmental sustainability ensures that ecosystems are stable, which is important for the provision of vital services such as water, climate regulation and food supply.	The application of strict environmental standards may lead to restrictions on the development of certain sectors, such as industry or agriculture.
Sustainable development in a changing climate	Environmental resilience helps ecosystems adapt to climate change and ensures the survival of diverse species in new environments.	Some measures to achieve environmental sustainability can have unpredictable consequences in the long term, especially when it comes to global changes in ecosystems.
Economic benefits	In the long run, investments in environmental sustainability measures can lead to a reduction in the costs associated with climate change, pollution and biodiversity loss.	Achieving environmental sustainability requires cooperation between different sectors of society and government agencies, which can be difficult to achieve.
Social stability	Maintaining environmental sustainability helps to improve the quality of life and health of the population, which ensures social stability and promotes the development of society.	Unsustainable or inadequate activities can lead to the loss of valuable ecosystems and the services they provide, with serious consequences for human well-being and health.
Long-term benefits	Investing in environmental sustainability measures can have a long-term positive impact on ecosystems and human well-being, contributing to sustainable development.	Building an environmentally sustainable society requires a balanced approach that takes into account the needs of ecosystems, the economy and society.

Source: compiled by the authors

Implementation of the 2030 Agenda for Sustainable Development, 2019).

Achieving environmental sustainability has its advantages and disadvantages, but its importance for the viability of the planet and the well-being of humanity is crucial. The path to a sustainable and environmentally resilient future requires joint efforts, creative solutions and continuous improvement of practices in all areas of life. Despite these shortcomings, environmental sustainability remains an important principle for ensuring the health of the planet and the well-being of all its inhabitants. The path to achieving environmental sustainability may require compromises and continuous improvement, but it is essential to securing the future of the planet. Environmentally sustainable is a concept that defines a path to balanced development where the interests of people and nature interact in harmony.

The main vectors of building an environmentally sustainable society are: 1) greening of the economy aimed at transition to a "green" economy, where priority is given to environmental principles and balancing the interests of man and nature; 2) significant increase in the level of environmental education of citizens, which will create conditions for sustainable consumption, environmental control and restoration of natural resources; 3) rational use of resources aimed at reducing resource consumption, reuse and recycling of materials, introduction of resource-saving technologies; 4) renewable energy sources, including the transition from fossil fuels to renewable energy sources such as solar, wind, hydro and geothermal energy; 5) pollution reduction, based on the reduction of emissions of harmful substances into the air, water and soil, as well as the introduction of cleaner production technologies; 6) preservation of biodiversity, including protection of natural ecosystems, protection of rare and endangered species, creation of protected areas; 7) economic sustainability that does not lead to depletion of natural resources, support for green technologies and is aimed at developing a green, renewable, circular economy; 8) social justice, which involves ensuring equal access to natural resources and environmental benefits for all segments of the population, taking into account the interests of future generations, as well as the formation of the concept of a creative personality as a factor in the creative and cognitive economy in the context of globalisation (Oleksenko, 2017).

An environmentally sustainable society that lives in harmony with nature and maintains a balance between its needs and the capabilities of the ecosystem. Such a society seeks to minimise its impact on the environment, preserve natural resources for future generations and promote biodiversity. Ukraine, as a country with a transformed natural environment, faces great challenges in building a sustainable society, especially after the Chornobyl disaster. It is important to continue working on environmental issues to ensure the future of the planet.

4. Conclusions

Exploring the impact of digital technologies on solving global problems is of significant practical importance to the development of environmental sustainability. The introduction of digital technologies into business processes increases efficiency, reduces costs and opens up new markets. The use of FinTech contributes to financial inclusion by enabling people who previously had no access to banking services to use financial products. In general, the study of the role of digital technologies in solving global problems allows for the development of effective strategies and solutions that contribute to sustainable development, improve the quality of life and create a more inclusive society. Studying the role of digital technologies in solving global problems is indeed of great practical importance for building environmental sustainability. Digital technologies make it possible to optimise the use of natural resources.

For example, smart agricultural systems use sensors and analytics to accurately determine plant water and nutrient needs, which reduces costs and reduces environmental impact. Likewise, smart grids contribute to the efficient management of energy resources, reducing energy loss and consumption. Digital models and big data analytics algorithms can predict natural disasters such as earthquakes, floods and hurricanes. These forecasts help prepare for natural disasters in advance and reduce their impact on people and the environment.

Digital platforms contribute to the development of a circular economy in which materials and resources are reused. They enable tracking the product life cycle, optimising recycling processes and reducing waste. For example, blockchain technologies can provide transparency in supply chains and guarantee responsible waste management. Digital technologies, such as social media and mobile apps, help to raise environmental awareness. They allow for the rapid dissemination of information about environmental issues and solutions, as well as the engagement of communities in environmental initiatives and campaigns.

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