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## ЗМІСТ / CONTENTS

---

<b>О. Чеберяко, І. Лещенко</b> Зелені фінанси як інструмент сталого розвитку та повоєнного відновлення в Україні .....	8
<b>O. Cheberyako, I. Leshchenko</b> Green finance as a tool for sustainable development and post-war recovery in Ukraine .....	8
<b>Л. Леваєва, А. Овсієнко</b> Незалежний розрахунок результатів фінансової діяльності Київського метрополітену з урахуванням оренди рекламних площ .....	19
<b>L. Levaieva, A. Ovsiienko</b> Independent calculation of the financial performance of the Kyiv Metro, including the lease of advertising space .....	19
<b>О. Корогод</b> Бізнес-стандарт як набір практичних інструментів для підвищення економічної ефективності бізнес-об'єднання .....	28
<b>O. Korohod</b> Business standard as a set of practical tools to improve the economic efficiency of a business association.....	28
<b>С. Кучеренко, Є. Костик</b> Видавничий бізнес VS Інтернет: як всесвітня мережа вплинула на економіку та маркетинг поліграфічних підприємств?.....	40
<b>S. Kucherenko, Ye. Kostyk</b> Publishing business VS the Internet: How has the World Wide Web affected the economics and marketing of printing companies?.....	40
<b>О. Глушко</b> Комплексний організаційно-економічний механізм управління ефективною диверсифікацією підприємства.....	49
<b>O. Hlushko</b> Complex organisational and economic mechanism for managing effective diversification of an enterprise .....	49
<b>О.О. Олота</b> Технологічна інфраструктура та підключення як чинники сталості стартапів: дослідження обраних фінтех-галузей.....	61
<b>O.O. Olota</b> Technological infrastructure and connectivity on startup sustainability: A study of selected fintech industries .....	61
<b>О. Паламарчук, О. Семененко, О. Кучеренко</b> Інтегрований підхід до бухгалтерського обліку в умовах сталого розвитку та циркулярної економіки.....	73
<b>O. Palamarchuk, O. Semenenko, O. Kucherenko</b> Integrated approach to accounting in the context of sustainable development and circular economy.....	73
<b>Н. Бондаренко</b> Методика аудиту грошових коштів на підприємстві.....	83
<b>N. Bondarenko</b> Methods of auditing cash at the enterprise.....	83
<b>В. Криловський</b> Проблеми та перспективи розвитку інвестиційного клімату в Україні.....	100
<b>V. Krylovskiy</b> Problems and prospects of investment climate development in Ukraine.....	100



## Green finance as a tool for sustainable development and post-war recovery in Ukraine

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**Abstract.** The ongoing war in Ukraine poses significant challenges to the country's economy and environmental sustainability, and the use of green finance can be a key tool for post-war economic recovery and sustainable development by attracting resources for environmentally friendly and innovative projects. The purpose of the article was to study the potential of green finance and analyse the possibilities of implementing this tool to support the country's economic and environmental sustainability in the post-war period. The study used empirical, analytical, and systematic methods to assess the impact of green finance on economic growth, reducing environmental impacts, and improving the quality of life of citizens. Overall, the study results demonstrated the high potential of green finance for Ukraine's future development. The article analysed the policy framework and international commitments that could serve as a basis for green finance policy in Ukraine. The study examined the dynamics of green finance in the world over the past 16 years, which showed a steady increase in interest in environmentally sustainable investments. Recommendations for the development of green finance were proposed, including the introduction of mechanisms to attract investment in sustainable environmental projects, support sustainable growth, and modernise sectors of the economy that are critical to the country's post-war recovery. The main conclusion is the need to integrate environmentally friendly and innovative projects into infrastructure reconstruction, which will help ensure sustainable economic development and reduce environmental risks. International financial instruments and commitments that help attract investment in green projects play an important role in this process. The scientific results obtained in the course of this study can contribute to solving the current problems of integrating green finance into Ukraine's sustainable development and recovery strategies, and can be used by government agencies to develop effective mechanisms for financing environmentally sustainable initiatives in the post-war period

**Keywords:** green finance; green investments; climate change; green bonds; environment; sustainable development goals; post-war reconstruction

### INTRODUCTION

In a globally competitive environment, economic growth has led to significant environmental risks, which are of particular relevance for Ukraine due to the consequences of the war and its devastating impact on the environment. The

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climate crisis and the need to address it have become global issues that require quick and effective solutions. One of the main ways to overcome these challenges is through a decarbonisation strategy, which involves reducing greenhouse gas emissions. At the same time, the transition to a 'decarbonised' economy requires significant financing, which will be quite a challenge for Ukraine in the context of post-war recovery. In this context, green finance can become an important tool for attracting the financial resources necessary for the country's environmentally sustainable development and restoration of its ecosystem. The relevance of the study is driven by the need to develop effective mechanisms for using green finance to achieve sustainable development in Ukraine, especially during the post-war recovery period, when it is important to balance economic recovery with environmental sustainability. Therefore, studying the opportunities and obstacles to attracting green finance to the post-war recovery is critical to ensuring the sustainability of the country's economy and ecosystem in the future.

As of 2024, there was no single generally accepted definition of green finance; the concept is multifaceted and encompasses both environmental and economic aspects. In economics, the term is seen as the accumulation of financial resources to address climate and environmental issues, on the one hand, and to improve the management of financial risks related to climate and the environment, on the other (Solodovnik, 2023). Due to the multifaceted nature of the concept of green finance, there are different approaches to the interpretation of this term among scholars. M. Karlin & O. Ivashko (2020) understand green finance as financial relations, entities and financial measures that ensure the conditions for sustainable development and are an important element of financial and economic regulation of environmental management at all levels. A. Dubko (2022) believes that green finance is a set of economic relations for the accumulation and use of funds for the implementation of environmental projects and other programmes aimed at reducing harmful environmental impact and minimising negative environmental consequences. Scientists B. Lutsiv *et al.* (2023) explain the essence of green finance in a narrow sense as the implementation of environmentally friendly investments and low-carbon technologies, projects, and industries based on appropriate tools and products that take into account environmental factors in making decisions on loans and risk management. Ukraine's economy is particularly vulnerable to environmental and economic risks, given the effects of the war and the decline in natural resources. This calls for the effective implementation of green finance mechanisms that can support the country's post-war recovery, contributing to both environmental sustainability and economic growth.

A green financial strategy is important for maintaining financial sustainability and sustainable development, particularly in the context of post-war infrastructure and industrial recovery. O. Cheberyako *et al.* (2021) analysed the key aspects of green finance development in Ukraine as a tool for social and environmental security. Among the main

tasks in this area, the authors identify strengthening cooperation with foreign companies and international financial institutions to attract financial resources for sustainable development. In addition, important steps include consultations with banking institutions, institutional investors, and national regulators to develop effective mechanisms to support environmental initiatives and investments in green projects. The authors emphasise that the implementation of these strategies will not only strengthen environmental security at the national level, but also ensure the stability of the social and economic situation in Ukraine in the face of global challenges.

According to research by N. Reznikova (2021), the successful implementation of environmental projects aimed at sustainable development in Ukraine requires close cooperation between public authorities and private entities. This is important given the amount of investment required to implement environmentally friendly technologies and projects. Cooperation between national governments and the private sector can provide the necessary funding and contribute to the development of infrastructure that meets sustainable development standards.

According to N. Ivanova & S. Kononenko (2023), Ukraine has significant potential for a green energy transition, especially in the context of adaptation to new climate conditions and climate policy change. The key to unlocking this potential is the development of renewable energy sources, in particular solar and wind power, as well as improved energy efficiency in the industrial and residential sectors. Thanks to its natural resources and technological progress, Ukraine has the opportunity not only to reduce its dependence on fossil fuels, but also to become a regional leader in green energy.

The strategy of economic recovery based on the principles of sustainable development will allow Ukraine not only to integrate into new industrial processes of the European Union, but also to increase its competitiveness in the global market. The implementation of this strategy envisages the introduction of an "industrial visa-free regime", which opens up new opportunities for Ukrainian industries by facilitating access to EU public procurement, as well as receiving financial and technical support from the European Union in the area of climate change adaptation. However, in order to successfully implement recovery strategies and transition to green initiatives, it is necessary to take into account the obstacles faced by companies and projects. L. Donchak & D. Shkvarchuk (2024) find that the high costs of implementing green technologies can be a serious financial obstacle for many Ukrainian enterprises. This makes it difficult to attract the necessary financing, as many enterprises are not ready for large upfront costs. Another major challenge is the unstable political and legal environment in Ukraine. Changes in legislation and policy can significantly affect the effectiveness of green financial instruments, creating additional uncertainty for investors and borrowers, which reduces their level of trust and encouragement to invest in green projects.

The purpose of the article was to explore the potential impact of green finance on the post-war economic recovery of Ukraine, in particular through the implementation of initiatives in the field of ecology, energy efficiency, and sustainable development. To achieve this goal, this paper set out the following objectives: to highlight the theoretical foundations of green finance as a tool for sustainable development, to consider the prerequisites and international initiatives that contributed to their emergence, to analyse the current state of green finance in Ukraine, and to formulate the prospects for green finance in Ukraine as a tool for post-war recovery.

### MATERIALS AND METHODS

To achieve the goal of considering green finance as a tool for the post-war recovery of Ukraine, general scientific and special scientific methods and approaches were used. The prerequisites for the emergence of green finance, which became the basis for the development of the green finance concept, were studied using the chronological method. In particular, the development of the green finance concept from 1972 to 2019 was analysed in dynamics. A critical review of scientific literature sources made it possible to determine the economic essence of the term 'green finance'.

The historical method was used to clarify the essence of the concept of "green finance". The grouping method was used to classify green finance by economic sectors, and the tabular method allowed to present key international events and initiatives that became the basis for the formation of the green finance concept. The tabular method was also used to systematise information on the main programmes of international organisations that support the development of green finance in Ukraine, their areas of activity and financial instruments that can be used in the post-war recovery process.

The graphical method made it possible to build a graph of the dynamics of green finance in the world over a sixteen-year period, as well as to analyse the rates of its growth and increase, which made it possible to assess global trends in the development of this area of financing. To study the main trends in green finance, the article used the systemic and structural methods, and to analyse strategies for their implementation in different countries, the method of statistical comparisons was used. The structural-functional approach has provided for the disclosure of the impact of green finance on sustainable development. It was used to model their potential contribution to the post-war reconstruction of Ukraine, taking into account the principles of sustainable development, with a special emphasis on the implementation of green initiatives. The observational method was used to analyse the environmental consequences of military operations, which significantly affect the implementation of the sustainable development model in Ukraine. Empirical methods were used to identify the strategic goals of green financing in the context of the country's post-war recovery.

The information base of the study was based on scientific articles by scholars from the UK, the US and Ukraine,

as well as publications and reports by international organisations for the period from 2009 to 2024. Key sources include documents from the European Union, the World Bank, the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN), and the World Commission on Environment and Development (WCED). In addition, materials from research institutions and non-governmental environmental organisations, such as the Centre for Climate and Energy Solutions (C2ES), were used. The study also analysed programmes of international organisations operating in Ukraine, including the EaP GREEN programme implemented by the United Nations Economic Commission for Europe, OECD, UNEP and UNIDO; the EU-funded EU4Environment initiative; the EBRD Green Cities programme; and the Norway-Ukraine energy efficiency programme.

### RESULTS

Amid global change, sustainable and responsible investment in the economy has become an integral part of development. Green finance, which aims to finance environmentally sustainable projects, is one of the key tools for achieving sustainable development and combating climate change. They contribute not only to environmental protection but also stimulate innovation in energy, transport and other critical sectors of the economy. Therefore, it is important to continuously analyse the state of green finance, its potential, challenges and opportunities to ensure a sustainable future.

Green finance is aimed at achieving economic growth while reducing environmental pollution in general, improving waste management and the use of natural resources (OECD iLibrary, n.d.). It can contribute to sustainable development by improving countries' regulatory frameworks, aligning government financial incentives, increasing investment in green projects across sectors, integrating environmental principles into decision-making on financing government programmes in line with the Sustainable Development Goals, financing sustainable use of natural resources and the climate-oriented blue economy, and increasing the use of green bonds. The goals of green finance can be defined as specific areas or achievements that society seeks to achieve: adaptation to climate change, conservation of natural resources, support for the transition to renewable energy, reduction of greenhouse gas emissions, creation of new green financial instruments, raising awareness and attracting investors, support for green innovations and technologies, etc.

The preconditions for the emergence of green finance reflect key international events and initiatives that have become the basis for the development of the green finance concept. Starting with the Club of Rome, which in 1972 first drew attention to the limits of economic growth in the face of limited natural resources, to modern initiatives such as the European Green Deal, presented in 2019. The following developments have formed the basis for the implementation of environmentally sustainable financial practices at

the global level (Table 1). They have become the basis for a taxonomy of green finance that plays a key role not only in global policies but also in national strategies, including for Ukraine in its post-war recovery.

**Table 1.** Prerequisites for the emergence of green finance

Prerequisite	Event	Year	Description
The “Limits to Growth”	Report Presented by the Club of Rome at an international meeting, New York	1972	Awareness of the planet’s limited resources and the need to preserve the environment has prompted investors and financial institutions to look for new, more sustainable investment models.
“Brundtland” report	42 <sup>nd</sup> session of the UN General Assembly, New York “Our Common Future”	1987	The report became the basis for the formulation of global sustainable development strategies.
Agenda for the 21 <sup>st</sup> century	UN Conference on Environment and Development (Earth Summit), Rio de Janeiro	1992	It reflected a comprehensive approach to achieving sustainable development, combining economic, social and environmental aspects.
Kyoto Protocol	3 <sup>rd</sup> Conference on Climate Change (COP3 – UNFCCC), Kyoto	1997	It has become the basis for the development of financing for green projects and initiatives related to emissions reduction and climate change.
Millennium Development Goals (MDGs)	55 <sup>th</sup> session of the UN General Assembly / Millennium Summit, New York	2000/2001	It set 8 global goals to be achieved by 2015 aimed at combating poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women.
Copenhagen climate conference	15 <sup>th</sup> UN Climate Change Conference (COP15 – UNFCCC), Copenhagen	2009	The conference highlighted the importance of global efforts to combat climate change.
Sustainable development goals (SDGs)	69 <sup>th</sup> session of the UN General Assembly / UN Summit on Sustainable Development, New York	2015	The SDGs encourage the integration of environmental and social aspects into financial strategies.
Paris climate agreement	21 <sup>st</sup> UN Climate Change Conference (COP21 – UNFCCC), Paris	2015	Presentation of the European Commission’s strategy for the development of the European continent, European Parliament.
EU action plan for financing sustainable growth	Presentation of the European Commission’s action plan on financing sustainable growth, European Parliament	2018	The plan aims to mobilise finance for sustainable economic growth by promoting environmentally responsible investments.
European Green Deal	Presentation of the European Commission’s strategy for the development of the European continent, European Parliament	2019	The EU strategy aimed at achieving climate neutrality by 2050, which includes incentives for financing green initiatives.

**Source:** developed by the authors based on data from The Limits to Growth (1972), Report of the World Commission... (1987), United Nations Conference... (1992), Kyoto Protocol (1997), C2ES (2009), United Nations (n.d.), The Paris Agreement (2015)

According to the events and documents presented, it can be concluded that green finance has developed in parallel with the awareness of global environmental problems and the need for sustainable development. Thus, the pre-conditions for the development of green finance have been evolving over several decades, and have eventually resulted in specific initiatives and policies aimed at achieving global sustainable development goals. They clearly reflect the growing influence of environmental factors on economic decisions, which has largely driven the development of sustainable growth finance.

Addressing climate change and environmental protection requires significant investment, and experts estimate that between USD 125 trillion and USD 275 trillion will be needed to achieve net zero greenhouse gas emissions by 2050 (Krishnan *et al.*, 2022). In this regard, international governments and investors are actively looking for new ways to raise capital through green finance, which should become the main mechanism for addressing global

environmental issues and achieving climate goals. Table 2 and Figure 1 show the volume of green finance in the world over the past 16 years, as well as its growth and growth rates, which allows us to assess the dynamics of green finance development at the global level.

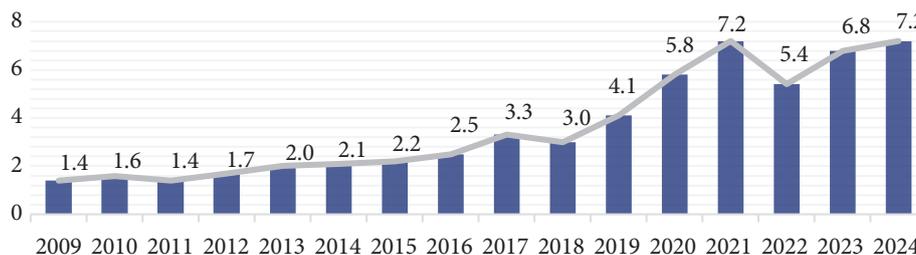
The graph clearly demonstrates the rapid growth of green finance in the world from 2009 to 2024, which indicates a significant interest of investors in environmentally friendly projects and a general trend towards more sustainable development models. This fact is confirmed by the activities of companies such as Apple, General Motors, Meta, and Google, which are actively investing in renewable energy sources. For example, as of February 2023, Amazon became the largest buyer of renewable energy (24.8 GW), and Microsoft signed a USD 10 billion agreement to purchase 10.5 GW of renewable energy for the period from 2026 to 2030 (Microsoft signs largest-ever corporate..., 2024). These large investments highlight the importance of green finance as a key tool for achieving sustainable development. More

than 50 countries are actively using green finance in their national economies. Given the steady involvement of green finance in the world, it is also important to analyse how it is distributed across different sectors of the economy (Fig. 2).

**Table 2.** Analysis of the volume of green finance in the world in 2009-2024, trillion US dollars

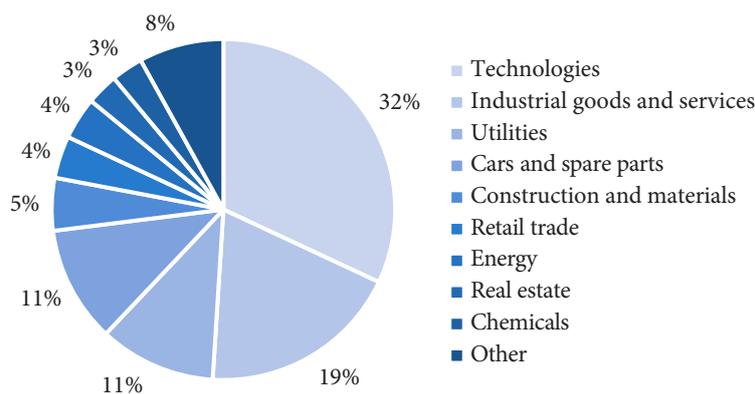
Year	Volume	Absolute growth		Growth rate, %		Growth rate, %	
		Basic	Chain	Basic	Chain	Basic	Chain
2009	1.4	-	-	-	-	-	-
2010	1.6	0.2	0.2	1.1	1.1	0.1	0.1
2011	1.4	0.0	-0.2	1.0	0.9	0.0	-0.1
2012	1.7	0.3	0.3	1.2	1.2	0.2	0.2
2013	2.0	0.6	0.3	1.4	1.2	0.4	0.2
2014	2.1	0.7	0.1	1.5	1.1	0.5	0.1
2015	2.2	0.8	0.1	1.6	1.0	0.6	0.0
2016	2.5	1.1	0.3	1.8	1.1	0.8	0.1
2017	3.3	1.9	0.8	2.4	1.3	1.4	0.3
2018	3.0	1.6	-0.3	2.1	0.9	1.1	-0.1
2019	4.1	2.7	1.1	2.9	1.4	1.9	0.4
2020	5.8	4.4	1.7	4.1	1.4	3.1	0.4
2021	7.2	5.8	1.4	5.1	1.2	4.1	0.2
2022	5.4	4.0	-1.8	3.9	0.8	2.9	-0.3
2023	6.8	5.4	1.4	4.9	1.3	3.9	0.3
2024	7.2	5.8	0.4	5.1	1.1	4.1	0.1

Source: developed by the authors on the basis of L. Clements *et al.* (2024)



**Figure 1.** Dynamics of the volume of green finance in the world in 2009-2024, trillion US dollars

Source: developed by the authors on the basis of L. Clements *et al.* (2024)



**Figure 2.** Breakdown of green finance by sector in 2024, %

Source: developed by the authors on the basis of L. Clements *et al.* (2022; 2024)

A breakdown of green finance by sector in 2024 showed that the largest share of investments is in technology (32%), reflecting the high demand for innovative and environmentally friendly technologies that contribute to sustainable development. A significant percentage (19%)

is accounted for by industrial goods and services, which underlines the importance of transitioning to sustainable production processes and minimising their environmental impact. Utilities, automobiles and spare parts (11% each) also receive significant funding, indicating the importance

of infrastructure development and green mobility. At the same time, the construction, energy and real estate sectors receive a smaller share, reflecting the gradual, albeit important, transition of these industries to environmentally sustainable models. Other sectors, such as chemicals and retail, have a smaller share of investments, indicating that further efforts are needed to adapt them to environmental requirements. The current state of green finance in Ukraine is an important step towards the country's integration into global economic and environmental processes. To date, Ukraine has ratified 42 international agreements and conventions related to the protection of the environment, nature, flora and fauna (Cheberyako & Miedviedkova, 2021).

Ukraine's tax system contains taxes that can be a fiscal instrument for green finance: environmental tax, excise tax on fuel and electricity, rent for the use of natural resources, etc. In order to achieve the decarbonisation goals in Ukraine, UAH 759 million was allocated for 2024, which was significantly less than the UAH 1,953 million allocated in 2023. Since 2022, the number of taxpayers for air emissions from stationary sources has decreased by 20% due to the consequences of Russia's full-scale invasion (SAF Ukraine, 2024). At the same time, the State Tax Service forecasts that due to a decrease in production volumes, the amount of this tax will decrease by 10% annually starting in 2024.

The basis of green finance in the world is the use of a carbon tax (i.e. the price of emissions of each tonne of carbon dioxide). According to the Tax Code, in 2024, Ukraine will have a carbon tax of EUR 0.77 per tonne of CO<sub>2</sub>eq (UAH 32/t CO<sub>2</sub>eq), which is one of the lowest carbon prices in the world (SAF Ukraine, 2024). For example, in the EU, the market price for 1 tonne of carbon dioxide equivalent is about €6. Therefore, to meet global green finance standards, Ukraine should not only increase the carbon tax rate but also create appropriate financial instruments that would help attract investment in environmentally friendly projects. This includes the development of green bonds, support for renewable energy sources, and increased financial incentives for businesses that switch to cleaner and more energy-efficient technologies.

European countries together currently lead the green bond market in terms of volume (trading almost half of the world's bonds) (Shevchenko, 2024). The first green bond

issues by Ukrainian issuers took place in 2019-2021. In 2019, DTEK issued bonds on the Irish Stock Exchange with a maturity of 5 years and an annual interest rate of 8.5%. The proceeds from these bonds were used to finance renewable energy projects, including the construction of the Tiligul wind farm. In November 2021, state-owned Ukrenergo placed green bonds worth USD 825 million on the London Stock Exchange. USD 825 million on the London Stock Exchange with a five-year maturity and an annual interest rate of 6.875%. However, no green government bonds were issued, due to the martial law in Ukraine and the issuance of domestic government bonds and government bonds. Nevertheless, the potential for financing environmental projects with green financial instruments remains relevant, although it is complicated by political and financial controversies. According to IMF estimates, the total volume of green bonds issued in Ukraine between 2012 and 2022 was USD 1.2 billion (Emerging market green bonds, 2023). It is expected that by 2030 Ukraine is expected to raise USD 36 billion through the issuance of green bonds (Lutsiv *et al.*, 2023).

Given the growing importance of sustainable development and the fight against climate change, international organisations such as the International Energy Agency (IEA), the World Bank, the OECD and the World Economic Forum are actively supporting various initiatives and programmes aimed at financing green projects. These programmes provide governments and businesses with access to finance and expertise to implement environmentally friendly, energy efficient and socially responsible projects. They contribute to infrastructure development, reduce greenhouse gas emissions, improve energy efficiency, and support green investments, which in turn helps Ukraine make the transition to sustainable development and climate change adaptation. Table 3 below summarises the main programmes of international organisations active in Ukraine that support the development of green finance in various sectors of the economy. These programmes help Ukraine to achieve its strategic goals in the field of green finance, support energy-efficient and environmentally friendly projects, create conditions for attracting international investment and climate change adaptation, and promote the integration of environmental standards into the national economy.

**Table 3.** Green finance support programmes in Ukraine

№	Programme	Essence
1	Programme "EaP GREEN"	The programme, implemented by the United Nations Economic Commission for Europe (UNECE), OECD, UNEP and the United Nations Industrial Development Organization (UNIDO), aims to assist the EU's Eastern Partnership countries (including Ukraine) in the transition to a greener development and business model. It supports the decoupling of economic growth from environmental degradation and promotes the integration of sustainable development principles into national strategies.
2	EU4Environment	The programme supports partner countries in identifying green investment needs and opportunities, as well as sources of public and private finance. The programme also initiated a project to issue green bonds, support subsidy reform and promote greener public spending. The programme, initiated within the framework of Euro Clusters, aims to facilitate the transition of small and medium-sized enterprises (SMEs) to sustainable green production.
3	GEMSTONE	Through the development of specialised services and financial instruments, the programme provides SMEs with access to green finance and supports them in implementing innovative environmental solutions to increase their sustainability and competitiveness.

Table 3. Continued

№	Programme	Essence
4	Programme EBRD "Green cities"	The programme not only promotes the sustainable development of urban infrastructure, but also actively supports green finance as the main tool for implementing environmentally friendly and sustainable projects. The aim of the programme is to help cities implement a green development strategy that includes improving the environment and the quality of life of residents by integrating sustainable solutions into urban infrastructure and natural resource management.
5	Norway-Ukraine Energy Efficiency Programme	The main objective of the programme is to promote the use of local and external financing to improve the energy efficiency of public buildings. The programme also supports the development of local governance and sustainable procurement. Mixed financing is offered for project implementation, including loans, grants, technical assistance and other support.

Source: developed by the authors on the basis of data taken from the websites EU4Environment (n.d.), Norway-Ukraine Energy Efficiency Initiative (n.d.), EBRD Green Cities (n.d.) та OECD iLibrary (n.d.)

Since 24 February 2022, Ukraine has been going through a difficult time of war, which has caused significant damage in many areas, including the economy, infrastructure and social life of the population. Russia's full-scale invasion has not only caused a humanitarian catastrophe, but also made it difficult to implement sustainable development in Ukraine. The war has exacerbated existing environmental problems and created new ones that are much more difficult to solve. The war has caused serious environmental consequences that have a significant impact on Ukraine's sustainable development model. The main ones are:

- ♦ mining of large areas, which restricts access to natural resources and negatively affects the conservation of flora and fauna;
- ♦ soil contamination, in particular through the use of explosives and the destruction of environmentally hazardous industrial facilities (destruction of a chemical plant in Sievierodonetsk, destruction of the Donetsk Azot plant, repeated rocket attacks on the Artem plant, etc.);
- ♦ deterioration of the quality of drinking water contaminated by explosions and aerial bombing (water pollution due to the destruction of sewage systems in Kharkiv, rocket attacks on the Kyiv reservoir, etc.);
- ♦ emissions of chemicals into the air due to fires, shelling and other hostilities;
- ♦ destruction of such important facilities as the Kakhovka and Dnipro hydroelectric power plants, which led to the loss of part of the green energy potential and the need to use less environmentally friendly energy sources;

- ♦ inability to conduct environmental audits in the affected areas, which complicates the assessment and restoration of ecosystems;

- ♦ complications in the implementation of measures to reduce the negative impact of toxic and chemical pollution, which further worsens the state of the environment.

Despite the ongoing hostilities, large-scale consequences and the occupation of certain territories, representatives of state and municipal authorities of Ukraine, as well as international experts, are actively discussing the needs and opportunities for post-war reconstruction of the country. One of the most important areas of such discussions is the topic of reconstruction based on the principles of sustainable development, with a focus on green initiatives. Increasing funding for nature should not be based on limiting spending on inclusive development priorities in post-war reconstruction (Naumenkova *et al.*, 2023). Grants from donors and loans on concessional terms for Ukraine cannot be permanent and cover the growing needs for nature financing in full (Naumenkova & Mishchenko, 2024). Thus, in January 2023, the European Commission discussed the possibility of integrating Ukraine's green recovery into the European Green Deal, which was an important step in defining strategic guidelines for the country's post-war recovery. In this context, programmes and initiatives involving the use of green finance should become the basis for sustainable recovery and modernisation of the national economy. Table 4 shows the main areas of recovery, financial instruments and programmes that can be used to achieve these goals in the post-war period.

Table 4. Strategic goals of green finance in the context of post-war reconstruction of Ukraine

Objective	Examples of financial instruments and programmes	Description
Ecosystem restoration and nature conservation	Ecodia; EU Emissions Trading System (EU ETS); Waste Management Support Programme (EU); ISO 14001	Remediation of contaminated or mined areas, biodiversity protection, conservation of natural resources
Energy recovery (green energy)	Green Deal (EU), Commercial Energy Efficiency Programme in Ukraine (UKEEP); green bonds, international loans and grants	Transition to renewable energy sources (solar, wind, bioenergy), restoration of energy infrastructure
Industrial eco-modernisation	EU Industrial Energy Efficiency Programme; Horizon 2020 Programme; Eco-innovation Programme; green bonds	Modernisation of enterprises, transition to energy efficient and environmentally friendly technologies, reduction of CO <sub>2</sub> and other pollutant emissions
Sustainable agribusiness development	CAP – Common Agricultural Policy; Green Agriculture Initiative; support for organic farming through subsidies and grants	Support for sustainable production methods in the agricultural sector, introduction of environmentally friendly methods of soil cultivation and water conservation

Table 4. Continued

Objective	Examples of financial instruments and programmes	Description
Sustainable infrastructure projects	IQ Energy; Green Infrastructure (EU); Urban Sustainable Infrastructure Programme; Climate City Programme	Rebuilding and modernising infrastructure in line with the principles of sustainable development, energy efficiency, and low pollution
Financing through green bonds and loans	Climate Bonds Initiative; green bonds; green loans	Raising funds to finance green projects, both at the national and local levels
International cooperation	United Nations Development Programme (UNDP); EU4Environment; EaP GREEN; Green Economy Financing Facility (GEFF)	Attracting foreign investment, international technical assistance and support for the implementation of sustainable development projects and green initiatives

Source: developed by the authors on the basis of data taken from the websites Emerging market green bonds (2023), EU4Environment (n.d.), OECD iLibrary. (n.d.), UNDP, GEFF (n.d.), Ecodia (n.d.) та ISO (n.d.)

Given the current challenges, including the effects of the war, the green financial sector can be an important tool for achieving environmentally friendly and sustainable development. Thus, despite the challenges posed by the consequences of the war, these factors also open up new opportunities for the introduction of green finance. The need for environmental restoration after the destruction and modernisation of infrastructure can be an impetus for attracting significant investments in sustainable development. Restoring the environmental situation in Ukraine and implementing green finance programmes will be an important step towards building a more sustainable economy that meets the requirements of the current environmental agenda.

In light of the growing attention to the serious environmental challenges facing the planet, green finance is becoming increasingly important as a key element of the modern economy. It goes beyond traditional investment and becomes an important area that links the financial sector to the principles of sustainable development. Major environmental challenges such as climate change, pollution and the depletion of natural resources require immediate attention and action. As noted by D. Shkvarchuk (2024), green finance is an innovative and critical tool for achieving sustainable development and preserving the planet's ecosystems.

The war has caused significant losses for the economy, environment and citizens of Ukraine, which requires the development of an appropriate mechanism to compensate for these losses. An important element of this mechanism should be the development of a system of measures for green financing the reconstruction of the Ukrainian state. It is important to strengthen not only state financial control over the implementation of green projects with foreign investment, but also public control, as the level of corruption in state environmental services is quite high. This is primarily important to prevent so-called 'environmentally toxic' foreign investments from entering Ukraine during the reconstruction period. Such investments may include, among other things, support for coal and oil energy projects, inefficient waste management methods, or other practices that harm biodiversity or contribute to climate change (Karlin & Prots, 2022).

There are a number of factors that hinder the spread of green investments. First and foremost, it is the imbalance of economic indicators, high inflation and high interest rates that reduce the country's investment attractiveness. Another important obstacle is that the technologies used in Ukraine are lagging behind those of developed countries. Low levels of technological innovation and poor infrastructure also reduce the country's investment attractiveness. In addition, corruption processes in Ukraine significantly complicate the implementation of sustainable projects and hinder the development of green finance (Nazarova & Havryk, 2023).

Ensuring sustainable development in the context of post-war recovery in Ukraine requires a more thorough definition of the legal framework for green finance, establishing cooperation with foreign investment companies, international financial organisations and donor funds to attract green finance to Ukraine, although in such circumstances it is difficult to predict its further development. The main areas of green finance development include public-private partnerships, climate risk insurance, sustainability bonds, Islamic finance, government support, and investment in education (Cheberyako *et al.*, 2021). In addition, Ukraine's energy strategy requires ambitious changes in the post-war period of Ukraine's recovery, which should ensure energy independence and energy security of the state and contribute to the welfare of citizens, and RES should not be one of the options for diversifying energy resources, but the basis for rebuilding Ukraine's energy system (Metelenko *et al.*, 2022).

S. Naumenkova & S. Mishchenko (2024) note that excessive debt burden limits the financing of programmes to restore damaged ecosystems and create a green and safe environment. They see green debt swaps as a tool for raising capital in low-income countries to address environmental issues. The debt swap (or conversion) is based on the cancellation of a portion of a country's external debt in exchange for a commitment by its government to mobilise domestic resources (local currency or other assets) to finance the achievement of agreed environmental goals on terms agreed with the creditor.

Thus, the formation of green finance is a modern trend of ensuring sustainable development of the state in the context of globalisation in order to reduce poverty, control the

use of natural resources and increase the number of jobs. And improving the environmental situation is not only a matter of state budget expenditures, but the essence of the new economic system – new economic conditions for doing business, which involve attracting investments in the development of new ‘green’ industries.

### CONCLUSIONS

As a result of the study of theoretical and practical aspects of implementing green finance as a tool for sustainable development and post-war recovery in Ukraine, the following conclusions have been drawn. Green finance includes three areas: infrastructure financing, economic support for industries and enterprises, and financial market development. The concept of green finance has evolved over time in line with the aspirations of economies. With each new international initiative and agreement, the integration of environmental aspects into financial strategies has increased, ensuring the formation of stable financial mechanisms to support climate and environmental goals. Given the need to adapt the economy to climate change and invest in environmentally friendly technologies, the introduction of green finance is an important step towards achieving long-term economic and environmental sustainability.

Between 2009 and 2024, there was a growing demand for environmentally friendly projects and a general shift towards more sustainable economic models. More than 50 countries are actively using green finance mechanisms in their economic strategies. This trend is driven by the introduction of carbon taxes. European countries are leading the way in the green bond market, controlling about half of the world’s issuance of these securities. International organisations, such as the International Energy Agency (IEA), the World Bank, the OECD, and the World Economic Forum, actively support various initiatives and programmes aimed at financing green projects, providing governments and businesses with access to financing and expert assistance for the implementation of environmentally friendly, energy efficient, and socially responsible projects. The hostilities

have caused serious environmental consequences that have a significant impact on Ukraine’s sustainable development model. In the context of Ukraine’s post-war reconstruction, the green transformation of the economy can be an important factor not only for recovery but also for increasing the country’s competitiveness in the international arena. The introduction of sustainable energy solutions and environmental technologies creates the preconditions for integration into European economic processes and the use of EU financial mechanisms.

Thus, it is important to focus on the principles of sustainable development for Ukraine’s successful recovery. International investors are interested in projects that contribute to economic recovery, conservation of natural resources, and energy efficiency. Therefore, projects that meet these requirements will attract investment and contribute to the development of Ukrainian cities, creating conditions for the introduction of environmentally friendly technologies and the restoration of infrastructure to modern standards. This is the basis for effective post-war reconstruction that takes into account the needs of the environment, sustainable development, and improving the quality of life of citizens. Important areas for further research include the development of methods for biodiversity conservation, the introduction of sustainable urbanism models, and the study of effective strategies for managing Ukraine’s water and energy resources in the context of post-conflict recovery. It is also important to explore opportunities for the development of smart cities that integrate innovative technologies to reduce the negative impact on the environment.

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### CONFLICT OF INTEREST

None.

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## Зелені фінанси як інструмент сталого розвитку та повоєнного відновлення в Україні

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**Анотація.** Тривала війна в Україні створює значні виклики для економіки та екологічної стабільності країни, а залучення «зелених фінансів» може стати ключовим інструментом для повоєнного відновлення економіки та сприяння сталому розвитку, завдяки залученню ресурсів для екологічно чистих та інноваційних проєктів. Метою статті було дослідження потенціалу зелених фінансів, а також аналіз можливостей впровадження цього інструменту для підтримки економічної та екологічної стійкості країни в післявоєнний період. Під час дослідження використовувалися емпіричні, аналітичні та системні методи, що дозволило оцінити вплив зелених фінансів на економічне зростання, зменшення екологічних наслідків та покращення якості життя громадян. Загалом результати дослідження продемонстрували високий потенціал зелених фінансів для відбудови України у майбутньому. У статті було проаналізовано політичні рамки та міжнародні зобов'язання, що можуть стати основою для формування політики зелених фінансів в Україні. В ході дослідження було розглянуто динаміку обсягів зелених фінансів у світі за 16 років, яка засвідчила постійне зростання інтересу до екологічно стійких інвестицій. Було запропоновано рекомендації щодо розвитку зелених фінансів, що включають впровадження механізмів для залучення інвестицій у стійкі екологічні проєкти, підтримку сталого зростання та модернізацію секторів економіки, що є критичними для відновлення країни після війни. Основними висновками є необхідність інтеграції екологічно чистих та інноваційних проєктів у відбудову інфраструктури, що допоможе забезпечити сталий економічний розвиток та зменшити екологічні ризики. Важливу роль у цьому процесі відіграють міжнародні фінансові інструменти та зобов'язання, що сприяють залученню інвестицій у «зелені» проєкти. Отримані в процесі даного дослідження наукові результати можуть сприяти вирішенню актуальних проблем інтеграції зелених фінансів у стратегії сталого розвитку та відновлення України, і можуть бути використані державними органами для формування ефективних механізмів фінансування екологічно стійких ініціатив у повоєнний період

**Ключові слова:** зелене фінансування; зелені інвестиції; зміна клімату; зелені облігації; навколишнє середовище; цілі сталого розвитку; післявоєнна відбудова



## Independent calculation of the financial performance of the Kyiv Metro, including the lease of advertising space

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**Abstract.** Accounting of financial results, especially in the context of leasing advertising space, is critical for the effective development and expansion of the financial activities of the Kyiv metro in the context of digitalisation and socio-economic changes. The purpose of the study was to examine the economic benefits of the financial activities of the Kyiv subway, including the lease of outdoor advertising. The study used the methods of economic analysis, inductive, modelling, and comparative. The results of the study showed that the lease of advertising space is accompanied by high profits of the outdoor advertising industry and investments, characterised by the growth of the industry as a whole, but does not cover all the costs of the Kyiv Metro utility. International advertising agencies and media companies may be interested in investing in advertising space, which is the only outdoor advertising medium in the Kyiv Metro. Competition is becoming intense in the areas of advertising and technology, which affects the metro's advertising revenues. The urban terminal of the metro includes advertising materials placed in stations and carriages, which provide visibility of advertising to passengers and are important for attracting attention to brands. The growth in the market value of these advertising spaces indicates their potential for investment, which may attract the interest of venture capitalists to new projects in this area. It has been found that optimising the use of advertising space can significantly increase the profitability of the Kyiv metro. It has been found that diversification of advertising formats and the introduction of digital advertising media can increase the profitability of the subway compared to traditional methods. Collaboration with local businesses for advertising can increase revenues and strengthen the connection between the metro and the local community. The results of the study can be useful for finance and economics specialists in the field of public transport to optimise the financial performance of the enterprise and improve the efficiency of resource management

**Keywords:** inflation; investment; profit; profitability; utility company

### INTRODUCTION

The study of the independent calculation of the financial performance of Kyiv Metro, in particular in the context of leasing advertising space, is due to the growing importance of public transport as an advertising platform. Many advertising brands prefer the subway because it provides a large volume of potential consumers who use its services on a daily basis. In the context of interactive technologies

and the development of media communication, the lease of advertising space opens up new financial opportunities for the metro. Modern advertising solutions, such as digital screens, interactive panels and integration with mobile applications, can significantly improve the effectiveness of advertising campaigns and increase consumer interest. These innovations can significantly increase advertising revenues,

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which in turn will affect the overall financial stability and development of the metro. That is why it is crucial to conduct an independent calculation to determine the efficiency of the existing use of advertising space and its impact on the overall financial results, which will optimise the financial performance of the Kyiv Metro. The issues of financial performance of underground transport systems and their profitability are important not only for Kyiv. This issue is becoming the subject of research in many countries, where public transport plays a key role in the life of cities.

J.H. Kwon (2024) explored the possibilities of increasing the profitability of the subway by leasing movable and immovable property for outdoor advertising, pointing to the significant potential of this approach to increase profitability and improve the financial performance of the utility. The large flow of passengers at the capital's metro stations encourages advertisers to invest in creative advertising, which not only helps to attract resources but also develops new forms of advertising in the metro. The spatial capabilities of the metro provide a great deal of scope for creativity in the production of advertising media, which, in turn, generates useful content and has a positive impact on the financial results of the company.

A. Buryachenko *et al.* (2024) concluded in their study that in order to increase the level of targeted use of advertising revenues by the Kyiv Metro utility, it is necessary to reform the mechanism of interaction between the city and intermediary companies, in particular, to establish direct accounting of revenues at the market value of the space, rather than a fixed price. In conformity with S. Boyko *et al.* (2024), the introduction of digital advertising in the subway could increase advertising revenues by 40% by 2027.

R. Mao *et al.* (2021), emphasise in their work the fact that looking at the business structure, it is easy to find that it is impossible for the metro to achieve profitability by relying only on ticket sales. J. Zhou *et al.* (2019) found in their study that the business strategy of a transport enterprise is not to rely on traditional business, but to expand integrated services and form its own development characteristics. That is why there are many types of advertising in the metro, including video advertising (LED digital media in the metro, mobile TV in cars, ads on platforms), print advertising (light boxes of channels, light boxes on platforms, light boxes in station halls, special extra-large light boxes), wall posters (light boxes of cars), and interior posters. However, there is little information in researchers' works about the specifics of financial activities with regard to the lease of advertising space.

Researchers L. Sun *et al.* (2020) consider in their works the financial activities of the subway in terms of planning and construction, emphasising the development of rail transit networks in large cities and demonstrating trends in the development of a single network where the subway system should dominate. The researchers note that in large cities there is less and less space for a metro system, but the benefits of passenger traffic and generated time value are not as obvious as the benefits of a central city line, which

affect the competitiveness of urban rail transport within the city. In large cities with relatively developed urban rail transit networks, their structure has many levels, including urban metro, suburban rail and new transit systems, which achieve better ridership effects. N. Gendron-Carrier *et al.* (2022) concluded that it is important for each city to consider how the multilevel rail network will be deployed in the future, as it is related to the economic benefits and sustainable development of the metro as a whole. However, these works do not outline specific indicators that affect the financial performance of the metro.

The purpose of this research article was to analyse the economic benefits of the financial activities of the Kyiv subway, considering revenues from the lease of outdoor advertising. The study was aimed at determining the impact of this phenomenon on the overall development of urban infrastructure and the economy of Kyiv.

## MATERIALS AND METHODS

This study was based on the analysis of the financial performance of Kyiv Metro, taking into account the lease of advertising space for 2019-2023. In the course of its conduct, the methods of economic analysis, inductive, modelling, and comparative were used. The method of economic analysis at the stage of assessing the financial performance of Kyiv Metro allowed us to describe the general vision of the financial structure of the organisation, its profitability, solvency, and risks. The official financial statements of the municipal enterprise were analysed (Department of internal..., n.d.; Official website of Kyiv Metro, n.d.; Portal "Kyivaudit", n.d.; Audit report..., 2024). The key to diagnosing financial indicators was the quantification and assessment of the balance between profitability and risk.

To calculate the formation of the price of renting advertising space, a common unit of variable costs was determined by the formula:

$$CV_T = CV_P \quad (1)$$

where  $CV$  is the variable cost and  $F$  is the fixed cost, considering that  $T$  is the contribution factor, or the percentage margin of the contribution, which will serve to add to  $CV$  and thus form the price sought to cover the fixed cost.

The use of the inductive method allowed us to identify the financial models used at the enterprise, as well as the specifics of its economic indicators, in particular in the context of advertising space rental indicators. This method helped to identify the features and characteristics of the enterprise's functioning in the current Ukrainian market. The modelling method in the formation of the mechanisms of financial activity of the municipal enterprise "Kyiv Metro" was represented by such forms of economic data as panel data, and binary logistic regression. This ensured an objective analysis of the observed economic phenomena to generate numerical data to describe the financial environment. Thus, these models emphasised the existing relationships between external

variables represented by numerical forms. This allowed us to obtain descriptive elements that helped to generalise the behaviour of the analysed variables in the context of advertising space leasing.

The comparative method was used to compare the data provided in the financial statements of the utility company with the results of the study. This allowed us to identify the peculiarities and differences in the information, which pointed out the need for an independent analysis of the financial performance of the Kyiv Metro. As a working hypothesis, it was assumed that the minimum profit to be earned is a function of the value of total capital employed, consisting of interest earned on the liability and revenues expected from the subway. Thus, assuming that the weighted cost of total capital employed is defined as:

$$C_{p=R_{P/A}+R^C/A} \quad (2)$$

where  $C$  is the ticket yield,  $R_{P/A}$  is the ratio of the ticket price  $P$  to the total assets  $A$ ,  $R$  is the return on advertising capital  $C$ , and  $R^C/A$  is the proportion represented by capital relative to the total assets of the advertising space lease. This means that the profit structure, taking into account the lease of advertising space, can be planned on the basis that the minimum profit is not less than the cost of capital used.

This method helped to determine the norms of the potential product, which arose from the need to consider the

activity index as a comparison process in order to assess the current levels of growth of indicators and determine the inflationary risks occurring in the monetary policy of the utility company. Drawing parallels made it possible to determine different degrees of economic expansion and contraction, while characterising the development of the metro economy.

## RESULTS AND DISCUSSION

The main purpose of any enterprise is to make a profit. There is a need to know its minimum level in order to adopt it as a goal when planning operational activities, such as generating the necessary income and controlling costs and expenses (Sabau-Popa *et al.*, 2020). An important aspect of the financial activities of the municipal enterprise Kyiv Metro is the attraction of financial resources that can have different origins. In general, in addition to ticket sales, the company also receives income from government subsidies and lease of advertising space.

For a comprehensive analysis of the financial performance of the municipal enterprise Kyiv Metro, it is important to consider its expenses and revenues over the past few years. These indicators allow us to assess the financial position of the company, determine its profitability and identify trends that may affect its further development. Table 1 illustrates the expenses and revenues of the subway for 2019-2024.

**Table 1.** Expenses and income of the municipal enterprise Kyiv Metro for 2019-2024 (UAH million)

Year	Expenses	Income	Net profit/loss
2019	4,389	3,389	-1,000
2020	4,328	1,845	-2,483
2021	5,715	4,268	-1,447
2022	4,787	3,675	-1,112
2023	10,132	6,612	-3,520
2024*	4,531	2,581	-1,950

Note:\* – data for 6 months of 2024

Source: developed by the authors on the basis of Official website of Kyiv Metro (n.d.), Community enterprise “Kyiv Metropolitan” (2020), Audit report... (2024)

The table shows that the costs of urban rail transport exceed its revenues, a widespread problem. The cost of maintaining the municipal enterprise Kyiv Metro is significant, while fares remain relatively low due to the specific nature of public transport. In addition, there is a clear dependence of the company's financial performance on the intensity of passenger traffic, which

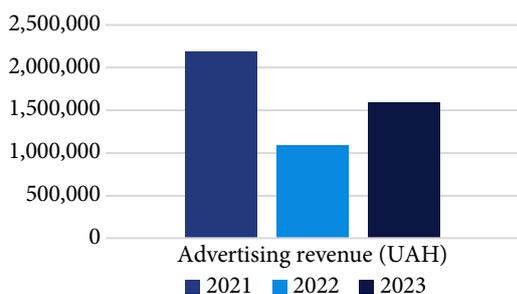
affects the company's assets (Table 2). According to the data, a significant decline in revenues correlates with a decline in passenger traffic in 2020 and 2022, the period of active restrictions related to the COVID-2019 pandemic and the year of the beginning of the full-scale Russian invasion of Ukraine, which caused a crisis in the entire economy.

**Table 2.** Passenger traffic intensity in the Kyiv metro in 2019-2024 (thousand people)

Year	Passenger traffic intensity (thousand people)
2019	350,000
2020	270,000
2021	319,000
2022	162,000
2023	232,000
2024	241,000

Source: State Tax Service of Ukraine (n.d.)

Similar fluctuations are observed in the MEs' income from the lease of advertising space, as evidenced by the data of the Department of Advertising of the executive body of the KCSA (n.d.) for 2021-2023. Figure 1 shows significant fluctuations in income, which indicate the impact of external factors, such as economic instability and war, on the financial performance of the enterprise. According to statistics from the Advertising Department of the executive body of the Kyiv City State Administration, in 2021, the subway's profit reached UAH 2,189,376. However, in 2022, there was a sharp drop to UAH 1,085,451, a 50.4% decrease due to the outbreak of a full-scale war in Ukraine and its impact on the economy and the advertising market. However, in 2023, there was a positive trend – the profit increased to UAH 1,589,880, which is 46.5% more than in 2022, but 27.4% less than in 2021 (Advertising Department..., n.d.). These dynamics indicate a gradual adaptation to the new conditions, but also highlight the need to revise the strategy for using advertising space, in particular by introducing new advertising formats, adapting pricing policies, and focusing on local businesses that continue to operate in wartime.



**Figure 1.** Kyiv Metro's profit from the lease of advertising space for 2021-2023

**Note:** Official data for 2024 were not available at the time of writing

**Source:** developed by the authors on the basis of Department of internal... (n.d.), Portal "Kyivaudit" (n.d.)

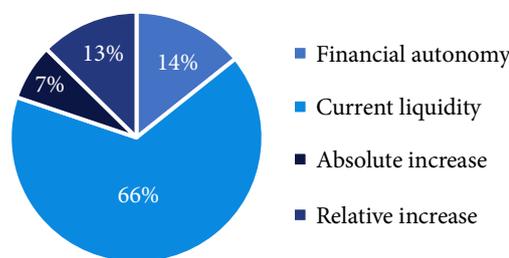
An important issue when planning profitability is the procedure for setting the rental price of advertising space. To a large extent, the rental price depends on the payback ratio of the tariff box (which is mostly set by law), i.e. the ratio of fare revenue to total operating costs (Onofrei *et al.*, 2020). They are, in turn, divided into variable and fixed costs, the latter being periodic and related to the costs of production or purchase of materials and services. The total unit of variable costs is determined using formula (1).

According to the calculations of H. Akono & E. Nwaeze (2018), a generally well-managed metro system can maintain a farebox payback ratio of more than 50%, generating higher profits by capturing the cost of renting advertising space. This success is due to its urban form due to the high density of the urban population and the functional zoning of the mixed-use metro. Consequently, the contribution factor that should be used to price the

proposed lease of advertising space should be in line with the profitability of sales.

Profitability has the same property for different combinations of profit and sales, where as the contribution margin increases, the price also increases and the number of units to be leased decreases. The higher the value of sales, the higher the value of the resulting utility, and the latter decreases as the value of sales decreases. Therefore, it all comes down to finding a relationship that guarantees the right price and volume to achieve the target profitability. To achieve this goal, the financial elements must have an effective capital budgeting process that selects sustainable and profitable investment projects that are accompanied by an appropriate financial structure (Berest & Sablina, 2022). Otherwise, business continuity and progress in value creation may be at risk. Once the investment decision has been made, the financing decision is made. In some cases, financing can come from own resources in a high proportion, but in many others, due to the size of the investment, other financing options need to be evaluated, including the lease of advertising space in the Kyiv Metro.

The Kyiv Metro receives revenue only from ticket sales and the lease of advertising space, as the municipal enterprise Kyivreklama is responsible for advertising placement (Municipal enterprise Kievreklama, n.d.). On average, the sector has favourable liquidity indicators. However, it should be emphasised that debt-to-asset ratios are primarily intended to measure the level of total enterprise profits provided by creditors in the short and long term (Fig. 2).



**Figure 2.** Indicators of solvency and sustainability of the municipal enterprise 'Kyiv Metro' for 2023 in % ratio

**Note:** Official data for 2024 were not available at the time of writing

**Source:** State Statistics Service of Ukraine (n.d.)

The emergence of the golden mean as a point of stability confirms the existence of a mechanism that prevents the interest margin from being arbitrary and even chaotic, and hence the prices and other items in which it is involved. To reinforce the above, it is important to consider the most complete cases where unit variable costs are split into those that depend on production or direct purchases and those that depend on price or volume. There are numerous models with different characteristics that allow for the interpretation of a data set at different points in time. If this dataset belongs to different units, then a panel data analysis may be an appropriate methodology to measure the effects of

renting advertising space in the studied utility, Kyiv Metro. Thus, transformations were made to the ratios of financial assets to approximate arithmetic operations. In this case, the panel data model is written as follows:

$$Y = X\beta + \varepsilon, \quad (3)$$

where  $Y$  is the matrix of dependent variables,  $X$  is the matrix of independent variables,  $\beta$  is the matrix of estimated coefficients, and  $\varepsilon$  is the error term.

Given this evidence, it was decided to perform a binary logistic regression, preceded by a principal components factor analysis, which would reduce the information redundancy represented by the set of ratios. This model takes into account the heterogeneity of the cross-sections, which allows each unit to have its own cross-section of the enterprise's assets from transport activities and advertising space lease. The limitation of the model is that the value of  $\varepsilon$  is not directly observable. Given daily earnings data, the capital asset valuation is the most convenient scheme for hedging risk in the market, as it formally describes the relationship between risk and return, and serves as a general framework for understanding systematic diversification. Accordingly, an asset is considered risk-free if its return is equal to the expected return, because the return is directly proportional to the risk exposure, as the higher the risk, the higher the return.

Hypothesis (2) was confirmed by economic indicators that depend on causal relationships. Similarly, the assumption is based on the fact that the available amounts of different risky financial assets are set as an exogenous variable of the model. On the other hand, the usefulness of the model lies in the ability to estimate the cost of capital when conducting a discounted cash flow valuation of the capital metro or when evaluating new investment projects. Total asset turnover indicates the ability of a company to use its property to generate income, which is related to management efficiency (Amirhossein *et al.*, 2020). The higher the turnover of total assets, the higher the level of efficiency of the company's use of funds and rights it owns. Fixed assets turnover expresses the company's productivity in generating income through the investments it makes in fixed assets – buildings, structures, machinery, and equipment. A particularly important aspect is that inventory in any organisation is the minimum amount of available products or items needed to meet customer demand. It is an indicator that expresses the number of inventory turns during the year, where a higher inventory turnover means that the company is effectively

managing and constantly supporting new products and ways of making money.

The natural dynamics and processes of change in the country's economy, which affect the current financial structure of the company, make it increasingly necessary to analyse the company's financial situation, taking into account its internal development and its position relative to other companies operating in the same market (Monasterolo, 2020). The investment elements continue to have the same decision-making pattern subject to alternatives, in line with new market investment trends, where space leasing is understood more globally and is linked to the system of economic organisation and the complex structure of modern markets. This vision implies the adoption of an analytical perspective that allows us to link its effects to the global scale of the economic system, which faces great difficulties, mainly stemming from the near impossibility of quantifying the impact of leasing advertising space on the overall economic activity of the enterprise. The conceptual framework of financial performance is important for decision-making in the economic sphere of the municipal enterprise Kyiv Metro, as the modern globalised market requires individuals and legal entities to develop to be innovative, capable and develop their financial skills in order to achieve their goals, mission, and vision.

According to researchers J.D. Farmer *et al.* (2019), an independent financial analysis of a utility serves as a basis for assessing the situation and real economic performance to identify difficulties and apply appropriate corrective measures to address them. Financial analysis is based on the calculation of key indicators that express liquidity, solvency, performance, debt, efficiency, and profitability. As a key management and analytical tool in all business activities, it determines the conditions and helps to predict the future. The transformation process brought about by technological progress, automation, and economic development makes it difficult to calculate the results of a company's financial performance, especially when considering the lease of advertising space. The importance of financial analysis in this case lies in the fact that it allows identifying economic and monetary aspects that show the conditions in which the utility company operates, in terms of liquidity, solvency, debt, efficiency, effectiveness and profitability, facilitating management and economic decisions. Therefore, the behaviour and activity of exogenous variables, such as inflation, which affects the current market value of assets and liabilities, should be taken into account and the importance of the balance between current and non-current assets should be considered (Table 3).

**Table 3.** Assets of the municipal enterprise Kyiv Metro for 2019-2023 (UAH, thousand)

Year	Non-current assets	Current assets	Assets
2019	50,191,774	1,150,744	51,342,518
2020	49,462,456	1,564,738	51,027,194
2021	48,594,136	1,834,189	50,428,325
2022	46,951,959	2,044,748	48,996,707

Table 3. Continued

Year	Non-current assets	Current assets	Assets
2023	170,981,222	2,754,566	173,735,788
2024	171,437,662	3,140,029	174,577,691

Source: State Tax Service of Ukraine (n.d.)

Researchers Q. Zhang & A. Posso (2019) believe that independent financial analysis should be applied by all types of companies, small or large, and regardless of their production activities, as it is a measure of operational efficiency that allows assessing the results of the enterprise. This tool facilitates decision-making on investments, financing, and action plans, and helps to identify the strengths and weaknesses of an organisation. However, it is important to note that financial analysis with respect to the lease of advertising space should be conducted systematically to determine the company's liquidity and solvency, assess its operating activities, asset utilisation, ability to pay off and cancel contractual obligations, its profits, required investments, productivity, and profitability. As for the interpretation of the indicators, it may be difficult to establish criteria for their evaluation, as the result may be ambiguous with respect to the production activities of the utility. To this end, it is important to describe financial analysis as a management stage, identifying the relevant methods on which it is based, the impact of the inflationary phenomenon on its application, and briefly analyse the importance of international financial standards in the use of this useful management tool, especially when calculating the profit from the lease of advertising space. The authors acknowledge that the technique of assessing the operational behaviour of a company, including the lease of advertising space, facilitates the diagnosis of the current situation and anticipates any future events that are most focused on achieving pre-set goals, while confirming the results of the study.

From the point of view of M. Amidu *et al.* (2021), the analysis of independent financial statements is characterised by the fact that it is an operation based on the reclassification, compilation, receipt, and comparison of accounting, operational and economic data of a utility company, which, through the use of appropriate methods and tools, seeks to assess the financial condition, development, and results of economic activity in the present and past to obtain the best performance in the near future, taking into account indicators for the rental of advertising space. From these statements, it follows that this process is a management phase consisting of several stages. Initially, it focuses on the use and transformation of accounting information recorded in the financial statements, and is subsequently used as a mechanism to select the most relevant information to prevent counterproductive situations and forecast assets by calculating indicators and applying a specific methodology. In this context, the objectives of independent financial analysis are aimed at considering trends in the financial variables involved in the company's operations. They are based on measuring the level of solvency,

liquidity, profitability and, in general, the current state of the utility company, and therefore, full compliance with these objectives depends on the quality of the accounting information used for their application, especially with regard to the lease of advertising space. Therefore, the importance of calculating the indicators lies in the interpretation of the value given by each indicator or their ratio, since this value itself provides very little information, its calculation should not be limited to the use of formulas.

H. Sugiarto *et al.* (2023) recognised that profitability is determined by the way in which a company is able to generate a surplus for distribution to shareholders, comparing it with the total resources invested in operations as an indicator of the efficiency achieved. According to the authors, the most profitable companies are those that succeed due to their ability to generate income, in particular through the rental of advertising space. Thus, profitability is the main indicator for assessing business performance, since, setting aside the issue of financing, it is possible to understand how productive and viable the enterprise was in the context of the development of its economic activities and management practices. Similarly, if entities are able to analyse risks in the dynamics associated with economic conditions, they can predict changes in profitability over time. Therefore, making strategic investment decisions is a crucial activity for the development of a utility organisation. Accordingly, comparing the authors' analysis and the results of the study, it is possible to highlight the fact that financial indicators provide information about the company's performance and economic condition when they are calculated for a series of periods, which allows determining average indicators and trends in one industry. As noted by A. Lusardi (2019) in his work, the economic context is characterised by a sequence of situations in which facts and phenomena affecting the current company at all levels occur with unprecedented speed and depth in history. These facts make it necessary, if not essential, to create a reserve or bank of ideas designed to maintain a stock of assets.

The authors B. Bui *et al.* (2020) pointed out that one of the most important challenges in financial analysis is to determine the impact of changes in the financial structure on the cost of capital and firm value. Using an analytical formulation and numerical examples, they conclude that the cost of capital decreases with an increase in the debt ratio. By modifying the input hypotheses, the conclusions can be adjusted, expanding the range of specific situations that lead to the development of new financial models.

In summary, despite high maintenance costs, Kyiv Metro faces uneven development of profitability caused by external economic factors, such as changes in market

conditions, economic instability and fluctuations in demand for public transport services. Significant fluctuations in revenues from the lease of advertising space, which demonstrate both a decrease and an increase in profits in different years, confirm the need to adapt the strategy for using these assets, including a review of pricing policy and the introduction of new advertising formats. The importance of independent financial analysis for assessing the situation and performance of the metro was identified, as it provides a clear understanding of the financial position of the enterprise and allows for further development and optimisation of financial flows.

### CONCLUSIONS

The study analysed the state and economic benefits of the financial activities of the municipal enterprise Kyiv Metro, and identified the main factors affecting its profitability, including tariffs, passenger traffic and income from the lease of advertising space. The analysis showed that income from the lease of advertising space accounts for a significant share, but its fluctuations from year to year require adaptation of the strategy for using these assets to ensure stable income.

The study paid special attention to the panel data model, which allowed for an in-depth study of the relationship between the main economic indicators of Kyiv Metro, taking into account the impact of external factors such as inflation, market volatility and passenger traffic dynamics. This model provided a comprehensive analysis of the company's financial position, allowing for comparison of indicators for different periods and identification of key trends, including risks and opportunities for increasing profitability. The results of the panel analysis showed that with an increase in passenger traffic and advertising space

rental, there is an increase in profitability, but profitability is significantly affected by fluctuations in external factors. Additionally, the current assets of the enterprise were considered, which allowed assessing the efficiency of using the resources of the subway. The results show that higher asset turnover contributes to the financial stability of the enterprise, providing flexibility in the use of working capital to cover operating expenses and investments in development. At the same time, optimisation of the asset structure allows the company to use its financial resources more efficiently, which has a positive impact on its overall profitability. An essential aspect of the study was also an independent financial analysis that provided an objective assessment of the financial performance of the metro. This analysis helped to identify weaknesses that require corrective measures, in particular in the strategy for managing revenues from the lease of advertising space.

Further research could focus on developing new financial models to forecast the company's profitability and assess the risks associated with changing economic conditions. Another important area is to improve the strategy of using advertising space and search for additional sources of income, which will increase the sustainability and efficiency of the subway's financial activities.

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# Незалежний розрахунок результатів фінансової діяльності Київського метрополітену з урахуванням оренди рекламних площ

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**Анотація.** Облік фінансових результатів, особливо в контексті оренди рекламних площ, є критично важливим для ефективного розвитку та розширення фінансової діяльності Київського метрополітену в умовах цифровізації та соціально-економічних змін. Мета дослідження – розглянути економічні переваги фінансової діяльності метрополітену міста Києва, враховуючи винайм зовнішньої реклами. У дослідженні використовувались методи економічного аналізу, індуктивний, моделювання, порівняльний. Результати роботи визначили, що оренда рекламних площ супроводжується високим прибутком індустрії зовнішньої реклами та інвестицій, що характеризуються зростанням галузі в цілому, однак не покриває всіх витрат комунального підприємства «Київський метрополітен». Міжнародні рекламні агенції та медіа-компанії можуть бути зацікавлені в інвестиціях у рекламні площі, які є єдиним зовнішнім носієм реклами в Київському метрополітені. Конкуренція стає інтенсивною в сферах реклами та технологій, що впливає на доходи метрополітену від реклами. Міський термінал метрополітену охоплює рекламні матеріали, розміщені в станціях та вагонах, що забезпечують видимість реклами для пасажирів і є важливими для залучення уваги до брендів. Зростання ринкової вартості цих рекламних площ свідчить про їхній потенціал для інвестицій, що може привернути інтерес венчурних капіталістів до нових проектів у цій сфері. Виявлено, що оптимізація використання рекламних площ може суттєво підвищити рентабельність Київського метрополітену. Встановлено, що диверсифікація рекламних форматів та впровадження цифрових рекламних носіїв може збільшити прибутковість метрополітену порівняно з традиційними методами. Співпраця з локальними бізнесами для розміщення реклами може збільшити доходи, та посилити зв'язок метрополітену з місцевою громадою. Результати дослідження можуть бути корисними для спеціалістів з фінансів та економіки у сфері громадського транспорту для оптимізації фінансової діяльності підприємства та підвищення ефективності управління ресурсами

**Ключові слова:** інфляція; інвестиції; прибуток; рентабельність; комунальне підприємство



## Business standard as a set of practical tools to improve the economic efficiency of a business association

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**Abstract.** In the modern business environment, business standards are a crucial tool for improving corporate governance and strengthening trust in business associations. However, in Ukraine, their dissemination and implementation are at an early stage, which necessitates a detailed analysis and adaptation of standards to local conditions. The purpose of the present study was to cover the essence of business standards as a set of practical tools, to determine their role in improving the economic efficiency of business associations. The study employed content analysis, the desk research method, the case study method, and the interpretation method. The study found that modern business associations, which are a continuation and development of the idea of cooperation, are created with the purpose of promoting the development of entrepreneurial activity. The introduction of business standards as a set of practical tools is a major factor in improving the economic efficiency of business associations. Standards can take the form of a general code of business ethics, a code of professional conduct, a corporate code, a professional code, a code of interaction, etc., which are applicable in specific areas of activity. The study found that the form and structure of business standards are determined primarily by the characteristics of the business association, its organisational structure, development goals, and strategic vectors of the management. However, in terms of content, they should cover the key principles and provisions that regulate corporate relations in the association. The key components of business standards include a clearly defined mission and development strategy, a transparent management system, financial stability, qualified personnel, an established system for assessing the needs of members, and mechanisms for meeting these needs. The study emphasised that the introduction of business standards can be a powerful tool for strengthening the capacity of business associations in Ukraine. It was substantiated that standards can ensure the stable development of business associations, strengthen their influence on the government, and contribute to the long-term growth of the business environment. The practical significance of the present study lies in the fact that the presented proposals can become the basis for the implementation of business standards and contribute to improving the efficiency of business associations

**Keywords:** cooperation; entrepreneurship; business standards; code of ethics; code of professional conduct; corporate governance

### INTRODUCTION

Global competition requires companies and business associations to continuously improve their processes, increase their productivity and efficiency. Many companies face the problem of inefficient resource management, lack of a clear coordinate system, and unified practices that would enable them to achieve sustainable growth. In this context, the introduction of business standards as a set of practical tools is a crucial factor in improving their economic efficiency.

However, not all business associations are aware of the potential of business standards or have access to clearly formulated and tailored solutions. The absence of a unified model for implementing business standards that accommodates the specifics of multiple industries often leads to inefficient use of these tools, and sometimes even to their underestimation.

Thus, the problem lies in the need to develop approaches and solutions that would demonstrate the practical value

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of business standards for business associations, facilitate their integration into internal processes and serve as a basis for improving economic efficiency. Considering this, it is significant to investigate business standards as tools for improving the economic efficiency of a business association.

In foreign and Ukrainian literature, considerable attention has been paid to the problems of functioning of business associations, development, and implementation of business standards. T.A. Hemphill (2023) noted that the primary reasons for a company to join a business association include “improving reputation and trust in business”, as well as “the availability of quality standards, including codes of ethics” that protect its members and directly affect the legitimacy of the company in society. Analysing the relationship between the code of ethics and the code of conduct of a business association, the researcher recognised that business associations usually adopt either a code of business ethics or a code of conduct, but rarely both standards. An industry code of business ethics is a set of values that reflects the consensus moral views specific to a particular industry. A business association’s code of conduct, based on the industry code of ethics, includes concrete business practices and rules of conduct.

M. Kaptein (2021) considered a business code to be a crucial method of self-regulation of a business association. The researcher covered its content through the following aspects: formal nature – the business code must be approved by the highest governing body of the association to ensure its effectiveness; prescriptive nature – the business code describes not current, but rather desired behaviour (laws, morality, and ethics are key sources of prescriptive behaviour); the business code covers a wide range of issues related to the external and internal environment of the business association (honesty, integrity, respect, compliance with laws, relations with stakeholders, etc.). I. Fedets (2021) stated that a business association is a hub for interaction and dissemination of information, networking, exchange of ideas and knowledge. At the same time, the effectiveness of business membership organisations, their advantages and benefits are facing challenges due to changes in business cooperation models, digital transformation, and other factors.

In Ukraine, the topic of business associations and standards for business associations has been explored to a limited extent, which is explained by their novelty and lack of prevalence. From the perspective of L. Yaremko *et al.* (2021), business associations are the result of economic integration processes arising from the needs of business entities and the possibility of effectively addressing economic and social problems. The researchers noted an increase in the number of enterprises that combine their production facilities, changing the structure of interaction between them. One of the key conclusions of the researchers was that the merger of enterprises enables the creation of so-called clusters – integrated business structures that engage in coordinated activities. These clusters are the result of economic processes that increase production capacity and profitability.

O. Zarichna & V. Zelic (2022) focused on the code of ethics as a separate type of business standards, emphasising that in the context of Ukraine’s European integration, most codes of ethics factor in the United Nations requirements for responsible business conduct, which prescribe the alignment of business strategies with basic principles in areas such as human rights, labour relations, environmental protection, and anti-corruption. Overall, ethical business practices form an integral part of sustainable development and strong relationships with all stakeholders. O.M. Honcharenko (2024), recognising the code of ethics as a valuable means of self-regulation of business entities, fairly noted that the codes of ethics of enterprises should reflect the specific features of their functioning under martial law. Accordingly, the codes of ethics should be amended. They must include provisions prohibiting the conduct of business in Russia or in countries that support it and prohibiting cooperation with business entities of the aggressor state and persons supporting them.

A. Petrova *et al.* (2024) substantiated that ethics not only creates a positive image of companies but also increases competition and trust among consumers and partners. Modern ethical business practices are aimed at achieving a balance between innovation and its impact on society by addressing issues related to data privacy, cybersecurity, social justice, and sustainable development. At the same time, the researchers emphasised that there are no universal binding ethical standards, although the codes of conduct of different companies are comparable.

Considering the global challenges related to transparency, efficiency, and responsibility of business associations, it is becoming increasingly relevant to investigate the role of business standards in corporate governance. Ukrainian business associations face a series of challenges, including a lack of systematic research on the adaptation of international standards to local conditions, insufficient training and methodological support, and a lack of understanding of the benefits of standardisation among market participants (Fedets, 2021). A study of micro, small, and medium-sized enterprises (MSMEs) supported by the United Nations Development Programme (UNDP) also shows strong potential for the implementation of a voluntary standard for business associations, highlighting the need for greater motivation and organisational support. Thus, previous studies have formed the basis for the investigation of business standards, but left considerable room for the development of concrete recommendations that would accommodate the specifics of Ukrainian business associations.

The purpose of the present study was to examine the nature of business standards and substantiate their significance for improving the economic efficiency of business associations. The objectives of the study were to cover the essence of business associations and substantiate their role in improving economic efficiency through interaction between different participants; analyse the theoretical foundations and modern approaches to the use of business standards in corporate governance; identify key

components of business standards that are of practical value for optimising the activities of business associations.

## MATERIALS AND METHODS

The study of the role of business standards as practical tools for improving the economic efficiency of business associations employed a comprehensive approach that combined both qualitative and quantitative methods of analysis. One of the key tools of this study was content analysis, which was employed to investigate the Voluntary Standard for Business Associations in Ukraine (associations of micro, small, and medium-sized enterprises) (Voluntary Standard, 2024) to identify its individual components. The desk research method was applied to analyse scientific publications and documents related to the research topic (Introduction of business conduct standards, 2019; Fedets, 2021). The use of the case study method helped to provide concrete examples of Ukrainian business associations and business standards. The method of interpreting and comparing different perspectives on business associations and business standards offered a better understanding of the subject matter, while comparison of the opinions of other authors helped to identify key points for further conclusions.

The source base of the study included materials of modern Ukrainian and foreign studies, the findings of which were presented in scientific literature, periodicals, and information resources on the Internet, including information from the websites of individual business associations: All-Ukrainian agrarian forum (n.d.); Inter-industry association “Ukrteplokomunenergo” (n.d.); Ukrcement (n.d.). The study examined the content and structure of the Code of Business Conduct of the Ukrainian Agribusiness Club (Ukrainian agribusiness club, n.d.) and the Code of Ethics of the Ukrainian Chamber of Commerce and Industry (Code of Ethics of the Ukrainian Chamber of Commerce and Industry, n.d.).

The study employed the findings of the online survey “Do Ukrainian Business Associations Need a Voluntary Standard to Regulate Their Activities?” (Strykun, 2024), conducted by the National Platform for Small and Medium-sized Businesses (SMEs) within the framework of the UNDP project “Strengthening MSMEs’ Membership Business Associations in Ukraine” from 24 September to 4 October 2024. The survey involved 44 respondents representing 41 business associations. The survey results were used to assess the prospects for the development and implementation of the Voluntary Standard for Business Associations in Ukraine.

## RESULTS AND DISCUSSION

Cooperation has always been a valuable form of economic activity that brings people and organisations together to achieve collective goals and meet consumer needs. It involves joint actions aimed at efficient use of resources and sustainable development through interaction and support. The idea of creating cooperatives is based on the recognition that individuals or groups facing the same economic

and social challenges can achieve much better outcomes if they work together. In this case, success is achieved not through outside help, but through the pooling of their own resources, the development of initiative, coordinated actions, and strict adherence to the established rules of joint activities (Malik, 2023). Modern business associations are a logical continuation and development of this idea.

Business associations are organisations created to promote the development of entrepreneurial activity (Dmytrenko, 2025). They create a platform for businesses to unite to strengthen their competitive position, jointly address economic challenges, and grow in the market. Analogous to cooperation, which provides benefits through joint work and resource sharing, business associations create conditions for the mutual benefit of its members through concerted action and effective cooperation. Every tenth business in Ukraine is a member of at least one business association. Business associations are more likely to be comprised of large and medium-sized enterprises, as well as enterprises engaged in export and import activities, and less likely to be comprised of micro and small businesses and those not engaged in export and import activities (Fedets, 2021).

Business associations can exist in the form of public associations (NGOs, public unions), industry associations, clusters, business clubs, chambers of commerce, or other associations of entrepreneurs. In Ukraine, the oldest business associations include the Association of Cement Producers of Ukraine (Ukrcement) and the Inter-sectoral Association for the Development of Heat Supply Systems (Ukrteplokomunenergo). The Association of Cement Producers of Ukraine unites enterprises and organisations of the cement and asbestos cement industries. Its mission is to protect the interests of Ukrainian clinker and cement producers, as well as to represent the views of its members on industry issues (Ukrcement, n.d.). The Ukrteplokomunenergo Intersectoral Association is a voluntary association of heat generating, heat transporting, and heat service organisations, production, research, design, and repair companies. The purpose of the association is to coordinate their activities to address the issues of energy supply to Ukrainian settlements (Inter-industry association “Ukrteplokomunenergo”, n.d.).

The Chamber of Commerce and Industry of Ukraine (CCI of Ukraine) is a non-governmental, non-profit, self-governing organisation that brings together legal entities, individual entrepreneurs, and their associations on a voluntary basis. The CCI of Ukraine provides legal aid and information support to help businesses grow, adapt to market changes, and interact effectively with international partners. The CCI provides advisory services on foreign trade, market assessment and business strategy development; conducts independent quality and compliance assessment of goods; valuation of movable and immovable property; organises exhibitions, conferences, and seminars, etc.

Business associations also include NGOs, including the All-Ukrainian Agrarian Forum, the National Platform for Small and Medium Business, the Ukrainian Business

Council Foundation, etc. For instance, the All-Ukrainian Agrarian Forum unites the Agrarian Union of Ukraine, the All-Ukrainian Agrarian Council, the All-Ukrainian Association of Village and Settlement Councils, the All-Ukrainian NGO Ukrainian Agrarian Confederation, and the Ukrainian Agribusiness Club Association. The purpose of this public union is to protect the interests of its member organisations and their partners, promote the development of effective communication skills, defend common interests at various levels, and cooperate constructively with international agrarian associations (All-Ukrainian agrarian forum, n.d.). The Ukrainian Agribusiness Club unites over 200 leading agribusinesses in Ukraine, promoting the development of agribusiness by providing information support, solving practical problems, and improving agricultural policy. It is actively engaged in attracting investments, improving the efficiency of enterprises, as well as informing its members about changes in legislation and organising training programmes for employees of agricultural companies (Ukrainian agribusiness club, n.d.).

Information on the legal form of a business association helps potential members to better understand the content of its activities. For instance, membership in a business club will provide an opportunity to establish business connections or receive training that is useful for business development. Participation in a chamber of commerce and industry will provide support on export issues or customs procedures. In EU countries, business associations are the key tool for influencing economic policy. In Ukraine, the war has brought substantial changes to the operations of many companies, but it has also opened opportunities for business transformation. In these circumstances, business associations must become real agents of change. Only by joining forces can conditions be created for business development in Ukraine, even in the most turbulent times (Dmytrenko, 2025).

A prominent element of the success of business associations is the introduction of business standards – a set of practical tools that streamline processes, minimise risks, and help achieve economic efficiency. Just as cooperation once provided the foundation for building trust and coordination among its members, business standards now provide a framework that helps integrate best practices into business processes, increasing their efficiency and productivity (Zinovchuk, 2019).

Business standards or business standards are norms developed and voluntarily adopted by all participants in

an industry or sector of the economy to create a healthy business culture and increase consumer confidence. These standards can take the form of general codes of business ethics or industry-specific codes of professional conduct. Business standards define the rules for conducting business and interacting with consumers (Introduction of business conduct standards, 2019).

Business standards can be referred to in different ways: code of professional ethics, professional code, code of business ethics, code of conduct, code of interaction, corporate code, etc. The crucial task of business standards is to set priorities for target groups and ways to reconcile their interests. Business involves economic relations between many stakeholders: customers, employees, shareholders, suppliers, competitors, government, etc., and the root cause of ethical problems in business is the conflicting interests of these stakeholder groups (Pigosh, 2020).

As an example, the Code of Business Conduct of the Ukrainian Agribusiness Club Association, which defines the basic ethical standards for all its members. The Code promotes socially responsible and efficient operations in the Ukrainian agricultural market. According to the Code, the members of the Association shall strictly follow the legislation of Ukraine; respect the rights of counterparties and competitors, guided by the principles of equality and good faith; support fair competition; fulfil obligations on time and in full; build relationships on trust and maintain their reputation; understand the importance of a positive business reputation; and promote effective interaction with the authorities. Violation of the Code damages the reputation and purpose of the Association and therefore is grounds for expulsion from it (Ukrainian agribusiness club, 2025).

The UCCI Code of Ethics is based on core values and principles, defines standards of activity and rules of conduct for employees. Structurally, the Code of Ethics includes the following components: mission and vision; principles of activity; values; confidentiality; anti-corruption; countering the financing of terrorism; workplace safety; environment; communications on behalf of the UCCI; documentation and information management; cost management; image of the UCCI; conflict of interest; unacceptable actions; liability for violations (Code of Ethics of the Ukrainian Chamber of Commerce and Industry, n.d.). Table 1 presents the components of the Voluntary Standard for Business Associations in Ukraine (associations of micro, small, and medium-sized enterprises) to assess the level of their institutional development.

**Table 1.** Components of the Voluntary Standard for Business Associations in Ukraine

Components of the Voluntary Standard	Contents
Organisational capability	An optimal organisational structure that corresponds to the scale of the business and the level of development of the business association; transparent and democratic management procedures
Services and activities	Ability to meet the needs of participants through the provision of quality services
Membership and representativeness	A policy that ensures that the benefits of membership are available to all members

Table 1. Continued

Components of the Voluntary Standard	Contents
External communications	Interaction with business, government agencies, and the public
Transparency and accountability	Openness of the association's operational and financial activities, accountability to its members and accessibility to the public

Source: developed by the author of this study based on Voluntary Standard (2024)

These components may have a varying priority for individual business associations, depending on their type, orientation, and scale of activity. Each of these components has a set of criteria for compliance with the standard. Thus, the form and structure of business standards depend primarily on the specifics of the business association, its organisational structure, development goals, and strategic orientations of its management. However, in terms of content, they must include the fundamental principles and provisions that regulate corporate relations in the association: shareholder policy, ways to resolve conflicts of interest, approach to employees, social responsibility of the business

association to society, as well as the obligation to follow safety and environmental standards (Harun & Matyukh, 2018).

Business associations use the principles of cooperation to organise joint activities, while business standards serve as a tool to streamline these activities and make them more efficient. They contribute to the creation of a harmonious environment where companies and organisations can cooperate, preserving their individuality, but at the same time working according to general rules to achieve shared economic goals. In practice, it is standards that help to transform a business association into a more efficient and focused structure (Fig. 1).

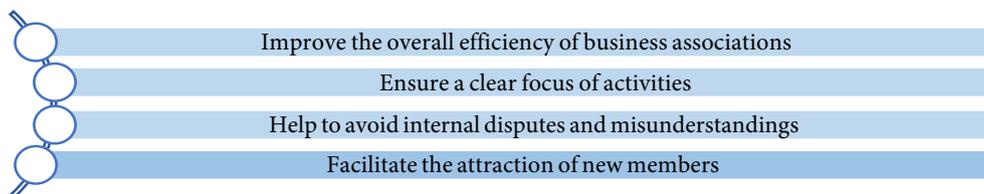


Figure 1. Factors indicating the feasibility of using business standards

Source: developed by the author of this study

Clearly established rules and procedures allow focusing on key objectives, reducing the risk of deviations in work, and ensuring consistency in the execution of tasks. As a result, the quality of services and products offered by the members of the association is greatly improved, which increases the trust of customers, partners, and investors. One of the key advantages of business standards is the ability to prevent internal conflicts that often arise in complex associations. Unified approaches to the distribution of responsibilities, use of resources, and decision-making create a transparent system of interaction between participants. This promotes harmonious work within the association, minimises tensions, and ensures stability.

Furthermore, standards make an association more attractive to new members. Clear and effective rules that have already proven themselves in practice create a sense of

orderliness and reliability. This motivates other businesses or organisations to join the association, as they see it not only as a growth opportunity, but also as an opportunity to work within a system that guarantees stability and support. The creation and consolidation of a standard is a multi-stage and complex process, as it requires close cooperation, strategic planning, and a pronounced level of trust between all participants (Fig. 2).

The first step is to involve business representatives of a particular industry or region in the development of the standard. Their participation is not merely desirable, but necessary, as they are the ones who best understand the specifics of their industry, its main challenges and real needs. This approach will ensure that the standard developed will be as adapted to the realities as possible and useful for business stakeholders.



Figure 2. Stages of business standard development and implementation

Source: developed by the author of this study

For a standard to be effective, it is vital to clearly set out its principles and functions in relevant documents. This includes the development of internal policies, rules, and procedures that underlie its implementation in business associations. Documentation of the standard guarantees its transparency and provides clear guidelines for participants seeking to follow it. The introduction of business standards and their compliance by all market participants involves the use of a self-regulatory mechanism. A business association independently develops, implements, and monitors the implementation of a document that defines the rules of business ethics or professional behaviour (Introduction of business conduct standards, 2019).

A prominent role in the establishment of a self-regulatory system is played by identifying a leader or body that will take responsibility for the development of the standard. Such an organisation or entity must have credibility and trust among industry participants, as it will coordinate the process, develop compliance criteria, and confirm compliance. Trust in the leader is a key aspect, as without it, business associations will not be ready to adopt the standard and adapt their activities to its requirements.

The development of a standard begins with a detailed analysis of the preconditions, which helps to identify the key challenges and opportunities for an industry or region. At this stage, an understanding of the need to implement the standard is developed, which motivates participants to join forces to collaborate on the development of the standard. This is followed by the actual development of the standard, which accommodates the interests of all stakeholders and defines the basic principles, rules, and procedures that will form its basis.

Once developed, the standard moves to the implementation stage. At this stage, the members adapt to the new rules, and their activities are checked for compliance with the established requirements. Communication with all stakeholders plays a special role in this process, ensuring transparency of all stages, making it possible to clearly explain the benefits of the standard and facilitating the involvement of new members in the process. The development and consolidation of a standard is not only a technical task, but also a socio-economic process that helps build trust, improve the efficiency of business associations, and create a new culture of interaction in the business environment.

The process of joining a business standard depends on many factors and involves understanding the needs and identifying areas for improvement. For each business association, this process begins with an analysis of its individual operations, identification of weaknesses, and an understanding of how the implementation of a standard can help solve their concrete problems or improve efficiency. For example, a standard can help to optimise internal processes, improve service quality, strengthen governance mechanisms, or facilitate better coordination between the association's members.

It is vital to understand that standards are not limited to governance aspects. They are a marker of leadership and

a demonstration of an organisation's willingness to take responsibility for its activities by following certain rules and principles. Strict standards indicate the maturity of an association and its commitment to achieving long-term results. Adherence to the standard is evidence that the organisation is ready not only to integrate best practices but also to work on its own improvement, contributing to the overall development of the entire business environment. The standard is voluntary for business associations. No organisation is obliged to join it until it reaches a certain level of maturity, when the need for standardisation becomes apparent. At a certain stage of development, a business or association begins to realise that further growth requires a clear system of rules and procedures that will allow it to coordinate its activities more effectively, attract new members, and increase competitiveness (Introduction of business conduct standards, 2019).

The basis for the successful functioning of business associations is to guarantee their independence from the influence of large enterprises that are members of the association or its founders. This ensures equality, when each member, regardless of the size of its contribution, enjoys the same right to take part in decision-making. It is critical to prevent situations where members who have made a larger financial contribution try to monopolise management and use the association in their personal interests. For this, it is necessary to introduce effective checks and balances. For example, the formation of an executive committee that includes representatives of both large and small enterprises, with regular rotation. Furthermore, annual voting at general meetings, such as the General Assembly or other forums of participants, enables democratic governance and consideration of everyone's position.

At the same time, the standard sets certain boundaries by dividing business associations into those that meet certain criteria ("good") and those that have yet to meet these criteria ("conditionally bad"). However, the task of business associations and the standard as a tool is not to cut off initiatives or block the development of individual business units, but rather to stimulate grassroots initiatives and facilitate their gradual rise to the level of institutional capacity. It is essential to provide new and weaker players with clear guidelines that will help them grow stronger year after year. These serve as "beacons" that show what works and what does not, where progress has been made and where more effort is required. This approach creates the conditions under which all members of the association can develop in line with their potential. This positively affects the overall dynamics, as strengthening weaker members contributes to stability, increases representativeness, and supports the sustainable development of the entire business environment. In this context, a business standard plays the role of not only a regulatory tool, but also a means of motivation and support aimed at the long-term efficiency and success of business associations (Voluntary Standard, 2024).

Another vital condition for the effective functioning of the standard is the availability of clear mechanisms to

confirm compliance with the established requirements. The standard itself, even if it is carefully crafted, will stay only a formal document if it does not provide tools for verifying and monitoring compliance. This means that an internal policy should be developed that clearly outlines the rules, criteria, and procedures that help determine whether an organisation is compliant with the standards. Without such an approach, any assessments can be subjective, which will greatly complicate the verification process and create room for misunderstandings or even manipulation.

The mechanism for monitoring compliance with the standard is a key element to ensure its effectiveness and trust on the part of participants. First of all, it is crucial to determine the approach that will be used to assess compliance. One option is the self-regulation model, when organisations independently assess their activities according to the established criteria. Such an approach will be effective if there is trust between the members of the business association and a strong level of responsibility. Another mechanism is the involvement of a collegial body or an independent organisation that assumes the

control function. This helps to ensure the objectivity and transparency of the process. Such structures can act as accreditation organisations, assessing the compliance of participants with the standard, and confirming their status within the business network. Independent control not only strengthens the credibility of the standard but also creates further incentives for organisations to follow the established norms.

The procedure for assessing compliance with the standard should include both quantitative and qualitative indicators. Quantitative indicators help to accurately measure the organisation’s achievement of the established requirements, such as the volume of completed projects or financial transparency. Qualitative indicators help to assess compliance with ethical principles, the quality of governance, or the level of satisfaction of clients or members. A balanced combination of these indicators ensures a comprehensive assessment of an organisation’s compliance with the business standard. Table 2 presents the quantitative and qualitative indicators that can be used to assess the compliance of a business association with the standard.

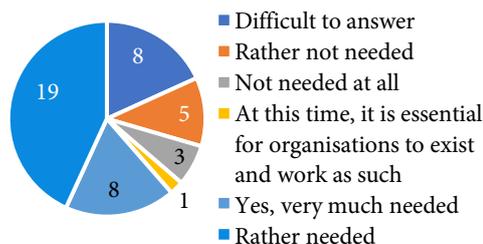
**Table 2.** Quantitative and qualitative indicators for assessing compliance with the business standard

Quantitative indicators	Qualitative indicators
Total revenue of an organisation for a certain period	Assessment of employees’ professional knowledge and attitude towards their duties
Indicator of the efficiency of the use of an organisation’s assets, calculated as the ratio of gross income to average assets	Average time spent on processing customer requests
Assessment of stakeholder access to financial and other reports	Assessment of the compliance of the organisation and its employees with the established ethical standards
Number of successfully completed projects over a certain period	Assessment of the quality of service provided to customers based on a survey or feedback

Source: developed by the author of this study

Furthermore, effective control involves an accreditation system, where a higher-level organisation recognises those who meet the standards. Participants who pass the accreditation procedure receive official confirmation of their compliance, which gives them the opportunity to join the general network and enjoy its benefits. This not only raises the prestige of the organisation but also creates an environment for mutual learning and experience exchange.

While business standards are not yet widespread in Ukraine, the process of their implementation has already begun to gain momentum, and this can be considered a major step towards improving the governance of business associations. The results of an online survey conducted by the National SME Platform within the framework of the UNDP project “Strengthening MSMEs’ Membership Business Associations in Ukraine” (Strykun, 2024) revealed that respondents’ opinions were divided on the issue of readiness to implement the standards, but most of them believed that this standard is necessary for Ukraine, and most business associations were ready to implement it (Fig. 3). Overall, the survey showed a strong interest in the idea of developing a standard, although there were certain concerns and challenges related to its implementation.



**Figure 3.** Readiness to implement the standard

Note: the figures in the graph reflect the number of respondents who took part in an online survey conducted within the framework of the UNDP project “Strengthening MSMEs’ Membership Business Associations in Ukraine”

Source: developed by the author of this study based on the online survey conducted by H. Strykun (2024)

When analysing the survey results in terms of the components of the business associations’ performance standard, the participants paid the most attention to the strategic vision and management efficiency. The highest score among all the criteria was given to the need for a clearly defined mission, a vision of the future, a developed and adopted

development strategy, and a clear positioning of the business association – 2.60 points. This underlines the significance of a focused approach to planning and operation, which ensures clarity in defining goals and ways to achieve them. A pronounced level of significance was also given to a well-established system for studying the needs of the organisation's members and assessing their satisfaction. This criterion, as well as the need to have qualified staff, clearly defined employee functions and an effective HR management system, received the same score of 2.55 points. This suggests that high-quality internal organisation and focus on the needs of business associations' members are key factors in their successful operations.

At the same time, the lowest scores were given to issues related to financial sustainability and representativeness. For instance, the representativeness of business associations in terms of industry or territory received only 2.10 points. The issue of diversified and predictable sources of income, i.e., fundraising, was rated at 2.21 points. The approved budget and mechanisms to ensure its stability received a slightly higher, but still low score of 2.26. This indicated that even though financial sustainability and representativeness were significant aspects, they were not perceived as priorities in the development of business associations. The survey findings confirmed that for entrepreneurs to maximise their potential, effective platforms for cooperation, exchange of practices, and protection of interests must be created. This is exactly the role of business associations.

The findings of the present study were consistent with the findings of Ukrainian and foreign researchers. The opinion of P.S. Sinehub (2022) on the role of business communities as cross-sectoral associations that include representatives of small, medium, and large businesses is valuable for understanding how business associations contribute to improving economic efficiency and sustainability of business activities. The researcher emphasised that such associations not only protect the rights of their members but also help to establish effective communication between entrepreneurs and government agencies, which contributes to the creation of favourable conditions for doing business. This is crucial in a time of rapidly changing legislation and economic instability. One of the key advantages highlighted by P.S. Sinehub was the reduction of risks by sharing them among the members in a large project, which allows each business to reduce individual liability and gain access to larger, more complex projects that open opportunities for faster time to market and higher returns. Such diversification enables companies with different resources and strategic goals to create joint products or services that help attract a larger audience and create economic synergies. However, in such circumstances, each member sacrifices some autonomy, as decision-making often requires coordination with other partners.

Considering the activities of business associations in the context of self-regulation, the researcher emphasised that this involves the establishment of formalised "rules of the game" for participants in a concrete market

segment, including sanctions for violation of these rules, mechanisms for resolving conflicts between market participants, which to some extent limit the freedom of economic agents. The researcher interpreted formalised rules to mean rules prescribed in an official document. This is significant because formalising the rules helps to ensure a level playing field for all participants and reduces the possibility of unfair competition. Establishing such rules helps to create a transparent business environment, which is a major factor in attracting new members to a business association and ensures stability in the market. However, self-regulation may impose certain restrictions on the freedom of economic agents. Established rules, sanctions, and conflict resolution mechanisms can limit the scope for innovation and flexibility in business management. Businesses, especially small businesses, may feel pressure to follow strict rules, which may reduce their ability to adapt to market changes or new opportunities. Thus, while P.S. Sinehub (2022) emphasised the considerable benefits of business associations in reducing risks and improving access to new opportunities, the balance between self-regulation and freedom of economic agents is critical to maintaining innovation and adaptability in a competitive market.

The position of O.Yu. Vinnikov (2017) on non-profit business associations as an effective tool for implementing joint efforts of small and medium-sized enterprises deserves attention, as the researcher emphasised the value of cooperation in a competitive market. The distinction between various legal forms of non-profit business associations, such as public organisations, chambers of commerce and industry, associations and self-regulatory organisations, offered insight into their breadth and diversity. Each of them has its unique specifics and areas of activity, but they all have a shared purpose – to protect the rights and freedoms of their members and ensure favourable conditions for doing business. However, considering the non-profit nature of these business associations, the question of their effectiveness may arise. In this regard, one of the principal tasks of such associations is to find and use alternative mechanisms to attract resources and support members. The researcher interpreted the purpose of business associations as ensuring effective protection of the economic and social interests of their members. This is a crucial aspect, as small and medium-sized businesses often face problems related to high tax rates, complex bureaucracy, or insufficient support from the state. In business associations, entrepreneurs can receive legal support, lobby for their interests at the government level, and share experiences and resources, which greatly reduces individual risks and helps achieve collective goals.

U. Berezhnyska (2021) examined business associations in the context of supporting and developing small and medium-sized enterprises. The researcher conditionally grouped SME support institutions into five main types: entrepreneurship support funds, business innovation centres, business centres, business incubators, and associations of entrepreneurs. This categorisation allows clearly outlining the variety of instruments used to promote

entrepreneurship, each of which has its specific functions. However, it is worth focusing on the role of business associations, which include associations, unions, alliances, advisory and coordination councils, and clusters. According to the researcher, they contribute to lobbying for business interests, the development of certain industries and activities, and organise educational events that help raise awareness of entrepreneurs. The researcher noted that lobbying for business interests at the level of government agencies is a valuable mechanism for small and medium-sized enterprises. In this case, business associations act as a kind of intermediary between government agencies and business, trying to influence the creation of more favourable conditions for doing business. In terms of the significance of developing certain sectors of the economy, business associations can become centres for the development of innovative ideas and contribute to the creation of new markets. The role of associations and unions is essential in this process, as they can mobilise the resources of their members to solve shared problems, such as access to the latest technologies or funding for innovative projects. The educational activities of business associations also have immense potential to improve the level of entrepreneurship development. Organising trainings, seminars, consultations, and other educational events can help improve the skills of business association members, which helps them run their business more efficiently, optimise processes, mitigate risks, and take advantage of new opportunities for growth. However, apart from the positive aspects, there are certain challenges for business associations. For instance, coordination between multiple members of the associations can be complicated, as each business has its unique needs and strategic goals. It is vital for business associations to find ways to balance the interests of large and small businesses, and to promote the creation of conditions for cooperation between different sectors of the economy.

O. Dmytrenko (2024) identified the reasons for the creation of business associations: elevated levels of bureaucracy, corruption, complex tax regulation, and insufficient support for micro, small, and medium-sized businesses. The researcher concluded that in such conditions, an individual entrepreneur cannot influence systemic change, while business associations have a better chance of developing entrepreneurship, as compared to companies operating alone, business association members have access to education and information, joint implementation of large projects, a network of contacts, up-to-date information on grants and support, advocacy, collective protection, apparent marketing advantages, and mentoring. While the present study also discussed the undoubted benefits of business associations, there is also a risk that they may create barriers for entrepreneurs who are not members of a business association, which could limit competition and market development.

The principles of self-regulation defined by A.O. Soshnikov (2024) are another notable aspect of business associations. The researcher investigated business associations as self-regulatory systems. According to A.O. Soshnikov,

self-regulation as a form of management and self-control of business associations reduces administrative pressure on business and contributes to raising the standards of business activity and protecting the interests of consumers. Voluntary self-regulation is an indicator of the maturity of companies that are ready to unite and take on extra obligations. Such self-regulatory business communities form long-term cooperative relationships aimed at continuous improvement of products, their personal production and management processes, and can establish formalised rules for regulating their activities. However, self-regulation can limit the freedom of economic agents, which can be challenging for those used to working autonomously. Still, self-regulation allows raising business standards and reducing administrative pressure on companies, which is crucial in countries with an elevated level of bureaucracy.

A.O. Soshnikov (2024) and A. Avrampou *et al.* (2019) also examined the factors that led to the readiness of modern business to merge both within and between industries: various external challenges and threats, and a rethinking of the role of business in society. The researchers emphasised that one of the key tasks of a business association is to develop and implement uniform standards and rules, and to monitor their compliance by all members of the association. Business standards (rules of professional conduct, codes of ethics, and other acts) determine the general trajectory of the business and apply to the activities of all members of the business association. When developing rules of professional ethics in certain areas or industries, the researchers proposed to use the principles and rules of corporate social responsibility (CSR), which must consider the principles of responsible business and sustainable development. W.J. Donohoe (2017) and F. Rosati & L.G.D. Faria (2019) also highlighted the significance of implementing sustainable development strategies and creating value for all stakeholders. The opinion of the above-mentioned researchers that the CSR institution and sustainable development are critical elements of modern corporate ethics is notable. Reflection of CSR principles in business standards contributes not only to improving management efficiency, but also to business development overall, allowing business associations to be more sensitive to social and environmental requirements. This is also in line with the general trends of sustainable development that are actively gaining popularity.

It is worth addressing the opinion of S.M. Byars & K. Stanberry (2018) on the role of compliance with business ethics standards to reduce the risks of illegal activities. The researchers correctly pointed out that compliance with ethical standards helps to minimise the risks associated with illegal activities, including bribery, embezzlement, and fraud. Transparent and clearly defined ethical standards help to avoid such situations, creating a basis for honest and trustful interaction with all stakeholders. Furthermore, the researchers emphasised that compliance with corporate codes of ethics helps to build trust between the company, its partners, and consumers. The introduction of clear ethical principles and their adherence builds consumer

confidence in a business association, which contributes to more stable and long-term partnerships and increased customer loyalty. In terms of investment attractiveness, adherence to strict ethical standards is a valuable indicator for potential investors. Companies that adhere to ethical standards reduce investment risks and demonstrate their readiness to conduct business transparently. Investors are often looking for stability, minimisation of possible legal problems, and reliability of partners, with ethical standards being a crucial factor in attracting investment in this context. Overall, the opinion of S.M. Byars & K. Stanberry is logical and convincing: compliance with business ethics standards not only helps to avoid negative legal and financial consequences, but also contributes to the stable development of the company and the formation of trust on the part of partners and consumers, which positively influences its investment attractiveness.

M. Babri *et al.* (2019) analysed the evolution and trends in research on codes of ethics for 2005-2016, proving to be a valuable study, as codes of ethics have become an integral part of modern corporate governance and business practices. The researchers analysed changes in approaches to the investigation of this issue, reflecting global transformations in the business environment, and considered new areas that were relevant during this period. One of the key trends noted by the researchers is a change in the methods of researching codes of ethics. Whereas previously most studies were focused on legal or formal analysis, after 2005 they were more focused on the impact of codes on employee behaviour, company culture, and ethical standards. This meant that research approaches were shifting from the theoretical to the practical level, with an emphasis on real business processes and the application of ethical standards in the daily operations of companies. The researchers considered new areas relevant to the subject under study, aspects of the impact of codes of ethics on decision-making in the context of ethical dilemmas and social and cultural challenges faced by companies. Considerable attention was also paid to the methods of implementing codes of ethics. Whereas previously it was sufficient to formally introduce such a document, the effectiveness of codes of ethics now largely depends on how they are implemented in the organisational culture, whether there are control mechanisms and whether there is a constant dialogue between management and employees on ethical standards.

Thus, the conducted study confirmed that the introduction of business standards in the activities of business associations is an essential tool for increasing their economic efficiency and competitiveness, which helps to optimise internal processes, improve resource management, increase transparency, and build trust among consumers.

### CONCLUSIONS

The conducted study performed a comprehensive analysis of theoretical foundations and modern approaches to implementation of business standards by business associations. The study confirmed that business standards

are a valuable tool for optimising management processes and improving the efficiency of business associations. Their application helps not only to improve internal organisation but also to strengthen the trust in associations on the part of entrepreneurs, government agencies, and consumers. The key components of business standards that are of practical value to business associations include a clearly defined mission and development strategy, clear positioning, a system for studying the needs of members, transparent financial management, and a well-established performance evaluation system. The form and structure of business standards mainly depend on the specifics of the business association, its organisational structure, development goals, and the management's vision of the business association's development strategy.

The development and implementation of a standard includes the following stages: assessment of the initial conditions, awareness of the need for a standard, development of the standard itself, and interaction with stakeholders. Implementation of business standards and ensuring their compliance by all market participants involves the use of a self-regulatory mechanism, whereby a business association independently develops, implements, and monitors compliance with the established standards. Of particular value is the mechanism for confirming compliance with the standard, which must be based on objective and transparent criteria and accommodate the specifics of each organisation's activities. Business standards have not yet become widespread in Ukraine, but the process of their implementation is already intensifying. An analysis of the results of a survey conducted by the National SME Platform revealed that most respondents were ready to implement such standards. The key components of the standard included strategic planning and management effectiveness, along with a well-established system for studying the needs of members of organisations and assessing the level of their satisfaction.

Thus, business associations in Ukraine have a strong potential to increase economic efficiency through interaction between multiple participants and the implementation of clear standards and ethical norms. Joint activities within such associations help to reduce risks, improve communication with government agencies, and ensure sustainable conditions for business development, which is crucial in crises. Further research should focus on the long-term effects of business standards and identify specific factors that influence the success of their adaptation in various cultural and economic contexts.

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None.

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## Бізнес-стандарт як набір практичних інструментів для підвищення економічної ефективності бізнес-об'єднання

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**Анотація.** У сучасних умовах розвитку підприємництва бізнес-стандарти є важливим інструментом підвищення ефективності корпоративного управління та зміцнення довіри до бізнес-об'єднань. Проте в Україні їх поширення та впровадження перебувають на початковій стадії, що зумовлює необхідність детального аналізу й адаптації стандартів до місцевих умов. Мета дослідження полягала у розкритті сутності бізнес-стандартів як набору практичних інструментів, визначення їх ролі у підвищенні економічної ефективності бізнес-об'єднань. У статті використано контент-аналіз, метод Desk research, метод Case study, метод інтерпретації. Встановлено, що сучасні бізнес-об'єднання, які є продовженням і розвитком ідеї кооперації, створюються з метою сприяння розвитку підприємницької діяльності. Впровадження бізнес-стандартів, як набору практичних інструментів, є важливим чинником підвищення економічної ефективності бізнес-об'єднань. Стандарти можуть існувати у вигляді загального кодексу ділової етики, кодексу професійної поведінки, корпоративного кодексу, професійного кодексу, кодексу взаємодії та ін., що діють в окремих сферах діяльності. Дослідження виявило, що форма і структура бізнес-стандартів визначаються, в першу чергу, характеристиками бізнес-об'єднання, його організаційною структурою, цілями розвитку та стратегічними напрямками діяльності керівництва. Однак, з точки зору змісту, вони повинні охоплювати ключові принципи та положення, які виконують роль регулювання корпоративних відносин в об'єднанні. Ключовими компонентами бізнес-стандартів є: чітко визначена місія та стратегія розвитку, прозора система управління, фінансова стабільність, кваліфікований персонал, налагоджена система оцінювання потреб членів і механізми задоволення цих потреб. Акцентовано увагу, що впровадження бізнес-стандартів може стати потужним інструментом для зміцнення спроможності бізнес-об'єднань в Україні. Обґрунтовано, що такі стандарти здатні забезпечити стабільний розвиток бізнес-об'єднань, посилити їхній вплив на владу, сприяти довготривалому зростанню бізнес-середовища. Практичне значення дослідження полягає в тому, що пропозиції автора можуть стати основою для впровадження бізнес-стандартів, сприяти підвищенню ефективності бізнес-об'єднань.

**Ключові слова:** кооперація; підприємництво; стандарти ведення бізнесу; кодекс етики; кодекс професійної поведінки; корпоративне управління



## Publishing business VS the Internet: How has the World Wide Web affected the economics and marketing of printing companies?

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**Abstract.** The relevance of the topic is due to the influence of the Internet on all spheres of life and business, which requires printing enterprises to adapt their economic and marketing processes to modern realities. The aim of the work was to study the impact of the Internet on the economy and marketing of printing industry enterprises in the context of general digitalisation and popularisation of electronic publications. The theoretical basis of the study were scientific works of Ukrainian and foreign scientists-theorists in the study of adaptation processes of printing enterprises to the new information environment, and the main scientific methods – the method of system analysis, strategic planning (SWOT-analysis), updating and periodisation. The results of scientific work were the assessment of the degree of influence of the World Wide Web on the activities of printing enterprises in the context of assessing their economic and marketing indicators, as well as finding potential ways of development of the printing industry of Ukraine through the integration of publishing and printing enterprises in the Internet environment, as well as attracting attention and updating the study of the current issue. The significance of the results obtained is presented in highlighting the prospects of development of the publishing and printing industry of Ukraine due to the process of integration and the need for interaction of printing enterprises with electronic tools of communication within the framework of the World Wide Web. The study demonstrated that despite the crisis phenomena caused by the Internet, the printing industry of Ukraine retains significant potential for further development due to the integration of digital technologies. The introduction of innovative production systems, such as Industry 4.0, and the active use of Internet marketing to expand advertising opportunities and increase the competitiveness of enterprises are suggested as ways of modernisation. The results of the study can serve as a basis for the development of new business models adapted to the conditions of the digital market

**Keywords:** Internet marketing; printing industry; economic efficiency; digital transformation; innovative printing technologies

### INTRODUCTION

The relevance of the study of the impact of the World Wide Web on the economics and marketing of printing enterprises is due to the global changes that have occurred as a result of digitalisation and the introduction of Internet technologies. With the rapid growth of the online space, business

models based on traditional methods are no longer able to compete without the introduction of modern Internet innovations. Printing companies are faced with the need to adapt their marketing strategies to remain competitive and meet the needs of the digital market. The decreasing

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demand for printed publications and the growth of electronic communication between producers and consumers requires a rethinking of the ways of promotion and interaction with customers. Thus, the study of the mechanisms of the Internet's impact on the printing industry is crucial for determining further strategies for the industry's development in the context of digital transformation.

Studying the issue of the impact of digital technologies on printing enterprises, researcher O. Shapovalov (2024), noted the decline in demand for printed publications. The crisis of the publishing and printing industry caused by the spread of the Internet is also noted by Kh.B. Kulchytska & M.R. Semeniv (2023), emphasising that there is a tendency of decline in the volume of printed matter and also noting the decrease in the number of printing companies. The global situation caused by the worldwide coronavirus pandemic has also led to a shift in consumer engagement in favour of the Internet and online businesses. Researchers G. Gamprellis *et al.* (2021) observed that there is a downward trend in the number of printed books and newspaper publications. However, at the same time, there is a significant growth in the areas of printing of advertising materials, packaging, and labels as the number of products on the market is increasing all the time. Ya.V. Bruyaka (2024) focused her study on the problems associated with the lack of development of digital competencies of workers in the printing industry. The researcher came to the conclusion that it is informal education (courses, trainings, seminars, webinars, masterclasses) of printing specialists that plays an important role in modern conditions, as it is the most accessible to the public and can provide an increase in their level of knowledge in short terms. A. Kvasko & O. Sukhorukova (2023) described the trends of the modern printing sphere. The researchers were able to establish that in 2022-2023, there is a decrease in the volume of printed publishing products, namely newspapers and magazines, the number of electronic copies increases, which contributes to the reduction of the operating cycle, as well as reducing the costs of the enterprise.

Many researchers insist on the need to change the marketing strategies of enterprises in the publishing and printing industry. Thus, in her research paper, E. Kasumova (2020) insisted that the marketing strategy of printing enterprises in Ukraine should introduce mechanisms of systematic electronic marketing, using such tools as contextual advertising on the Internet, SEO-promotion (Search Engine Optimisation – a mechanism of website promotion, with its optimisation for search engines) and SMM-promotion (Social Media Marketing – marketing promotion in social networks). The mechanisms used by Ukrainian printing enterprises are somewhat outdated, which leads to even greater lagging behind publishing and printing companies from the rapidly developing Internet and electronic publications. The printing business needs to adapt to new realities by mastering new technologies and finding ways to integrate print and electronic communications.

The purpose of the research work was to study the mechanisms of influence of the World Wide Web on the

economy and marketing of printing enterprises. The novelty of the research work is the coverage of the topic of the process of integration and interaction of publishing and printing enterprises with the processes of digitalisation and development of the Internet, which will give grounds for the formation of new ways of development of the printing industry of Ukraine.

## MATERIALS AND METHODS

The methodological basis of the research covered the methods of statistical analysis, which were used to assess the state of the printing industry on the basis of quantitative indicators. In particular, data from the State Statistics Service of Ukraine (n.d.), the Ministry of Finance of Ukraine (n.d.) and the Ministry of Economy of Ukraine (n.d.) were used to analyse the dynamics of the number of enterprises and volumes of products produced. Advertising market indicators provided by leading advertising agencies and research organisations, such as All-Ukrainian Advertising Coalition (n.d.) and information websites Reklamaster (n.d.) and Market-er.ua (n.d.), were also considered. Statistical data included quantitative indicators of the development of the printing industry of Ukraine for the period from 2015 to 2023, the dynamics of changes in the number of enterprises and the volume of sold products. These data were used to analyse the state of the industry and form conclusions regarding key trends and challenges. The research period was limited to the year 2023, as statistical data on the number of printing industry enterprises and the results of their economic performance had not been published at the time of writing.

In the course of the work, graphical and mathematical methods were used to create charts that displayed the changes in the number of enterprises, volumes of products produced and the dynamics of the advertising market. These charts were used to visualise key trends and to facilitate data comprehension. SWOT analysis was used to identify the strengths and weaknesses of the Ukrainian printing industry, as well as opportunities and threats related to the external environment, including the impact of the Internet and digital technologies. This analysis helped to formulate strategic recommendations for further development of printing enterprises in the context of digital transformation of the market.

In addition, the study applied general scientific methods of system analysis, comparison, and grouping. The method of system analysis was used to study the relationship between changes in the printing industry and the development of Internet technologies. The method of comparison helped to compare the development indicators of the printing industry in different time periods, as well as between different market segments. The grouping method made it possible to classify printing industry enterprises according to the degree of their adaptation to new market conditions.

## RESULTS AND DISCUSSION

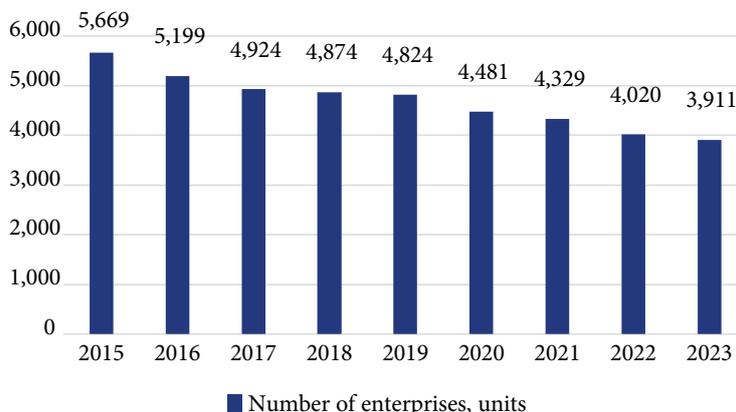
The printing industry is a socially important branch of the country and directly depends on the socio-economic

stability of the society and is extremely vulnerable in the conditions of economic instability. The development of information technologies creates new challenges for production enterprises in all countries of the world. The influence of the World Wide Web on the printing industry is quite strong. Today's rapid development of digital technologies and constant improvement of visual information dissemination processes raise the issue of relevance and efficiency of printed products.

The modern market of printing services is quite ambiguous. According to the conducted research, the main volume of printed products of printing enterprises previously accounted for fiction, newspapers, and magazines. It is not worth ignoring the fact that more and more people prefer electronic media, whether it is news publications or fiction, which has led to a significant decrease in demand for printed publications and, consequently, to a decline in the production of this type of products. At the same time, there has been a marked shift in the industry towards the production of promotional materials. The printing industry worldwide has witnessed a rapid growth in the printing of promotional materials and labels. The rapidly growing market for packaging and printed promotional products is attracting more and more printers from across the country who are actively pursuing it (He, 2019). To compensate for the declining

profitability caused by the decreasing distribution of traditional printing products, some printing companies are finally switching to the production of packaging and promotional products, leaving traditional printing in the past.

Thus, in recent years, in the period from 2015 to 2023, the total number of enterprises engaged in printing activities in Ukraine has decreased by almost 23%, to 3.72 thousand business units, many of the closed enterprises underwent a financial crisis and had to close production due to the unstable economic condition. More than 20% of enterprises in the sector had low financial performance indicators (Kachmar, 2023). In the period from 2020 to 2023, the situation in the industry had not improved, moreover, additional difficulties of doing business were added, such as the worldwide pandemic of coronavirus infection, active hostilities on the territory of Ukraine, which further contributed to the growing demand for Internet resources. Physical losses of production capacities of Ukrainian publishing houses due to the war, especially in Kharkiv, which was one of the largest printing centres of the country, significantly undermined the work of the industry, although some enterprises were able to partially restore their activities. Figure 1 shows the dynamics of change in the number of enterprises in the Ukrainian printing industry for 2015-2023 (Shapovalov, 2024).



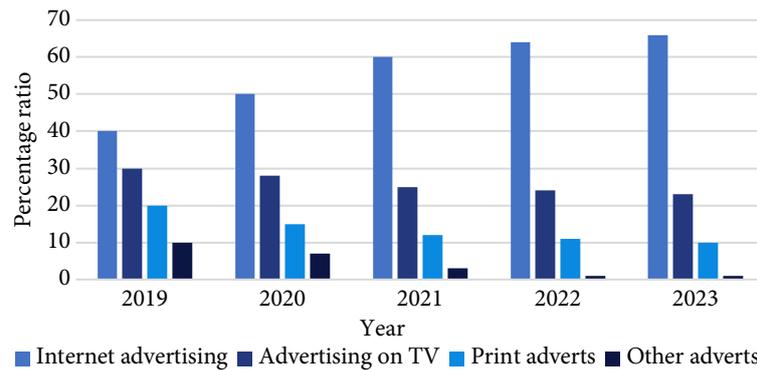
**Figure 1.** Dynamics of the number of enterprises in the printing industry of Ukraine in the period 2015-2023

**Source:** composed by the authors based on O. Shapovalov (2024)

In addition to the reduction in the total number of enterprises in the publishing and printing industry, these years saw a strong decline in their profitability. In the period up to 2018, less than 80% of the enterprises in the industry made a profit from their operations. After 2018, the situation continued to deteriorate. According to the State Statistics Service of Ukraine (2024), by 2023, only 60% of enterprises in the industry were able to make a profit from their operations, which is 20% lower than before 2018 (Kachmar, 2023). The main reasons for the decline in profitability were reduced demand for printed products caused by the popularisation of digital and electronic media, rising raw material and logistics costs in the context of inflation, and physical losses of production capacity due to

hostilities. The Internet has become only one of the main factors having a negative impact on the functioning and development of the printing industry in Ukraine.

Given the shift in printing production towards advertising products, as discussed above, it is important to analyse the industry's place in the intensively expanding advertising market. As of 2020, the first place among the channels most frequently used by advertisers was occupied by online advertising, with a market share of more than 50%. Print advertising and press, on the other hand, was only third in this ranking, with only 13% of the market share. The size of the advertising and communication market in terms of percentage for 2019-2023 is shown in Figure 2 (Semenyuk & Bagmut, 2024).



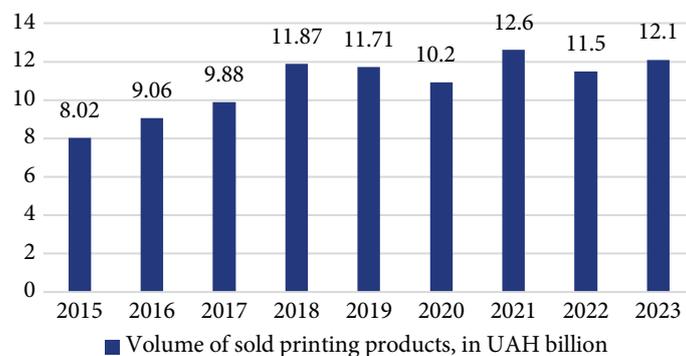
**Figure 2.** Advertising market size in terms of percentage for 2019-2023

**Source:** composed by the authors based on A. Semenyuk & I. Bagmut (2024)

In 2020, online advertising surpassed all other communication channels in terms of volume, which dealt an even greater blow to the print industry, causing a decline in output and, consequently, profits. At the end of 2021, online advertising remained dominant with over 60% of the market, while print advertising continued to decline and by the beginning of 2023 only accounted for about 10% of the total advertising market (Semenyuk & Bagmut, 2024). Speaking about the main stratum of production by printing enterprises, it is worth mentioning packaging products. The most popular and promising niches are the production of bags, labels, and other packaging elements. The increased demand for such products is caused by the fact that, having placed advertising on the Internet, companies cover large volumes of audience, including a fairly accurate hit of advertising

in the target audience, at acceptable costs, however, to sell their products companies need packaging materials, which must have a physical expression and cannot remain in virtual space. Moreover, there is an increasing trend in demand for the production of security printed elements that prevent goods from being tampered with or tampered with.

Apart from the growth in demand for packaging products, which is related to the development of online advertising and the need for physical packaging for goods, it is important to note other factors affecting the volume of printed products sold. One of such factors is the state support of the printing industry, aimed at stimulating business during the crisis. This was reflected in the dynamics of the volumes of sold printing products, which for the period 2015-2023 is presented in Figure 3.



**Figure 3.** Advertising market size in terms of percentage for 2019-2023

**Source:** composed by the authors based on O.P. Butenko *et al.* (2024)

Based on the presented data, we can see that the volume of sold printing products increased by 50% from 2015 to 2021, reaching a maximum value of UAH 12.6 billion. This growth indicates a gradual recovery of the industry despite the crisis phenomena. However, from 2021 onwards, there is a decline in sales volume, reaching UAH 11.5 billion in 2022 and recovering slightly to UAH 12.1 billion in 2023. This contradiction between increasing sales volume and decreasing profitability is attributed to changes in product mix and rising production costs. Printing companies are

facing rising prices for raw materials and logistics costs, which has led to lower margins. Additionally, despite the growth in sales volumes, profit margins are declining due to high demand for cheaper products such as packaging and labels, which, although produced in high volumes, are less profitable than traditional printing products. Thus, the growth of sales volumes does not always correlate with the growth of profitability of companies. In order to return the previous production volumes, or at least to increase the current indicators, thus ensuring profitability and

efficiency of enterprises, it is necessary to create a supply. To solve this problem, it is advisable to use the possibilities of Internet-mechanisms.

The influence of the Internet has not only affected the economic components of the process of implementation of printing enterprises, but also caused the need to transform marketing strategies. Thus, the development of a new marketing strategy can be considered as an additional element of finding ways to improve the efficiency of publishing and printing enterprises in the current

conditions of digital transformation of the market. One of the methods used for this purpose is SWOT-analysis. It is based on the identification of internal strengths and weaknesses of the company, as well as threats from the external environment in a new market or a market with significant changes, and the subsequent comparison of strengths and weaknesses with opportunities and threats. Within the framework of this research study, a SWOT-analysis was carried out, showing the ways of development of the printing industry of Ukraine (Table 1).

**Table 1.** SWOT-analysis of prospects of development of printing enterprises

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>◆ possibility of introducing innovative activities</li> <li>◆ printing of advertising products</li> <li>◆ low level of competition</li> <li>◆ convenient logistics</li> <li>◆ production of non-standard products</li> </ul>	<ul style="list-style-type: none"> <li>◆ loss of target audience caused by the development and spread of the Internet</li> <li>◆ long lead times</li> <li>◆ low economic efficiency</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>◆ publishing of premium products for collecting</li> <li>◆ government support (tenders, competitions, grants)</li> <li>◆ development and expansion of the range of printed advertising products</li> <li>◆ implementation of SEO-promotion and SMM-promotion</li> <li>◆ cooperation with Influencers (opinion leaders)</li> </ul>	<ul style="list-style-type: none"> <li>◆ rising costs of raw materials and their delivery</li> <li>◆ development of the Internet, leading to the complete discontinuation of printed news publications</li> <li>◆ changes in the market of main consumers</li> <li>◆ decreasing solvency of the population</li> <li>◆ declining demand for traditional printing</li> <li>◆ pandemics, crises and unforeseen world changes</li> </ul>

Source: composed by the authors based on A. Semenyuk & I. Bagmut (2024)

The weaknesses and threats to the industry include the unstable situation with the economic and political state of the country (Hamilton, 2020). One of the main threats to the functioning and development of the industry is the popularisation of the Internet. The World Wide Web covers all sectors of economic activity and brings about a cardinal restructuring of the entire business environment. Despite this, the printing industry enterprises have a chance to turn this threat into an advantage by trying to find ways to interact with it. Within the framework of this interaction, the printing industry enterprises can get additional consumer demand. This will be possible due to the correctly built marketing strategy of production and implementation of SEO and SMM-technologies. Interaction can start small, including the recruitment process, advertising of enterprises to expand the consumer market and find new target audiences, online shops, which can also become consumers of printing products. The main consumers of printing products are industrial, food, pharmaceutical, cosmetic and alcoholic products.

The strengths of Ukrainian printing companies include the possibility of introducing innovative technologies such as flexographic and digital printing. Additive manufacturing, which is a rather promising technology with great development potential, can also be considered as a potential area of development. Studies by R. Godina *et al.* (2020) proved that 3D printing can contribute to the sustainability of manufacturing systems due to its potential to optimise material consumption, create new shapes, customise

designs and reduce production time, which together will significantly change some already existing business models in the near future. Advances in technology in production will enable printing companies to realise significant economic benefits, shorten production times and improve their competitive position. Also, an important indicator of the industry’s prospects is the ability to produce non-standard products of different shapes and sizes in any volume, production of premium and collectible products (limited edition gift books and so on).

Taking into account modern trends, the sphere of polygraphy should be modified and adjusted to the market. Polygraphic enterprises should focus on technological development and introduction of innovations in production, as well as find ways to interact with the World Wide Web and electronic promotion mechanisms. It is necessary to optimise the company’s activities: the development of advertising and marketing strategies, including the establishment of promotion channels, will help to expand the customer base and increase the number of products.

Acquaintance with the scientific works of other researchers, within the framework of the studied issue, gave grounds to believe that in the conditions of economic and political instability, introduction of modern tools, digital transformation, and digitalisation in the industry, as well as the development of the Internet, the market of printing services undergoes changes and loses the former volumes of production, as a result, loses profit. Taking into account the process of digitalisation and the development of online

business mechanisms, it is worth noting that innovation is one of the main elements of the competitive struggle. Constant analysis of the impact of Internet technologies on the publishing business and the search for options to improve the country's printing industry involves constant monitoring of the state of the industry, as well as systematic study of international experience, among other things (Ruidong & Jun, 2021).

Speaking about the prospects for the development of industry, including the printing industry, scientists emphasise the need to implement Industry 4.0 technology. The concept of Industry 4.0, which defines the level of evolution of production, requires a responsible approach on the part of all participants in production, including the top management of enterprises and qualified personnel. The foundation of the concept is based on the identified drivers and barriers to this technological transformation. The concept of Industry 4.0 is considered along five business dimensions: strategic, organisational, technological, legal and ethical (Ghadge *et al.*, 2020). In particular, R. Godina *et al.* (2020) believe that this technology will take the industrial market to the next level. Within the printing industry, this model will help to reduce cost levels and enable the production of technically more complex product variants, through the rapid and relatively inexpensive development of photographic plates, clichés and dies for die-cutting products. The proposal to find new options for the development of printing companies is justified, because the production capacity of the printing house is almost always used more than 100%, which means that it is necessary to look for additional tools to simplify the production process.

Chinese researchers P.-H. Wang *et al.* (2019), in addition to implementing Industry 4.0 technology, propose to apply neural networks in the process of predicting the performance of enterprises, thereby setting a vector for the use of the Internet and digital technologies at all stages of enterprise functioning. In their opinion, this will increase the accuracy of forecasts and optimise production and marketing processes, which is especially important in a dynamically developing market. As a result, enterprises will be able to respond more quickly to changes in demand and better manage their resources, which will contribute to improving their competitiveness.

In turn, researcher M. Salwin (2021) talks about the need to implement Product-Service System (PSS) technology. This system is an integrated business model in which companies offer customers not just a physical product, but a range of services that may include technical support, maintenance, staff training and other services that add value to the product for the consumer. M. Salwin believes that the introduction of this technology for the printing industry has an extremely positive effect, extending the lifecycle of equipment, as printers will receive comprehensive maintenance and optimisation services. This will help businesses to minimise maintenance costs, as well as customise equipment to meet specific needs, helping to improve competitiveness and business resilience in a changing market.

Many scholars state that it was the development of the Internet that caused the decline in demand for printed products and the crisis in the popularity of printing enterprises. A. Drogovoz (2018), in his research, notes a steady tendency to reduce consumer interest in traditional printed publications, which negatively affects the economy of printing companies. Such dynamics are confirmed by G. Gamprellis *et al.* (2021) and L.H.A. Amri *et al.* (2022), who record a decrease in the output of printing products. The decrease in demand is associated with the active transition of consumers to digital media formats, which makes traditional print publications less in demand.

However, the printing industry has the ability to adapt and interact effectively with the Internet, despite the barriers and difficulties encountered. For any business, including the printing industry, along with the quality of its products, promoting these products online and building a reputation is often the key to success, claimed by J.M. Tomasena (2019). Such promotion has several significant advantages, these include:

- ◆ significant user audience;
- ◆ the average cost of business development in the online environment, including the creation of a company image and promotional tools, is lower than with traditional advertising methods;
- ◆ the process of digitalisation helps in cost savings;
- ◆ increased brand value and consumer awareness;
- ◆ the Internet acts as a universal and convenient channel of interaction with customers and partners.

Researcher E. Kasumova (2020) insists on the need to build the process of implementation of publishing and printing enterprises in interaction with the Internet, as well as with the use of Internet technologies, including the development of Internet marketing. E. Kasumova emphasises that the interaction of printing enterprises with the Internet should be exclusively within the framework of reinforcing, reminding and advertising functions. The researcher believes that the development of an Internet-oriented marketing plan should include strategies for promoting products in the global network, advertising, and the process of managing the communication mechanism (communication with consumers). These recommendations are absolutely relevant as the implementation of internet marketing plays an important role in the business model of enterprises, including those in the printing industry. Internet marketing, providing a complete statistical picture of the effectiveness of selected marketing campaigns, allows companies, in real time, to respond to changes in the structure of supply and demand, to offer new solutions and attract new customers. This form of interaction of publishing and printing industry enterprises with the Internet is effective.

Another niche, practically not used in Ukraine, but potentially able to have a positive impact on the state of printing enterprises, is the popularisation of products and companies themselves through blogger sites on the Internet. This is also the opinion of P. McIntyre *et al.* (2023). The researchers believe that cooperation and cooperation

with opinion leaders, so-called Influencers, is a powerful additional advertising channel to promote printing products and increase demand for them. Adopting the positive international experience, Ukrainian publishing companies can increase the number of products by publishing thematic literature by popular and authoritative personalities. Such cooperation will help printing companies to increase the volume of printed publications and increase profits, and Influencers – to increase quotability in mass media and get an additional source of income.

The Internet has had a significant impact on the printing industry, causing a decline in demand for print publications and a decrease in output. At the same time, digitalisation provides new opportunities for businesses that are ready to adapt to changing market conditions by introducing modern technologies and revising marketing strategies, finding new points of interaction with both suppliers of materials and equipment and consumers of products through the global network. Thus, the industry's prospects will depend on the ability of enterprises to integrate innovative solutions and find a balance between traditional and digital formats.

### CONCLUSIONS

According to the results of the study, the impact of the World Wide Web on the activities of printing enterprises, in many respects, has been negative, causing significant crisis phenomena in the industry. But at the same time, the tools and opportunities offered by the Internet and digital technologies in general, have a significant potential for modernisation and development of printing production in Ukraine. The results obtained in the course of the research provide grounds for the following conclusions. The printing industry in Ukraine is experiencing a crisis. It was found that from 2015 to 2023 the number of enterprises in the printing industry of Ukraine decreased by 23% – to 3.72 thousand units. More than 20% of the enterprises of the industry have low financial performance indicators. The situation is caused by various economic, social and political problems, as well as the increasing influence of the World Wide Web on global trends, and particularly the printing industry. In particular, a significant proportion of people favour electronic media; the share of online advertising in the Ukrainian advertising market has grown from

50% in 2020 to a dominant position in 2023, displacing print advertising, which occupies only 13% of the market. The output of printed polygraphic products has decreased in volume, and the main emphasis in the assortment policy has shifted from fiction and news literature, to the production of advertising and packaging products.

SWOT-analysis revealed the main threats to the industry: unstable economic and political situation, full-scale war on the territory of Ukraine, popularisation of the Internet. At the same time, the opportunities for the development of the printing industry were identified, which are expressed in the introduction of innovative printing technologies, the development of packaging and labels production, and the use of Internet marketing. Among the options of interaction with the latest technologies and the Internet, the most productive is considered to be the introduction of innovative systems into the process of printing production, including Industry 4.0 production systems, 'Product-Service' management systems and neural prediction mechanisms. The study also highlighted the feasibility of developing additive manufacturing and cooperation with influencers to expand their own advertising capabilities and promote their products.

Thus, the study demonstrated the need for the Ukrainian printing industry to adapt to new market conditions through the introduction of innovations and active use of Internet technologies for marketing and business development. In future research it is advisable to analyse effective ways of involving artificial intelligence in the development of printing enterprises in Ukraine. This would help identify practical tools for modernising production processes and improving service delivery. Ultimately, such advancements are essential for enhancing the industry's competitiveness and securing its long-term sustainability in both domestic and international markets.

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None.

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## Видавничий бізнес VS Інтернет: як всесвітня мережа вплинула на економіку та маркетинг поліграфічних підприємств?

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**Анотація.** Актуальність теми зумовлена впливом Інтернету на всі сфери життя та бізнесу, що вимагає від поліграфічних підприємств адаптації їхніх економічних і маркетингових процесів до сучасних реалій. Метою роботи було вивчення питання впливу Інтернету на економіку та маркетинг підприємств поліграфічної галузі в розрізі загальної цифровізації та популяризації електронних видань. Теоретичною базою дослідження виступили наукові праці українських і зарубіжних учених-теоретиків у питанні вивчення процесів адаптації підприємств поліграфії до нового інформаційного середовища, а основними науковими методами – метод системного аналізу, стратегічного планування (SWOT-аналіз), актуалізації та періодизації. Результатами наукової роботи є оцінка ступеня впливу всесвітньої мережі Інтернет на діяльність поліграфічних підприємств у розрізі оцінювання їхніх економічних і маркетингових показників, а також, знаходження потенційних шляхів розвитку поліграфічної галузі України завдяки інтеграції видавничо-поліграфічних підприємств до інтернет-середовища, а також привертання уваги та актуалізація вивчення поточного питання. Значимість отриманих результатів полягає у висвітленні перспектив розвитку видавничо-поліграфічної індустрії України завдяки процесу інтеграції та необхідності взаємодії поліграфічних підприємств з електронними інструментами комунікації в рамках всесвітньої мережі Інтернет. Дослідження продемонструвало, що, незважаючи на спричинені Інтернетом кризові явища, поліграфічна галузь України зберігає значний потенціал для подальшого розвитку завдяки інтеграції цифрових технологій. Як шляхи модернізації запропоновано впровадження інноваційних виробничих систем, таких як Industry 4.0, та активне використання інтернет-маркетингу для розширення рекламних можливостей і підвищення конкурентоспроможності підприємств. Результати дослідження можуть слугувати основою для розроблення нових бізнес-моделей, адаптованих до умов цифрового ринку

**Ключові слова:** інтернет-маркетинг; поліграфічна індустрія; економічна ефективність; цифрова трансформація; інноваційні технології друку; інноваційні технології друку



## Complex organisational and economic mechanism for managing effective diversification of an enterprise

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**Abstract.** The aim of the study was to develop approaches to optimising the management of enterprise diversification in the context of current economic changes, in particular, to increase competitiveness and financial stability. The study examined the theoretical foundations of diversification management and assessed the application of vertical and geographic diversification strategies that reduce risks and increase the stability of the company. The main results of the study demonstrated that the diversification strategy implemented by the Public Joint Stock Company “Myronivsky Hliboproduct” has a significant positive impact on the company’s financial results. In the period from 2016 to 2024, the company’s total revenue increased from USD 244 million to USD 3 billion, an increase of 14%. Export revenues increased by 52% over the same period, reaching USD 1.8 billion, accounting for 60% of the company’s total revenue. In addition, operating profit grew by 33% and earnings before interest, taxes, depreciation and amortisation (EBITDA) increased by 16%, reflecting the successful implementation of diversification strategies. One of the main results was a reduction in dependence on the domestic market, thanks to the expansion of exports and the development of innovative areas, in particular in the energy sector. Investments in green energy helped reduce operating costs and improve the environmental efficiency of production processes. Diversification in the retail segment and the expansion of brands such as “Nasha Ryaba” and “Myasomarket” also contributed to the Group’s market presence and additional revenue growth. The conclusions show that the diversification strategy was effective and contributed to the company’s financial stability. The results of the study confirm the importance of integrating new business lines to reduce risks and ensure long-term stability

**Keywords:** financial performance; investments; financial risks; competitiveness; sustainability

### INTRODUCTION

The diversification of business activities is an important tool for reducing risks associated with dependence on a single market or type of activity, allowing enterprises not only to ensure their stability but also to open up new opportunities for development. However, for the successful implementation of diversification, a comprehensive approach to its management is necessary, including organisational, economic, and strategic mechanisms. In this regard, the problem of forming an effective organisational and economic mechanism for diversification management is extremely relevant for modern enterprises striving to ensure their competitiveness and stability in the market.

The effective application of diversification to strengthen market positions and reduce risks associated with economic instability and changes in consumer behaviour is important for modern enterprises. D. Zevenko *et al.* (2024) proved that diversification reduces dependence on a single source of income and increases flexibility. The work also emphasised the importance of developing individual strategies for different types of enterprises depending on their specific needs and capabilities. The research suggests that for the successful implementation of diversification, it is necessary to elaborate in detail each stage of the strategy and carefully plan each step.

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Diversification allows enterprises to strengthen market positions and reduce risks. D. Voronets (2020) studied indicators for evaluating the effectiveness of diversification in the field of temporary accommodation and catering, proposing a system of financial, production, and market indicators. It turned out that these indicators can also be applied to other industries.

The choice of an optimal strategy to increase the adaptability of enterprises in a changing economic environment is important, as it is precisely this that helps them to ensure their stability and competitiveness. L. Kurbatska *et al.* (2024) emphasised the importance of adapting enterprises to modern economic conditions through the application of strategies for expanding their activities. Their research revealed that successful business expansion helps reduce risks and creates new opportunities for development, while requiring strategic planning and consideration of the enterprise's internal capabilities.

In the context of managing the development of enterprises, it is important to determine the methodology for diversification and integration development in changing conditions. This issue was considered by K. Zalutka (2020), who proposed an approach based on the unity of methodologies of cognition, practical value, and evaluation. She focused on the need to form a methodology for managing the diversification and integration development of enterprises, based on the interdependent unity of methodologies of cognition, practical value, and evaluation. In particular, the author proved that such management contributes to increasing the efficiency of business processes through the optimisation of their structure and the use of own and attracted resources.

The management of enterprise diversification is a key aspect for ensuring their sustainable development in a changing market environment. O. Bielienskova (2021) studied this issue, creating an algorithm for managing the expansion of enterprise activities that combines operational, investment, and financial operations. The author emphasised that this approach allows for the elimination of imbalances in the development of the enterprise that may arise during the expansion of its spheres of activity. The work also highlights the need to integrate economic and mathematical methods and budgeting to optimise the process of diversification management in the face of modern economic challenges. The research proved that such a strategy contributes to strengthening the financial stability of the enterprise and reduces the level of risks.

The diversification of enterprise activities is a strategic decision that increases competitiveness in a highly competitive environment. This issue was studied by O.A. Lykholat *et al.* (2023), who considered diversification as a tool for increasing the efficiency of hotel and restaurant enterprises. It was found that to assess the effectiveness of a business expansion strategy, it is necessary to analyse financial, economic, production, technological, and information subsystems, as well as take into account the impact on the external environment and the level of consumer loyalty. The results

confirmed that diversification can strengthen market positions if an appropriate system of indicators and an algorithm of actions are applied.

Diversification is a key tool for ensuring the resilience of enterprises in economic crises. O. Hlushko (2024) developed a model for managing the diversification of trading activities of enterprises during crisis phenomena in Ukraine. The author investigated the effectiveness of such diversification measures as the transition to online sales, the use of postal and courier services, and the duplication of export routes. The research proved that these strategies helped enterprises maintain and even expand their activities during the crisis.

Diversification is an important strategy for enterprises, the impact of which on strategic management can be different. K. Buzhymyska *et al.* (2024) studied various diversification strategies – horizontal, vertical, concentric, and conglomerate – and their impact on business. Horizontal diversification allows for quick entry into new markets, vertical diversification increases control over the supply chain, and concentric diversification minimises risks. Conglomerate diversification brings high income but has significant risks. The successful application of these strategies using the example of companies such as Disney, Tesla, and Myronivsky Hliboproduct confirms their effectiveness.

The issue of diversification is an important aspect for the strategic development of enterprises, as it allows for the reduction of risks, increased competitiveness, and ensures stable growth in a changing market environment. However, there are weaknesses that require further study. Among them is the insufficient research on the integration of new technologies into the diversification process, as well as the adaptation of strategies to the specific conditions of regional markets. Also, the study of the adaptation of these approaches to different types of enterprises in the service sector remains a relevant issue. Gaps that require further research include the analysis of the characteristics of the adaptation of the diversification strategy for different types of companies, as well as a more detailed study of the impact of external factors on the choice of this strategy.

The aim of this study was to develop approaches to optimise the management of enterprise diversification in the context of modern economic changes, allowing for an increase in its competitiveness and financial stability. The objectives of the study were: to analyse the theoretical foundations and practical approaches to the management of enterprise diversification; to assess the effectiveness of the application of various diversification strategies using the example of PJSC “Myronivsky Hliboproduct”.

## MATERIALS AND METHODS

Within the framework of the research, a theoretical substantiation of strategies such as vertical and geographical diversification was conducted through the analysis of scientific works, the study of existing diversification models and their application in management practice, and an analysis of their impact on the stability and development

of the Myronivsky Hliboproduct company. This analysis made it possible to understand how the company adapted to the changing market environment, particularly in conditions of economic instability and global crises. The study of scientific sources allowed for the construction of a clear understanding of how diversification affects management strategies and what methods of evaluating effectiveness are applied at different stages of the company's development (Aversa & Haefliger, 2015; Oladimeji & Udosen, 2019; Shatilo, 2020). These works were taken as the basis of the research, containing a detailed analysis of diversification strategies in the context of modern economic conditions and providing methods for evaluating effectiveness that can be adapted to the specifics of the enterprise under study. As part of the research, an analysis of the theoretical foundations of enterprise diversification management was carried out, in particular, the main approaches and concepts that determine the role of diversification in strategic management were studied. To assess the effectiveness of diversification strategies, methods such as portfolio analysis (Boston Consulting Group), the cost-benefit analysis method (Hayes, 2024), the Return on Investment (ROI) method (Batllori Lloveras, 2024), as well as SWOT analysis (Puyt *et al.*, 2023) were analysed. These tools were chosen due to their widespread use in evaluating the effectiveness of investments and business diversification, which allows for a clear analysis of financial results and the identification of the most profitable strategies for the further development of the company.

The analysis of the effectiveness of enterprise diversification management was conducted using the example of the Public Joint Stock Company (PJSC) "Myronivsky Hliboproduct" (MHP) as one of the largest agricultural holdings in Ukraine, which has implemented numerous diversification strategies, achieving significant economic efficiency. The period from 2016 to 2024 was chosen, during which the company underwent a number of important strategic changes, including investment in the energy sector, the development of new products, and geographical diversification, which significantly increased its competitiveness.

A combined approach was used, including theoretical analysis, the company's financial indicators, as well as qualitative methods, in particular an analysis of the company's diversification strategy. To this end, the financial reports of MHP (2016; 2018; 2023a; 2023b; 2024a) were collected and analysed. The results of these reports made it possible to assess the impact of the implemented strategies on financial results such as total revenue, export revenue, operating profit, and earnings before interest, taxes, depreciation, and amortisation (EBITDA). As a result of the research, a number of recommendations were developed to improve the diversification management mechanism, in particular through the further development of horizontal diversification, increased integration and optimisation of production and logistics processes, as well as through investments in new technologies and the expansion of export geography.

## RESULTS

### Theoretical foundations of enterprise diversification management

Business diversification is an important strategic tool that enables the reduction of risks and ensures business stability. It involves expanding the company's activities by introducing new products or entering new markets, which allows for stable profits and reduces dependence on individual market segments. Thanks to diversification, a company can adapt to changes in the external environment, particularly to economic fluctuations, changes in demand, or competition.

Business diversification is the process of changing or expanding a company's activities to increase economic stability and profitability. Diversification aims to reduce risks by creating new sources of income and decreasing dependence on a single product or activity. There are various types of business diversification based on different criteria: conglomerate, concentric, vertical, and horizontal – depending on the direction of development. Depending on the business strategy, market conditions, and available resources, each of these types has its own characteristics and is applied in different circumstances (Aversa & Hayashi, 2015).

Expanding the range of goods or services in an existing market is the goal of horizontal diversification. Offering several different goods or services that share common production processes, distribution channels, and technical characteristics allows companies to ensure greater stability. Companies that produce different products with the same technological base or enter new markets with similar goods are examples of horizontal diversification.

When a company controls the preceding or subsequent stages of the production process or supply chain, this is called vertical diversification. This can be integration at the supplier level (forward vertical diversification) or integration at the level of distribution and sale of goods (backward vertical diversification). The use of vertical diversification helps companies to reduce costs, create better products, and have better control over the supply of raw materials or the sale of goods.

Concentric diversification means introducing new goods or services that align with the company's core objectives. This makes it possible for the company to sell new goods or services using resources it already has, as well as new distribution channels. Concentric diversification involves including new product models in the existing range or entering related markets where existing skills can be used.

Conglomerate diversification allows a company to expand its operations by entering new markets or producing products unrelated to its core business. Large corporations typically use this type of diversification to reduce risks associated with demand fluctuations, changes in economic conditions, political instability, and exchange rate fluctuations in key markets. Conglomerate diversification helps reduce overall financial risks because the company can offset losses in one industry or market with stability or growth in others, and it also creates additional sources of income that help maintain financial stability in the event of adverse

changes in one area of activity. According to P. Aversa & S. Haefliger (2015), this approach is an important tool for reducing a company's dependence on a single market and increasing its resilience to external economic fluctuations. The authors emphasise that conglomerate diversification can provide companies with a more stable financial position by expanding their operations into various markets.

Each of these types of diversification has its own advantages and disadvantages. Horizontal diversification offers the possibility of reducing dependence on a single type of product, but it can lead to significant costs in creating new products. Vertical diversification allows for cost reduction and increased control, but it may require large investments in new production capacities. Concentric diversification allows for maintaining a connection with the core business, but it can limit the potential for significant growth. Conglomerate diversification helps reduce risks, but it can lead to the dispersion of resources and a loss of focus on the core business, as noted by M. Schommer *et al.* (2018).

Diversification management is a complex and multifaceted process, and a comprehensive approach is needed to address it. Theoretical approaches to the management of enterprise diversification are based on various economic models. These models include strategies for assessing the effectiveness of diversification, as well as methods for its implementation and deployment. The economies of scale model is the first theoretical approach. According to this model, diversification allows companies to reduce overall costs by increasing production volume or expanding the market. According to this model, diversification is a way to achieve greater efficiency because the company can use its resources (technology, personnel, and distribution channels) to produce different types of goods. In addition, important theoretical approaches to diversification management include models of organisational innovativeness and risk criteria. Innovation models focus on the development of new products and services through diversification, while risk criteria help companies determine the optimal level of diversification that will not lead to excessive financial or operational risks. According to M.S. Oladimeji & I. Udosen (2019), these models contribute to increasing the efficiency of enterprises by reducing costs and expanding the market, but the correct assessment of the level of risk when implementing a diversification strategy remains key.

Diversification management also requires constant monitoring and evaluation of the results of the strategy's implementation. Enterprises can assess how successfully diversification strategies are being implemented using performance evaluation methods such as cost-benefit analysis, strategic monitoring, and competitive advantage analysis. They can also change their strategies if necessary. The choice of diversification strategy is an important stage for a business, as it determines its ability to adapt to changes occurring in both the internal and external environments. The decision on diversification should be based on a thorough analysis of various elements that can affect the success of the plan. These elements can be divided into

internal and external, as noted by T. Pavliuk & V. Noda (2020), emphasising the importance of a comprehensive approach to assessing and adapting the strategy to changes in the business environment.

External factors include political, economic, and market conditions that determine opportunities for business expansion. Political factors, particularly the level of political stability, the direction of development of the political system, and the state's international policy, can significantly influence the choice of diversification strategy. Economic factors also have a significant impact on the diversification strategy. The level of economic development of the country, the globalisation of the industry, changes in cost and productivity structure, legislative changes, and changes in social values – all these factors create conditions for making decisions about how and where the company should expand its activities. Market factors, such as market saturation, declining demand, or the possibility of entering new markets, also determine the need for diversification. When the market for the company's core products becomes saturated and demand for them decreases, the company must look for new opportunities for growth, which can be achieved through diversification. Entering new markets or creating new products allows companies to expand their opportunities and reduce risks.

O. Shatilo (2020) emphasises that internal factors such as financial resources, resource potential, human resource potential, and management structure directly affect the company's ability to implement a diversification strategy. The availability of financial resources for investment in new business lines is the basis for choosing a diversification strategy. Without sufficient funds, the company will not be able to expand into new markets or add new products to its range. The company's resource potential determines its ability to create synergy between new and old business lines. If the company has the necessary technologies, infrastructure, and capabilities to integrate new products or services into its current operations, this gives it an advantage in implementing a diversification strategy. Human resource potential is an important factor, as successful diversification requires the company to have qualified employees capable of implementing new projects, as well as the ability to attract new specialists to support new business lines. The presence of experienced personnel capable of handling new challenges significantly reduces the risks associated with the introduction of new business lines. The management and organisational structure of the company also affect the choice of diversification strategy. To effectively manage several business lines, the company needs to have an appropriate organisational structure capable of ensuring coordination between different departments and business lines. The ability to organise and control activities at different stages of diversification is an important factor in ensuring its success.

The choice of diversification strategy depends on a detailed analysis of both external and internal factors affecting the company. It is important for the company to have a clear understanding of market conditions, available

resources, and expansion potential, as well as the ability to adapt to changes in the external environment. Companies that successfully take these factors into account are able to effectively implement diversification strategies that help them to reduce risks and increase competitiveness. Evaluating the effectiveness of diversification is a necessary step for making informed decisions about further steps in the company's development. To do this, there are a number of models and methods that help companies assess how successfully diversification strategies have been implemented and whether they are yielding the desired results. M.J.B. Kabeyi (2018) emphasises that for effective evaluation, it is necessary to consider the complexity of the strategy and its ability to adapt to changes in the internal and external environments.

One of the most common models is portfolio analysis. This method allows a company to evaluate the effectiveness of its investments in new business lines, classifying them according to profitability and risk criteria. The method is usually based on the use of tools such as the Boston Consulting Group (BCG) matrix, which helps determine which areas of the company are most profitable and which require additional investment or even abandonment. Portfolio analysis allows a company to prioritise its diversification strategies based on financial results.

The cost-benefit analysis method is another important tool for evaluating the effectiveness of diversification. This

method involves comparing the costs of implementing the diversification strategy with the revenues generated from new business lines. An important indicator is the profitability of new business lines. If the profitability of new projects exceeds the costs of their development and implementation, this is a signal that diversification has been successful (Hayes, 2024).

The Return on Investment (ROI) method is an indicator that allows companies to evaluate the effectiveness of investments in new areas. It shows how profitable the investment in new products or markets is. ROI allows for a quick assessment of the potential profitability of a diversification strategy, which is an important tool for making decisions about further investments (Batllori Lloveras, 2024).

Another method for evaluating effectiveness is SWOT analysis, which enables for the identification of the company's strengths and weaknesses, as well as the opportunities and threats associated with diversification. This allows the company to better understand whether it is ready for diversification and how it will affect its competitiveness. SWOT analysis helps identify key risks and opportunities, as well as potential problems in the implementation of the strategy (Puyt *et al.*, 2023). As can be seen from Table 1, each of the methods for evaluating the effectiveness of diversification has its own advantages and disadvantages, and their application depends on the specific conditions of the company and its goals.

**Table 1.** Methods for assessing the effectiveness of diversification

Method	Description	Advantages	Disadvantages
Portfolio analysis	Assessment of the company's business areas using financial indicators	Easy to apply, enables quick assessment of the effectiveness of different areas of activity; gives a clear picture of the allocation of resources between areas	It can be too general and does not take into account details such as changes in the market or external factors. Limitations in generalising the results
Cost and income analysis	Comparison of diversification costs with revenues from new areas	Clear result, measured in numbers, which makes it easy to compare the effectiveness of different areas; helps to determine the specific return on investment	Does not take into account all impact factors, such as risks or social/environmental impacts; may not reflect strategic objectives
Return on Investment (ROI)	Assessment of investment efficiency through the ratio of profit to investment	Ease of use, versatility: enables assessment the effectiveness of investments regardless of industry or business type	Does not take into account market changes, economic instability or strategic long-term benefits. May be simplified in case of unstable conditions
SWOT analysis	Identification of the company's strengths and weaknesses, as well as opportunities and threats for development	Wide range of applications, accessibility for companies of all sizes; helps to understand internal and external factors that may affect success	Subjectivity of assessments depends on the experience and knowledge of those conducting the analysis; often does not provide clear recommendations for action

**Source:** compiled by the author

Evaluating the effectiveness of diversification is an important aspect of ensuring the sustainable development of an enterprise. Comparing costs and benefits, using portfolio analysis and SWOT analysis methods allow for an accurate assessment of diversification results. Each of these methods has its advantages and disadvantages, so it is advisable to use them in combination for a more comprehensive assessment of diversification efficiency. The right

choice of methods helps to reduce risks and increase profitability, which, in turn, contributes to the achievement of the company's strategic goals.

#### **Practical aspects of diversification management: The case of PJSC "Myronivsky Hliboproduct"**

PJSC MHP is one of the largest agro-industrial holdings in Ukraine, actively implementing a diversification strategy to

strengthen its market position and reduce risks associated with economic fluctuations. The company's diversification strategy encompasses several important directions, including vertical and geographical diversification, expansion through strategic alliances and company acquisitions, and the development of innovative solutions in the energy and production sectors. These approaches allow the company to adapt to changes in market conditions and maintain competitiveness on the international stage.

The company actively implements vertical diversification, focusing on expanding its product line directly related to its core business – poultry processing. MHP is broadening its range with new products that logically complement existing ones, utilising available production capacities. This not only allows for cost reduction but also significantly increases the product assortment, maintaining leadership in the industry. The company continually works on improving the quality and accessibility of products for consumers. Among the main brands that make up the MHP line, the following can be highlighted: “Nasha Ryaba” (chilled meat, ready-to-eat products), “Apetetna” (sausage products), “Lehko!” (dietary products), “Bashchynsky” (traditional meat products), “Skott Smeat” (sausages and meat delicacies), “RyabChick” (chicken snacks), “Secrets of the Chef” (spices, sauces, ready meals), “Myasomarket” (store chain), “Döner Market” (fast-food chain), “Qualiko” (products for HoReCa), “Ukrainian Chicken” (export brand), “Sultanah and Assilah” (meat products for international markets), “Poli” (sausage products, production in Slovenia). This approach allows the company not only to increase the quantity of products but also to improve their quality and accessibility for consumers (MHP, 2016).

Furthermore, the company actively works on integration at all stages of the production process. Integration with raw material suppliers and distributors allows for a reduction in the cost of goods sold, which is an important element of the cost leadership strategy. As a result, MHP strengthens its market position while maintaining financial stability and the capacity for further development.

An important element of the company's strategy is geographical diversification, which allows for a reduction in dependence on a single market and lowers risks associated with fluctuations in domestic demand. MHP is the largest exporter of poultry in Ukraine, and as of 2024, it accounted for 93% of the total poultry exports from Ukraine, amounting to 397,000 tonnes out of a total of 428,000 tonnes (Tarasevych, 2024). As of 2024, MHP's products were supplied to 86 countries worldwide. MHP is actively developing export operations, particularly expanding its presence in European markets. In 2023, the company held 1% of the European poultry market (total production volume of 11.6 million tonnes), which is a significant achievement for a Ukrainian producer. The company is also actively working in the Middle East markets, entering into new agreements and strategic partnerships. In particular, in 2020, 53% of MHP's produced poultry was exported to the Middle East countries. This helps the company to remain competitive even in the face of external economic challenges, such as restrictions

on the export of Ukrainian poultry to the EU (MHP, n.d.).

In addition to geographical diversification, MHP actively uses cooperation mechanisms to enhance its competitiveness. For example, the company entered into a strategic alliance in 2016 with LLC “Podilsky Broiler”, which allowed for the integration of logistics networks and brand advantages to reduce costs and improve customer service. The company actively uses franchising models to improve its market position and increase profitability. One example is the “Nasha Ryaba” store chain, which allows for rapid expansion of market presence and the attraction of new partners. In 2012, the “Nasha Ryaba” franchise network had over 380 points. By 2024, the “Nasha Ryaba” network had been reformatting into “Myasomarket” and other brands, and the stores are being modernised under new formats. Overall, by the end of 2023, the company had 1,500 retail outlets of various formats, including “Myasomarket”, “Döner Market”, and “Secrets of the Chef”. At the end of 2024, the “Myasomarket” network ranks first among food franchises in Ukraine by the number of retail outlets (Symonenko, 2024). The cost of opening a franchise point is USD 1-3 thousand, and a company-owned store is USD 20 thousand with a payback period of 6-9 months. The cooperation model involves the absence of franchise fees, royalties, and marketing payments; MHP's income depends on the sales volume of its partners. The logistics infrastructure includes its own distribution centres and a transport network, ensuring quality control and cost reduction. 70% of products for franchisees are supplied directly by MHP, including ready-made culinary items, and operational assistance is provided to partners in IT, HR, and financial reporting to optimise costs (MHP, 2023a). The company also continues to expand its network of “Myasomarket”, “Yizha Svizha”, and “Döner Market” establishments. As of the end of 2023, the “Myasomarket” network numbered 269 stores, an increase of 76 points in a year, with a growth rate of 20%. The store's assortment reaches 420 product names, 70% of which are supplied directly by MHP. The company also plans to create 2,000 “Döner Market” outlets in a shawarma format under franchise with investments at the level of USD 8-10 thousand per point.

Another important area of strategy is energy diversification. MHP is actively investing in bioenergy, planning to commission biomethane plants in 2025. This will allow the company to significantly reduce energy costs and increase its energy independence. In addition, MHP (n.d.) plans to build a 60 MW wind power plant, which will increase the efficiency of resource use and help reduce the environmental impact of production.

In parallel with the development of energy projects, the company is actively developing innovations, particularly in the culinary field. MHP continues to transform from a raw materials company into a culinary company, focusing on ready-to-eat products and expanding the range of culinary brands. This allows not only to expand the market segment but also to increase the level of competitiveness, reducing dependence on fluctuations in the agricultural market. Thus, in 2019, poultry was the main product and brought

67% of revenue, amounting to USD 292.12 million. Innovations and retail activities include the development of innovative culinary solutions and the creation of a school for the professional development of employees, which allows the company to improve its products and services.

Thus, MHP's diversification strategy covers a wide range of areas, allowing the company to successfully adapt

to changes in the external environment, reduce risks, and increase its competitiveness. At the same time, to further strengthen its position, the company should focus on the development of horizontal diversification, which will further reduce the impact of the cyclical nature of the agricultural market on its operations. Table 2 summarises the main directions of diversification.

**Table 2.** Key strategies of MHP

Type of diversification	Main directions
Vertical diversification	Integration at various stages of the production process, increased control over supply and sales
Geographical diversification	Expanding our presence in new markets, including the European Union, the Middle East and North Africa
Innovation	Introducing new technologies, developing new products, automating production
Energy	Investing in renewable energy sources, including bioenergy projects

Source: compiled by the author

The diversification strategy of MHP has had a significant impact on its financial results, which has been reflected in the improvement of key indicators, including revenues and profitability. Thanks to the strategies implemented, the company was able to reduce its dependence on the domestic market and reduce the impact of seasonal fluctuations on its operations. Diversification covered several areas: vertical and geographical diversification, expanding the product range through organic production, and investments in the energy sector, in particular in renewable energy.

Since 2016, when the company focused primarily on the production of chicken and grain, its financial performance has been limited and the company has experienced certain financial difficulties, including losses. This was the result of low prices on international markets, currency fluctuations and other economic factors. However, strategic initiatives aimed at diversification have significantly improved the company's financial performance. MHP has

begun to actively expand its sales markets, particularly in the European Union, the Middle East and North Africa, and to optimise its production processes, which has helped to reduce operating costs and increase revenue.

Since 2018, the company has demonstrated steady revenue growth, which was made possible by business diversification. The expansion of the product range, in particular through organic production, as well as successful investments in the energy sector, led to improved financial results and stabilised profitability. In particular, the company's export revenue grew by 474% in 2023 compared to 2016, which demonstrates the effectiveness of its diversification strategy and expansion of sales markets. In 2023, the company reached new financial heights: its total revenue exceeded USD 3 billion, up 14% compared to 2022, and export revenue grew by 13% to USD 1.8 billion. Table 3 provides a comparison of the company's key financial indicators.

**Table 3.** MHP financial performance 2016-2024 (USD million)

Indicator	2016	2018	2023	2024 (3 quarters)
Revenue	244	1,136	3,000	2,262
Export revenue	115 (47% of the total)	660 (58% of the total)	1,800 (60% of the total)	1,368
Operating profit	68	283	339	346
Net profit	-71 (loss)	142	142	141
Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA)	89	362	445	437
Operating profit margin	28%	25%	11%	20%

Source: compiled by the author based on MHP (2016; 2018; 2023a; 2023b; 2024a)

An analysis of "Myronivsky Hliboproduct" financial performance for 2016, 2018, 2023 and the first 3 quarters of 2024 shows significant progress due to the implemented diversification strategies. In 2023, the company achieved a significant increase in revenues and exports, which confirms the effectiveness of the initiatives implemented. At the same time, investments in the energy sector and the expansion of the product range helped to reduce costs and stabilise financial results. The diversification strategy

allowed the company not only to strengthen its position in the domestic market, but also to significantly improve its competitiveness in international markets.

#### Strategies for improving diversification management at PJSC "Myronivsky Hliboproduct"

For the further improvement of the diversification management mechanism at MHP, several key aspects need to be considered. These will not only contribute to the

optimisation of existing processes but also to adaptation to new market conditions, increased competitiveness, and the effectiveness of the diversification strategy.

Expanding horizontal diversification is the first and most important step. Although the company has already achieved success in vertical and geographical diversification, broadening the product range with new products unrelated to the core business will allow the company to be less dependent on cyclical fluctuations in the agricultural sector. For example, consideration should be given to launching new brands in other areas of the consumer market, such as the production of beverages, frozen foods, and ready-to-eat meals. This will not only reduce seasonal dependence but also open up new sources of income for the company.

Secondly, it is necessary to improve integration and cooperation with partners in the distribution and supply stages. This can be achieved by creating strategic alliance strategies that include collaboration with other agricultural companies, raw material suppliers, and product distributors. Additional benefits can be gained from the joint use of infrastructure, as well as reduced logistics costs. MHP companies can enter new markets with minimal costs and risks thanks to strategic partnerships. This will shorten the time for adaptation in new markets.

Thirdly, the development of innovative methods for managing production processes is an important step. Maintaining high competitiveness depends on the introduction of new technologies that increase production efficiency and reduce costs. Increased productivity and reduced operating costs can be expected through the implementation of artificial intelligence and automated production process management systems. MHP is already investing in green energy, particularly in bioenergy projects, and this should be continued, actively integrating renewable energy sources into all stages of the production cycle.

Fourthly, the diversification strategy needs to continue to evolve to penetrate international markets, especially the markets of Asia and Latin America. Although the company is already actively operating in the markets of Europe and the Middle East, it will need to expand its export geography to achieve greater financial stability. To do this, it is necessary to adapt products to the needs of new markets, taking into account customer tastes and preferences, as well as local laws and regulations. This will lead to a significant increase in export deliveries and stabilise income from international operations.

In addition, the company needs to focus on improving its marketing strategies so that it can adapt to new target audiences. Current market trends require the company to be flexible in brand management, constantly update its product portfolio, and actively use digital platforms to interact with end consumers. It is important to actively use modern digital marketing methods and study consumer behaviour, which will allow for the rapid adaptation of the sales strategy to changes in consumer preferences.

The last aspect is improving the efficiency of internal management and human resource potential. For the

successful implementation of diversification strategies, it is necessary to have highly qualified employees capable of implementing new approaches in management and innovation. MHP should invest in the training and development of its personnel, particularly in the areas of diversification management, new technologies, and international markets. This will allow for the creation of a more effective team capable of solving complex problems in a changing economic environment.

Diversification is an important strategy for reducing risks and expanding the company's opportunities, but it is associated with certain risks that require careful analysis and management. First of all, one of the main risks is financial. Diversification requires significant investments in new business lines, which may not always be justified in the short term, especially if the new lines do not yield the desired results or require high costs.

Another significant risk is operational inefficiency. Increasing the scale of business and expanding the product range can complicate management processes and production activities, which, in turn, can lead to organisational errors, production delays, and additional costs. The risk of cultural and market adaptation is also important, especially in the case of entering new international markets. Failure to consider the cultural, economic, and legal peculiarities of new markets can lead to failure and financial losses. In addition, there is a risk of losing focus on the company's core business. Expanding activities into new areas can lead to a diversion of attention from the main business, which can negatively affect financial performance and reduce competitiveness.

The risk of integrating new products and services is also important, as incorrect assessment of the costs of adapting technologies, resources, and personnel can lead to additional difficulties and losses. Finally, reputational risk is a key factor, as the unsuccessful launch of new products or their non-compliance with quality standards can negatively affect the company's image and reduce consumer trust.

For the successful improvement of the diversification management mechanism at MHP, a comprehensive approach to change is necessary: optimising production and logistics processes, expanding the product range, actively entering international markets, and using modern marketing technologies. All these measures will contribute to the stable development of the company, risk reduction, and increased profitability in a constantly changing economic environment.

## DISCUSSION

Diversification is an important tool for businesses, contributing to their development and improved market competitiveness. In the context of changing economic, social, and environmental factors, the use of various diversification strategies allows companies to reduce risks, ensure financial stability, and promote sustainable development.

Exploring the issue of increasing the competitiveness of woodworking enterprises, O. Agres *et al.* (2024),

as well as D.A. Saidova (2024), focused primarily on the organisational and economic mechanisms of diversification. Their research, like the current work, confirmed the importance of managerial, financial, technological, and marketing tools for scaling and increasing the efficiency of enterprises. The authors emphasised the need for the introduction of modern technologies and the improvement of management practices, the development of an innovative strategy, and the creation of favourable conditions for the implementation of innovations. Optimal resource utilisation and effective management are key to long-term success and competitiveness.

L. Nguyen-Thi-Huong *et al.* (2023) investigated the impact of diversification and state support on the efficiency of small and medium-sized enterprises, particularly on the financial performance of companies. The results of their work showed that diversification positively affects the efficiency of enterprises, particularly the return on assets (ROA) indicator. This suggests that using internal resources to expand activities can improve financial results. In contrast, state support did not show a significant impact on the financial efficiency of companies. The analysis of MHP's diversification strategy, built on the development of its own resource base, aligns with this conclusion, despite the larger scale of the enterprise. Similarly, the research by A. Khudaykulov *et al.* (2021) also draws attention to the impact of state support on the diversification process of enterprises, especially in conditions of economic instability. Here, the emphasis is on aspects of cooperation between enterprises and on the evaluation of the effectiveness of state aid in stimulating diversification. The study of enterprises that received state support concluded that although support from the state can be an important factor in the diversification process, it is not always decisive for success. The current research, particularly using the example of MHP, focuses on diversification strategies based on the internal capabilities of the enterprise, where the effectiveness of strategies is assessed through financial results and risks characteristic of the specific conditions of the company.

The research by K. Itiola (2023) focuses on the strategic management of diversification as a way to improve the financial performance of companies. The scholar analysed the application of various diversification strategies to achieve sustainable development and increase the competitiveness of enterprises. He emphasised the effectiveness of horizontal and vertical diversification of small and medium-sized enterprises, particularly in retail. The emphasis in the current work was also placed on these types of diversification, which made it possible to obtain a more detailed understanding of the impact of such strategies on the development efficiency of enterprises.

The research by K. Arai & S. Hayashi (2021) showed the importance of diversification as a tool for reducing risks and increasing the competitiveness of enterprises in a changing economic environment. The authors emphasised the importance of a comprehensive approach taking into account both internal factors of the company and external

market conditions. Their research explained business diversification strategies, especially in the context of companies operating in several related industries. The effectiveness of the approach was confirmed by the practical example of the implementation of such strategies in the agro-industrial sector, described in the current work.

The work by I. Razak (2022) focuses on general diversification trends at the macro level, with an analysis of economic factors influencing this process in the context of global changes. In turn, the presented research focused on specific examples of vertical and geographical diversification using the example of MHP, which allowed for a deeper assessment of the advantages and risks of such strategies for individual enterprises in real conditions.

The research by M. Andreasson *et al.* (2024) focuses on the study of digital diversification processes in established companies, emphasising the implementation of digital innovations, both related and unrelated to the core activities of companies, to scale their business. The authors analysed various digital transformation strategies that allow enterprises to effectively diversify their activities, optimise business processes, and improve financial performance. In contrast, the current research focuses on energy diversification in the agro-industrial sector, particularly on the introduction of alternative energy sources as a tool to reduce dependence on traditional energy resources and increase the financial stability of enterprises. When considering energy diversification, the emphasis was placed on the impact of this strategy on the financial results of agricultural companies, allowing for an assessment of how the integration of new energy solutions contributes to cost reduction and increased competitiveness of enterprises. Although digital technologies have significant potential for business transformation, this research focuses primarily on energy innovations as one of the main directions of diversification in the agro-industrial sector.

Given that effective leadership allows for the reduction of the negative impact of diversification on a company's financial results, the research by E.E. Silalahi & I.B. Dwinanto (2021) underscores the importance of the CEO's role in managing company expansion. The authors emphasised the importance of leadership in managing risks associated with diversification, which helps minimise its negative impact on the business. In the context of this work, the current research focused on various diversification strategies and their impact on the company's financial performance. This allows for an assessment of the effectiveness of these strategies through specific financial results, which is important for achieving stability and sustainable development of the enterprise.

The study by J.C.D. Valliant *et al.* (2021) examined the impact of climate change on agriculture and farmers' adaptation strategies, particularly through the diversification of agricultural products. However, this approach focused on the family and social aspects of management, which limits the application of the strategy at broader levels. In contrast, in this research, the strategic approach

to diversification is more universal, in particular, vertical and geographical diversification are considered, which allows for the adaptation of strategies to different types of enterprises and industries.

The main advantage of diversification is the reduction of risks associated with market fluctuations and changes in the economic environment. However, the effectiveness of these strategies depends on the correct choice and integration with other management practices, such as cost optimisation and strategic management. The examples studied confirm that diversification is a necessary element for ensuring the long-term development of enterprises in changing economic conditions.

### CONCLUSIONS

The research established that diversification is an effective strategic tool for enhancing a company's resilience in the face of economic instability. It allows for a reduction in dependence on a single type of activity, lowers risks, and ensures stable revenue growth. An analysis of the main theoretical approaches to diversification showed that companies can employ various strategies, including horizontal, vertical, concentric, and conglomerate diversification, each with its own advantages and challenges.

The practical analysis of diversification strategies using the example of PJSC "Myronivsky Hliboproduct" confirmed that their implementation contributes to the growth of the company's financial stability and market opportunities. Thanks to diversification, the company's total revenue increased from USD 244 million in 2016 to USD 3 billion in 2023, indicating a significant improvement in financial indicators. The share of export revenue increased from 47% (USD 115 million) in 2016 to 60% (USD 1.8 billion) in 2023, demonstrating the success of geographical diversification.

Key strategies in achieving these results included vertical integration, the development of new brands, and entry into international markets. In particular, the expansion of the product range through new brands such as "Lehko!" and "Döner Market" contributed to the company's increased competitiveness. Furthermore, investments in bio-energy allowed for a reduction in dependence on traditional energy resources and increased production efficiency.

The assessment of diversification effectiveness using financial indicators showed that the company's operating

profit increased from USD 68 million in 2016 to USD 339 million in 2023 and to USD 346 million for the three quarters of 2024. At the same time, EBITDA increased from USD 89 million in 2016 to USD 445 million in 2023 and to USD 437 million for the three quarters of 2024, indicating a growth in business profitability.

However, the research identified a number of challenges associated with the implementation of diversification strategies. The main difficulties include the necessity of significant investments in new business lines, the complexity of managing expanded structures, and the risks associated with entering new markets. For example, the operating profit margin decreased from 28% in 2016 to 11% in 2023, indicating the need to optimise costs and improve the efficiency of resource utilisation. However, in 2024, it rose to 20%, suggesting a stabilisation of the situation.

To improve the mechanism of diversification management, companies are recommended to expand horizontal diversification, particularly by entering new segments of the consumer market, such as the production of beverages or frozen food. Strengthening strategic partnerships and cooperation mechanisms to reduce logistics and supply costs is also an important direction.

Thus, diversification is a powerful tool for enhancing a company's competitiveness. However, its effectiveness depends on careful strategic planning, analysis of the market environment, and the use of innovative technologies. Further research in this area could focus on optimising the management of diversification strategies in conditions of global instability. The prospects for research include the development of more flexible models for managing diversification that take into account the dynamic changes in the global economy and technological innovations. A limitation of the research is the analysis of data from a specific company, which may complicate the generalisation of conclusions to other industries and types of business.

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## Комплексний організаційно-економічний механізм управління ефективною диверсифікацією підприємства

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**Анотація.** Метою дослідження було розробити підходи до оптимізації управління диверсифікацією підприємства в умовах сучасних економічних змін для підвищення конкурентоспроможності та фінансової стабільності. В процесі дослідження було розглянуто теоретичні основи управління диверсифікацією, а також оцінено застосування стратегій вертикальної та географічної диверсифікації, що дозволяють зменшити ризики і підвищити стабільність компанії. Основні результати дослідження продемонстрували, що стратегія диверсифікації, впроваджена Публічним акціонерним товариством «Миронівський хлібопродукт», має значний позитивний вплив на фінансові результати компанії. У період з 2016 по 2024 роки загальний дохід компанії зріс з 244 млн доларів США до 3 млрд доларів США, що становить приріст на 14 %. Експортний дохід за той самий період збільшився на 52 %, досягнувши 1,8 млрд доларів США, що складає 60 % від загального доходу компанії. Крім того, операційний прибуток зріс на 33 %, а прибуток до вирахування відсотків, податків, зносу та амортизації (ЕБІТДА) зріс на 16 %, що свідчить про успішну реалізацію стратегій диверсифікації. Одним із головних результатів стало зменшення залежності від внутрішнього ринку, завдяки розширенню географії експорту та розвитку інноваційних напрямів, зокрема в енергетичному секторі. Інвестиції в зелену енергетику дозволили знизити операційні витрати, а також підвищити екологічну ефективність виробничих процесів. Також диверсифікація в сегменті роздрібної торгівлі та розширення мережі брендів, таких як «Наша Ряба» та «М'ясомаркет», сприяли збільшенню ринкової присутності і додатковому зростанню доходів. Висновки свідчать, що стратегія диверсифікації була ефективною та сприяла зростанню фінансової стійкості компанії. Результати дослідження підтверджують важливість інтеграції нових напрямів діяльності для зменшення ризиків і забезпечення довгострокової стабільності

**Ключові слова:** фінансові показники; інвестиції; фінансові ризики; конкурентоспроможність; стійкість



## Technological infrastructure and connectivity on startup sustainability: A study of selected fintech industries

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**Abstract.** Economic growth and personal well-being have been greatly affected by the spread of digital financial services, especially in emerging nations. The purpose of this study was to investigate the impact of technological infrastructure and connectivity on startup sustainability of selected fintech industries. Specifically, the study examined the effects of cybersecurity measures, 5G and beyond, and Internet of Things (IoT) on startup sustainability. A survey research design was selected, involving a population of 10,896 workers from 15 different fintech businesses. Using Krejcie and Morgan's formula, the final sample size was determined to be 386 individuals. Data collected was analysed using PLS-SEM. Findings revealed that 5G and beyond had the strongest effect on startup sustainability ( $\beta = 0.363$ ,  $t = 6.005$ ,  $p < 0.000$ ), followed by cybersecurity measures ( $\beta = 0.252$ ,  $t = 4.262$ ,  $p < 0.000$ ), and Internet of Things ( $\beta = 0.223$ ,  $t = 3.862$ ,  $p = 0.000$ ). It was concluded that technological infrastructure and connectivity were crucial for startup sustainability of selected fintech industries. It is therefore strongly recommended that a manager of a fintech startup concentrate on ensuring that the fundamental components of the behavioural fintech ecosystem, such as the Internet of Things, 5G and beyond, and cybersecurity measures, are suitably implemented and practised within the company to increase the sustainability of fintech startups. The practical value of this study lies in providing actionable insights for fintech startup managers to prioritise investments in technological infrastructure and connectivity, such as 5G, IoT, and cybersecurity, thereby enhancing their companies' long-term sustainability and competitiveness in the rapidly evolving digital financial landscape

**Keywords:** cybersecurity measures; 5G; Internet of Things; digital connectivity; emerging markets; financial technology

### INTRODUCTION

In the dynamic landscape of financial services, the integration of advanced technologies has become a pivotal factor in shaping the operational efficiency and growth trajectories of financial technology (fintech) companies. The infusion of digital tools and platforms has not only streamlined financial operations but also introduced innovative business models that cater to a diverse clientele. This technological evolution has been instrumental in enhancing the accessibility and quality of financial services, thereby fostering greater financial inclusion. For instance, fintech innovations enabled the development of sustainable investment platforms that empower investors

to allocate capital towards environmentally friendly projects, aligning financial objectives with sustainability goals (Hadizadeh *et al.*, 2024). Additionally, fintech's use of data analytics and machine learning simplified the individualisation of financial services, which increased client engagement and satisfaction (Odegbesan *et al.*, 2023). These developments demonstrate how technology is revolutionising the financial industry by fostering innovation and improving service rendering.

Economic growth and personal well-being are greatly affected by the spread of digital financial services, especially in emerging nations. Underprivileged communities

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benefit from the virtual infrastructure created by the widespread use of mobile devices and internet connectivity. For instance, greater acceptance of digital financial services was favourably connected with the growth of mobile network coverage in sub-Saharan Africa, which led to the promotion of financial inclusion (Ndofirepi & Steyn, 2024). This pattern reflects a larger worldwide trend where digital finance platforms are expanding access to financial services, which helps to reduce poverty and promote economic growth. Fintech's potential to close financial gaps and boost economic activity is best demonstrated by its capacity to reach isolated and previously unbanked people. Additionally, fintech's contribution to green finance projects has attracted a lot of attention. Fintech companies are encouraging environmentally conscious financial practices and supporting investments in sustainable projects by utilising data-driven methodologies. For instance, the use of blockchain technology improved carbon trading and sustainable supply chains' efficiency and transparency, which helps to maintain a sustainable environment (Hajoary *et al.*, 2024). Fintech's varied role in tackling global environmental issues and promoting economic growth is highlighted by this junction of finance and sustainability.

A major problem for firms striving for sustainability is cybersecurity. Because they sometimes lack the means to put strong cybersecurity measures in place, small businesses are prime targets for cybercriminals. S. Asoba & N. Mefi (2023) noted that small enterprises' lack of cybersecurity infrastructure and experience makes them particularly susceptible to cyberattacks. Data breaches, monetary losses, and reputational harm are all probable outcomes of this vulnerability, which can jeopardise a startup's long-term survival. Additionally, startups must constantly upgrade their security policies to protect against changing threats due to the quick rate of technology advancement. This can be a challenging and resource-intensive undertaking. This problem is exacerbated by the absence of standardised cybersecurity frameworks, since startups may find it cumbersome to put in place efficient security measures in the absence of defined rules (Wu *et al.*, 2023). A systematic strategy to cybersecurity is needed to address these issues, one that incorporates best practices, staff training, and investments in security infrastructure (Rathi, 2023).

For startups, the introduction of 5G technology brings both possibilities and difficulties. 5G raises serious security issues despite promising improved capabilities and faster communication. A review by D. Han *et al.* (2024) claimed that startups confront a significant obstacle due to the larger attack surface in 5G networks, which is brought on by a greater number of connected devices and network complexity. Furthermore, 5G's use of network slicing may introduce vulnerabilities; security lapses in one virtual network slice could jeopardise others, therefore strong isolation measures are required to safeguard private information. Furthermore, if not appropriately handled, the intricacy of the new authentication methods in 5G networks may result in vulnerabilities. To reduce these dangers, startups must

spend money on innovative security measures like end-to-end encryption and ongoing security monitoring (Zhang & Ji, 2024). Significant capital expenditure is also necessary for the quick rollout of 5G infrastructure, which might be a major hardship for businesses with little funding (Autio *et al.*, 2024). As a result, even though 5G promises exciting developments, companies must carefully handle these obstacles to properly reap the rewards.

Startups can improve operations and consumer experiences in innovative ways through the Internet of Things (IoT). IoT solution integration, however, comes with a series of complications that may affect sustainability. According to V. Hernández *et al.* (2024), a significant obstacle is the absence of standards since it complicates the integration of devices from various manufacturers and prevents the development of a smooth IoT ecosystem. Privacy and data security issues are also significant; IoT devices' massive data collecting raises the possibility of cyberattacks and data breaches, which could jeopardise personal data. Furthermore, for startups with tight budgets, the prohibitive implementation costs of IoT solutions, which include the price of purchasing and deploying devices and infrastructure, can be unaffordable (Ossen *et al.*, 2023). Since dependable networks are necessary for efficient operation, the implementation of IoT solutions is made more challenging by the limited infrastructure and connectivity in some areas. Startups must seek uniformity in IoT devices, engage in strong security measures, and carefully consider the cost-benefit ratio of deploying IoT solutions to overcome these obstacles (Eseigweneme *et al.*, 2024).

The objectives of this study were to ascertain how cybersecurity measures affected startup sustainability, examine how 5G and beyond impacted startup sustainability, and assess how the Internet of Things (IoT) influenced startup sustainability. The purpose of this study was to provide actionable insights for fintech startup managers to prioritise investments in technological infrastructure and connectivity, such as 5G, IoT, and cybersecurity, thereby enhancing their companies' long-term sustainability and competitiveness in the rapidly evolving digital financial landscape.

## LITERATURE REVIEW

Presently, technological infrastructure is crucial for organisations since it offers the framework required for smooth communication and effective operations. Together, these components hardware, software, networks, and data centres allow businesses to operate efficiently in the digital age. A crucial element of this infrastructure – connectivity – guarantees the seamless integration of these systems and makes it easier for data and information to be shared across several channels. Strong technology infrastructure and connectivity are becoming increasingly significant as firms expand and adopt innovative digital technologies (Dahri *et al.*, 2024).

Connectivity and technology infrastructure are closely related, and this relationship is essential to sustainability and corporate strategy. Businesses can innovate and

strengthen their competitive edge using well-developed technology systems (Hercheui & Cornford, 2025). Additionally, data-driven decision-making is supported by high-speed internet and cloud technologies, which improve client experiences and streamline operational procedures (Chen *et al.*, 2023). Businesses may be flexible and adaptable to shifting market conditions by having the ability to communicate with partners and customers easily, even when they are located on other continents (Khimani & Singhal, 2024). In this regard, the creation of effective IT infrastructure promotes long-term strategic growth in addition to ensuring daily business operations.

According to K. Sekhar (2024), startup sustainability is the idea of incorporating social, environmental, and economic factors into corporate operations to ensure the long-term viability of new endeavours. This strategy places a strong emphasis on the value of implementing eco-friendly procedures, guaranteeing decent working conditions, and giving back to the community while profiting (Li *et al.*, 2017). Sustainable startups are increasingly regarded as trailblazers, establishing a model for incorporating corporate social responsibility into business strategies, as noted by U. Dzakiy (2018). Apart from increasing their brand value, these firms attract a growing number of socially conscious customers by embracing environmental goals.

For startups, obtaining sustainability is a complex process that calls for creativity and adaptation at various phases of growth. Startups prioritise creating a distinctive value proposition and achieving market fit in their early phases, often with little funding (Robertson & Lapiņa, 2023). But when firms get older, including sustainability becomes essential to their success. This could entail developing sustainable supply chains, optimising resource usage, and implementing green technology (Tan & Miller, 2023). Partnerships with like-minded groups can also help firms enhance their sustainable practices. As a result, sustainability becomes crucial for both satisfying customer demands and building a strong basis for resilience and long-term growth (Lammers *et al.*, 2022).

Beginning sustainability is significantly affected by technological infrastructure and connection, which offer the resources and tools required for expansion and environmental responsibility. Startups can lower operating costs, track environmental effects, and effectively implement sustainable practices by having access to innovative technologies like cloud computing and digital platforms (Prasetyo *et al.*, 2025).

Integrating cybersecurity safeguards from the beginning helps assure a startup's survival and success in a competitive market, since many lack the means to recover from such disasters (Danchuk & Danchuk, 2024). Additionally, entrepreneurs can avoid legal problems that could result from non-compliance, which could negatively affect their sustainability, by following international standards like the GDPR. Startups can improve their client experience, customise services, and streamline their business models by processing massive amounts of data in real time. 5G also facilitates smooth integration across a range of sectors,

such as healthcare, banking, and logistics, which helps new businesses in these areas grow quickly (Yong *et al.*, 2022). Although 5G has many advantages, there are drawbacks as well that companies must overcome to maintain their viability. Smaller companies may find it challenging to fully benefit from 5G technology due to the prohibitive cost of the equipment required to support these networks (Bigliardi *et al.*, 2025). Furthermore, as 5G becomes more widely used, cybersecurity issues become more pressing since the wider network may expose companies to new security flaws (Hadizadeh *et al.*, 2024). Startups face the difficulty of striking a balance between the advantages of 5G's expanded capabilities and the requirement for strong security frameworks to safeguard their business operations and client information (Odegbesan *et al.*, 2023). In a fiercely competitive and rapidly changing market, startups that make cybersecurity investments in tandem with 5G adoption will be better positioned to capitalise on its potential while guaranteeing long-term resilience and growth (Ndofirepi & Steyn, 2024).

Furthermore, by providing more customised experiences like smart gadgets that adapt to consumers' preferences IoT can raise customer happiness (Hajoary *et al.*, 2024). Long-term sustainability is supported by these qualities, which enable startups to scale operations effectively and offer distinctive value propositions that set them apart from rivals (Asoba & Mefi, 2023). However, privacy and security issues become more prevalent as the number of connected devices rises. Since every IoT device can become a target for cyberattacks, startups must put strict security measures in place (Wu *et al.*, 2023). Furthermore, as startups install more devices, there is rising concern about the environmental impact of IoT, including the problem of electronic waste, or e-waste (Rathi, 2023). When adopting IoT, startups should prioritise sustainable methods like recycling outdated models and building gadgets with longer lifespans (Han *et al.*, 2024). Startups can use IoT to stimulate growth and innovation while guaranteeing the long-term viability of their business by tackling cybersecurity and environmental issues (Zhang & Ji, 2024).

Introduced by E. Autio *et al.* (2024), the Technology-Organisation-Environment (TOE) hypothesis examines the variables affecting the adoption of technological breakthroughs in companies. It highlights the three key contexts technology, organisation, and environment that together influence a company's capacity to embrace and incorporate technology. The organisational context includes a company's resources, culture, and management; the technological context is concerned with the state and preparedness of the technology; and the environmental context includes external factors like industry trends, market competition, and regulatory pressures (Hernández *et al.*, 2024). The concept is especially helpful for understanding how fintech firms use connection and technology infrastructure to secure their long-term viability in a changing market.

According to the TOE theory, companies assess their technological readiness based on both internal resources and external forces, and technology adoption is

influenced by both internal and external environmental factors (Ossen *et al.*, 2023). It is criticised, meanwhile, for being unduly general and failing to address the particular subtleties of rapidly changing industries like fintech, where technical change happens at a breakneck pace. Notwithstanding these objections, the TOE theory offers insightful information about how organisational preparedness and external elements, including market demand and regulatory restrictions, influence the technological infrastructure and connectivity choices made by fintech businesses. Analogous studies demonstrated that, specifically in tech-driven businesses like fintech, matching organisational and environmental aspects with technological skills is essential for startup sustainability (Eseigweneme *et al.*, 2024). Thus,

the combination of organisational capabilities and external conditions is a key factor in the sustainable development of startups in the fintech sector.

### MATERIALS AND METHODS

This study employed a survey research approach to collect data from a population of workers in specific fintech sectors and characterise the phenomenon pertaining to the influence of connectivity and technology infrastructure on startup sustainability. As of 2024, 10,896 workers from 15 different fintech businesses in Nigeria made up the study's population. The study focused on 15 fintech company offices in Ilorin, Kwara State, Nigeria. The companies are presented in Table 1.

**Table 1.** Fintech firms in Nigeria

Seq. No.	Fintech industries	Employees
1	Opay	1,542
2	PalmPay	1,330
3	Moniepoint Inc.	2,241
4	Kuda	200
5	Piggyvest	120
6	Paga	383
7	Cowrywise	555
8	Paystack	237
9	Carbon	502
10	Fairmoney	870
11	Flutterwave	930
12	Remita	90
13	Interswitch	1,614
14	Bankly	90
15	Bamboo	192
Total		10,896

**Source:** compiled by the author of this study

A questionnaire was used to collect the information required for this study. Overall, 357 responses, or 92.5% of the expected sample size, were collected; 29 more responses are required to achieve the expected sample size. Thus, the authentic responses comprised the data used in this study. Employees from different departments inside the fintech companies were chosen using a multi-stage sampling process including stratified sampling to select by department and simple random sampling to select respondents from each department to determine the right sample size. Using Krejcie and Morgan's formula, 386 individuals were selected as the final sample size, suitable for a moderate population. A structured questionnaire was the primary data collection instrument used in this investigation. The questionnaire was designed to cover the major aspects under study which included several items with a 5-point Likert scale options as response options.

The survey was conducted following the ethical standards for working with people (American Sociological Association..., 2018). Respondents' participation in the survey was voluntary, consent to take part and publish the results

was requested directly from the respondents; confidentiality was guaranteed and maintained; there was no discrimination or pressure on the respondents. To assess the validity of the questionnaire and ascertain whether it accurately gauges the influence of connectivity and technological infrastructure on startup sustainability, construct validity was employed in this study. The internal consistency questions in the questionnaire were subjected to a Cronbach Alpha and composite reliability analysis since it helps to determine the internal consistency of the constructs of the study. Structural equation modelling (SEM) was employed to assess how the independent factors affected the dependent variable. Startup sustainability was the dependent variable in this study report, whereas technological infrastructure and connectivity was the independent variable. Since structural equation modelling (SEM) was employed in the report, the following model was used:

$$SS = f(\text{cybersecurity [DEM + TDC + ACM]} + 5G \text{ and beyond [NLR + ECA + UHSC]} + \text{Internet of Things (IoT) [RTDA + ASI + DIS]}, \quad (1)$$

where SS – Startup Sustainability; DEM – Data Encryption Methods; TDC – Threat Detection Capabilities; ACM – Access Control Measures; NLR – Network Latency Reduction; ECA – Edge Computing Adoption; UHSC – Ultra-High-Speed Connectivity; RTDA – Real-Time Data Analytics; ASI – Autonomous System Integration; DIS – Device Interoperability Standards.

## RESULTS AND DISCUSSION

Strong cybersecurity measures must be put in place if startups want to remain sustainable over the long run. Cybersecurity enhances the company's overall credibility in addition to safeguarding private information and intellectual property, which is crucial for startups that mostly depend on client loyalty (Dahri *et al.*, 2024). Startups can reduce the risk of data breaches and cyberattacks, which can result in large financial losses and reputational harm, by implementing a proactive cybersecurity strategy (Chen *et al.*, 2023). Integrating cybersecurity safeguards from the beginning helps assure a startup's survival and success in a competitive market, since many lack the means to recover from such disasters (Hercheui & Cornford, 2025). Hence, the first hypothesis states as follows: H1: Startup sustainability is positively affected by cybersecurity measures. Startups now have more options than ever before to revolutionise their businesses because to the introduction of 5G technology. 5G makes it possible to develop applications like real-time data analytics, augmented reality (AR), and sophisticated Internet of Things (IoT) solutions that were previously impractical due to its faster data throughput and lower latency (Khimani & Singhal, 2024). This improved connectivity can induce product and service innovation, giving entrepreneurs a major competitive advantage in areas that move quickly (Sekhar, 2024). Hence, the second hypothesis states as follows: H2: Startup sustainability benefits from 5G and

beyond. Startups can use the Internet of Things (IoT) to find creative methods to streamline operations, cut expenses, and enhance customer satisfaction. IoT allows companies to gather useful data for resource management, predictive analytics, and customised services by linking different systems and devices (Li *et al.*, 2017). For example, real-time inventory level tracking via IoT-enabled sensors can cut waste and improve resource allocation (Dzakiy, 2018). Hence, the third hypothesis states as follows: H3: Startup sustainability benefits from the Internet of Things (IoT). All these hypotheses were tested to cumulatively determine the effects of technological infrastructure and connectivity on startup sustainability. This provided accurate details of the relationship as well as cause and effect of the various components of technological infrastructure and connectivity.

Table 2 presents the mean and standard deviation of the variables/indicators used in the study and obtained from the questionnaire used for the study. The study considered the sustainability of startups, tech infrastructure, and connectivity. A series of significant indicators were evaluated, each of which provided insight into a distinct aspect of these topics. For both academics and practitioners, the mean scores, standard deviations, and number of observations used for each indicator offer insightful information and significant consequences. The comparatively high mean score (above 3) for the questions indicated that respondents believed connectivity and tech infrastructure to be significantly related to the sustainability of startups. In each instance, the standard deviation was modest, suggesting that the replies deviated little from the mean. These descriptive findings highlighted the complex relationship between connection and digital infrastructure and the sustainability of companies. These highlighted how crucial it is for companies to be sustainable through effective tech infrastructure and connections.

**Table 2.** Descriptive analysis of responses and normality test

	Mean	Standard deviation	Excess kurtosis	Skewness	Number of observations used
5G and beyond 1	2.941	1.259	-1.047	0.035	357.000
5G and beyond 2	3.555	1.333	-1.061	-0.471	357.000
Cybersecurity measures 1	3.092	1.309	-1.134	-0.262	357.000
Cybersecurity measures 2	3.361	1.207	-0.742	-0.406	357.000
Internet of Things 1	2.689	1.235	-0.960	0.206	357.000
Internet of Things 2	3.235	1.281	-1.111	-0.158	357.000
Startups' sustainability 1	3.639	1.327	-0.741	-0.681	357.000
Startups' sustainability 2	3.639	1.255	-0.891	-0.521	357.000
Startups' sustainability 3	3.050	1.295	-1.075	-0.071	357.000

**Source:** developed by the author of this study using SmartPLS Output

According to the distribution's normality results, the sample size was greater than 100, meaning that an absolute skewness value of + 1.0 or less was required for the data to be considered normal. Additionally, for kurtosis, a normal peak must have an absolute value of  $\pm 3.0$  because any result below that threshold could be serious and cause concern. All

variables were under the absolute value criterion of  $\pm 1.0$ , according to the normality results, while the kurtosis values were within the value of  $\pm 3.0$  in absolute terms. The results of the normality test indicated that all the data entered for the study were normally distributed and suitable for further analysis and deductions. This suggested that all the variables

used to measure the regulatory framework had a moderate mean with little deviation from the mean, and that they were all normally distributed. Therefore, the variables were useful for establishing the causal relationship between the sustainability of startups and tech infrastructure and connectivity.

Cybersecurity measures, 5G and beyond, and the Internet of Things against startups' sustainability were the variables used to quantify digital infrastructure and connectivity to evaluate their influence on sustainability. These

variables were crucial for understanding how technological advancements and security practices influenced the long-term sustainability of fintech startups in the digital age. Analysing their effects can help identify key strategies to enhance the resilience and growth potential of these innovative enterprises.

Figure 1 presents the impact of connection and technology infrastructure on the sustainability of startups as evaluated by the structural route model.

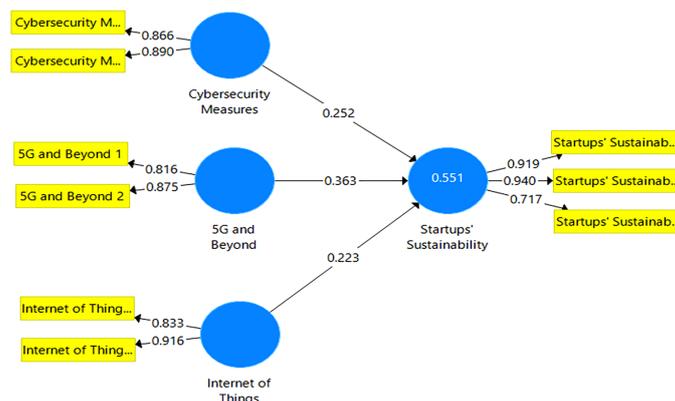


Figure 1. Path model of tech infrastructure and connectivity and startups' sustainability

Source: developed by the author of this study using SmartPLS Output

The model had one dependent variable – the sustainability of startups, and three independent variables – cybersecurity measures, 5G and beyond, and the Internet of Things. The model's findings demonstrated that the sustainability of startups was significantly and positively affected by all three independent variables. This indicated that connectivity and digital infrastructure were critical for businesses since they could improve the

sustainability of startups. The specific effects demonstrated that every independent variable significantly affected the viability of startups. This suggests that to improve the sustainability of startups, companies must concentrate on digital infrastructure and connection. Table 3 presents significant statistical indicators pertaining to the validity and construct reliability of the study's four latent variables.

Table 3. Construct reliability and validity

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
5G and beyond	0.706	0.834	0.716
Cybersecurity measures	0.703	0.871	0.771
Internet of Things	0.701	0.867	0.766
Startups' sustainability	0.827	0.897	0.747

Source: developed by the author of this study (SmartPLS 3.2.9 Output)

These metrics helped to evaluate how well these variables quantified the fundamental ideas they were meant to reflect. Cronbach's Alpha and Composite dependability were the two key measurements used to assess construct dependability. Cronbach's Alpha assesses a latent variable's internal consistency by determining the extent to which each item is related to every other item. Decent quality was shown by the internal consistency scores of the four latent variables, which were above 0.7. Since these values were much greater than the widely accepted threshold of 0.7, they suggested that the items within each variable were reliable markers of the related structures. Composite reliability is another construct reliability statistic that accounts for both internal consistency and the relationships between the items and the

latent variable. All the variables in this study showed strong composite dependability, providing a more trustworthy measure of reliability, with all values above 0.7. The latent variables' high values suggested that they were trustworthy predictors of the constructs they represented. The table also presents the Average Variance Extracted (AVE), which evaluated each latent variable's convergent validity. The degree to which items in a variable measure the same underlying notion and are related to one another is known as convergent validity. All the AVE values in the table were greater than the suggested threshold of 0.5. This indicates that the items for each latent variable were effectively converging and measuring their respective constructs as a whole. The findings suggest that the latent variables under study had

high construct validity and reliability. The choice of these variables as valid and dependable measures in the study was supported by their strong composite reliability, high internal consistency, and adequate convergent validity.

Compelling evidence of discriminant validity among the latent variables Internet of Things, cybersecurity measures, startups' sustainability, and 5G and beyond is supported by the findings of the discriminant validity study in Table 4.

**Table 4.** Discriminant validity

	5G and beyond	Cybersecurity measures	Internet of Things	Startups' sustainability
5G and beyond	0.846			
Cybersecurity measures	0.703	0.878		
Internet of Things	0.677	0.595	0.875	
Startups' sustainability	0.692	0.641	0.619	0.864

**Note:** the table is presented with empty cells, as it displays only the square roots of the Average Variance Extracted (AVE) on the diagonal and the intercorrelations of the latent variables in the lower triangle, consistent with the standard output format generated by SmartPLS software

**Source:** developed by the author of this study using SmartPLS 3.2.9 Output

Whether these constructs were separate and not strongly associated with each other was determined by discriminant validity. Examining the correlations showed that off-diagonal values, representing correlations between different variables, were significantly lower than diagonal values, which represented each variable's correlation with itself. This supported the idea that each latent variable was unique and measured a separate feature of the overall construct by indicating that each latent variable had a stronger relationship with itself than with the other constructs. The Internet of Things was highly correlated with itself, more so than it was correlated with cybersecurity, the sustainability of startups, 5G and beyond. Analogously, the sustainability of startups was strongly correlated with itself as opposed to the other characteristics. However, this was also true for other variables in

their respective contexts. These findings demonstrated that rather than being merely various expressions of the same underlying construct, the latent variables under study were measuring unique concepts. Considering that it successfully distinguished between these crucial elements – the Internet of Things, cybersecurity precautions, the viability of startups, and 5G and beyond – it appears that the measurement approach was suitable for the objectives of the present study.

The study evaluated the independent variable's correlation. The purpose was to determine whether two independent variables were associated and yielded the same results. In this study, the expected association between the independent variables was evaluated using the variance inflation factor (VIF). The VIF of the construct of the study is presented in Table 5.

**Table 5.** Inner VIF values

	5G and beyond	Cybersecurity measures	Internet of Things	Startups' sustainability
5G and beyond				2.490
Cybersecurity measures				2.087
Internet of Things				1.948
Startups' sustainability				

**Note:** the table is presented with empty cells, as it displays only the square roots of the Average Variance Extracted (AVE) on the diagonal and the intercorrelations of the latent variables in the lower triangle, consistent with the standard output format generated by SmartPLS software

**Source:** developed by the author of this study using SmartPLS 3.2.9 Output

Table 5 presents the VIF values for the latent factors pertaining to the sustainability of startups. It was encouraging that the VIF values for cybersecurity, the Internet of Things, and 5G and later were all far below the 10-point threshold. This implies that these latent variables did not exhibit significant multicollinearity. In other words, these variables were not significantly associated

with each other, hence multicollinearity was not a major concern when they were included in this study. This subsection provided the coefficient of determination score. The subsection also included the effect size score, as well as the path coefficient result.

Table 6 presents the quality of fit of a model as measured by the coefficient of determination, or R-squared.

**Table 6.** Coefficient of determination score

	R-squared	R-squared adjusted
Startups' sustainability	0.551	0.547

**Source:** developed by the author of this study using SmartPLS 3.2.9 Output

The independent or latent factors included in the startups' sustainability model explained approximately 55.1% of the variability in the dependent variable (startups' sustainability), according to the model's R-squared value of 0.551. This suggests that the model captured and explained the observed variations in the purchasing experience. The adjusted R-squared value was 0.547. This resulted in a more careful evaluation of the model's quality of fit. The adjusted R-squared value was almost the same as the standard R-squared value, suggesting that the inclusion of the independent variables in the model was unlikely to cause overfitting or excessive complexity. This implied that even when accounting for probable problems associated with model complexity, the explanatory power of the model was still robust. The model's performance did not appear to be negatively affected by the inclusion of numerous latent variables, and the R-squared and adjusted

R-squared values indicated that the startups' sustainability model was reasonably sound in explaining startups' sustainability variability.

The effect size, often denoted as f-square, is presented in Table 7. In statistical analysis, this quantifies the strength of the correlation or influence of independent variables on a dependent variable. This study evaluated the effect sizes of several latent variables on "startups' sustainability". Every independent variable had a value over 0.02, which was regarded as a minor effect size. This implied that every variable had a moderate effect size, i.e., they all significantly affected the sustainability of startups. In other words, variations in any of the variables can account for a moderate amount of the variation in the sustainability of startups.

The study tested the hypothesis that tech infrastructure and connectivity do not affect startups' viability using bootstrap route coefficient analysis, as presented in Table 8.

**Table 7.** Assessment of the effect size (f<sup>2</sup>)

	5G and beyond	Cybersecurity measures	Internet of Things	Startups' sustainability
5G and beyond				0.118
Cybersecurity measures				0.068
Internet of Things				0.057
Startups' sustainability				

**Note:** the table is presented with empty cells, as it displays only the square roots of the Average Variance Extracted (AVE) on the diagonal and the intercorrelations of the latent variables in the lower triangle, consistent with the standard output format generated by SmartPLS software

**Source:** developed by the author of this study using SmartPLS 3.2.9 Output

**Table 8.** Bootstrapping results showing path coefficient for structural model

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
5G and beyond → Startups' sustainability	0.363	0.371	0.061	6.005	0.000
Cybersecurity measures → Startups' sustainability	0.252	0.247	0.059	4.262	0.000
Internet of Things → Startups' sustainability	0.223	0.222	0.058	3.862	0.000

**Source:** developed by the author of this study using SmartPLS 3.2.9 Output

The findings showed that the viability of startups was significantly affected by the Internet of Things, cybersecurity measures, and 5G and beyond as components of digital infrastructure and connectivity. A thorough analysis of the relationship between cybersecurity measures, the Internet of Things, and advancements in 5G technology with the sustainability of startups demonstrated a statistically significant correlation among these variables. Compelling evidence to reject the null hypothesis was suggested by the T statistics being over 1.96 and the P-values being less than the conventional significance level of 0.05. As a result, the sustainability of startups was greatly affected by factors related to tech infrastructure and connectivity, such as the Internet of Things, cybersecurity, and 5G and beyond.

The findings of the study revealed that the sustainability of startups was statistically affected by all three factors: cybersecurity, the Internet of Things, and 5G and

beyond. Specifically, the results indicated that cybersecurity measures significantly affected startups' sustainability ( $\beta = 0.252, t = 4.262, p < 0.000$ ), supporting the H1 hypothesis. This underscored the critical role of robust cybersecurity practices in protecting startups from potential cyberthreats, thereby enhancing their operational resilience and long-term viability.

Furthermore, the Internet of Things was found to substantially influence the startups' sustainability ( $\beta = 0.223, t = 3.862, p < 0.000$ ), thereby supporting the H2 hypothesis. The IoT enables startups to optimise their operations, reduce waste, and enhance resource utilisation, which are essential for achieving environmental sustainability and operational efficiency. This aligns with the findings of G. Robertsons & I. Lapiņa (2023), who demonstrated that IoT technology not only increased operational efficiency but also promoted environmental sustainability by

reducing energy usage. Additionally, the study found that 5G and beyond had the strongest effect on startups' sustainability ( $\beta = 0.363$ ,  $t = 6.005$ ,  $p < 0.000$ ), thereby supporting the H3 hypothesis. Advanced connectivity through 5G and beyond enhanced operational efficiency, fostered transparency, and built credibility with partners and customers. This was consistent with the findings of Z. Tan & N. Miller (2023), who noted that improved connectivity was essential to establish trust and maintain a competitive edge in the market. The findings of the present study were corroborated by several other studies that highlighted the significance of technological infrastructure and cybersecurity in enhancing the sustainability of startups. For instance, T. Lammers *et al.* (2022) demonstrated that technical improvements enable startups to monitor their environmental impact and identify areas for waste reduction and resource optimisation. This aligns with the role of the Internet of Things in promoting sustainability by increasing operational efficiency and reducing energy usage, as found in the study by M. Prasetyo *et al.* (2025). Both studies support the idea that technological advancements are crucial for startups to achieve sustainability goals.

C. Yong *et al.* (2022) emphasised that data-driven insights enabled by strong IT infrastructure enable startups to make more accurate decisions about sustainability initiatives, such as reducing carbon emissions and increasing energy efficiency. This aligned with the findings of the current study, which highlighted the significant impact of 5G and beyond on startups' sustainability. Enhanced connectivity through advanced technologies like 5G not only improves operational efficiency but also fosters transparency and credibility with partners and customers, as noted by A. Chinedu *et al.* (2024).

The significance of cybersecurity in ensuring the sustainability of startups is also underscored by several studies. B. Bigliardi *et al.* (2025) and M. Hadizadeh *et al.* (2024) highlighted that establishing an organisational culture that prioritises security is crucial for reducing vulnerabilities and enhancing resilience against cyber threats. This was supported by the findings of the present study, which showed that cybersecurity measures significantly affected the startups' sustainability. O. Odegbesan *et al.* (2023) further emphasised the human element in cybersecurity, noting that investing in employee training and fostering a strong security culture can markedly improve startup sustainability.

T. Ndofirepi & R. Steyn (2024) conducted a mixed-methods study and found that startups with robust cybersecurity procedures and reliable infrastructure were better equipped to withstand disruptions, leading to improved financial performance and customer retention. This supports the current study's conclusion that the behavioural fintech ecosystem, including cybersecurity measures, is essential for startups' long-term sustainability. The findings of the present study were supported by several other studies that highlighted the critical role of technological infrastructure and cybersecurity in enhancing

the sustainability of startups. The behavioural fintech ecosystem, encompassing cybersecurity measures, the Internet of Things, and 5G and beyond, is essential for startups to achieve operational resilience, environmental sustainability, and long-term viability. These studies collectively emphasise the need for startups to invest in advanced technologies and robust cybersecurity practices to ensure their sustainability in a rapidly evolving digital landscape. Integrating these elements into core operations will help startups to better navigate the challenges of the digital age and achieve long-term success.

## CONCLUSIONS

The purpose of this study was to investigate the effects of technological infrastructure and connectivity on the sustainability of selected fintech startups, focusing on cybersecurity measures, the Internet of Things, and 5G and beyond. The findings confirmed that all three factors significantly influenced startup sustainability, thereby rejecting the null hypothesis that the behavioural fintech ecosystem had no discernible impact. Specifically, 5G and beyond had the strongest effect, followed by cybersecurity measures, and the Internet of Things. These findings aligned with the objective of this study to quantify the role of digital infrastructure in startup sustainability. The findings underscored the necessity of robust technological infrastructure for startups to thrive in a competitive and rapidly evolving digital landscape. Future research should explore the specific mechanisms through which these technologies enhance sustainability and investigate the potential of emerging technologies like artificial intelligence and blockchain in this context. Additionally, further studies could focus on the role of regulatory frameworks and policy interventions in fostering a supportive environment for fintech startups.

Considering the significant impact of cybersecurity on startup sustainability, it is crucial for fintech startups to invest in robust security protocols and employee training programmes. This will not only protect against cyber threats but also build trust with customers and partners. Startups must leverage IoT technologies to optimise operations and enhance resource management. By doing so, they can achieve greater efficiency and sustainability, ultimately improving their market position and competitiveness. To fully capitalise on the benefits of advanced connectivity, startups must prioritise the adoption of 5G and beyond technologies. This will enable them to deliver faster, more reliable services and foster innovation, which is essential for long-term success in the fintech industry.

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# Технологічна інфраструктура та підключення як чинники сталості стартапів: дослідження обраних фінтех-галузей

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**Анотація.** Економічне зростання та особисте благополуччя значною мірою зазнали впливу поширення цифрових фінансових послуг, особливо в країнах, що розвиваються. Метою цього дослідження було вивчення впливу технологічної інфраструктури та підключення на сталість стартапів в окремих фінтех-індустріях. Зокрема, дослідження розглядало вплив заходів з кібербезпеки, технологій 5G та новітніх рішень, а також Інтернету речей (IP) на сталість стартапів. Було обрано дизайн опитувального дослідження, яке охопило сукупність із 10 896 працівників із 15 різних фінтех-компаній. Відповідно до формули Крейчі та Морган, остаточний розмір вибірки склав 386 осіб. Зібрані дані були проаналізовані за допомогою PLS-SEM. Результати показали, що найбільший вплив на сталість стартапів мав фактор 5G і новітніх технологій ( $\beta = 0,363$ ,  $t = 6,005$ ,  $p < 0,000$ ), далі йшли заходи з кібербезпеки ( $\beta = 0,252$ ,  $t = 4,262$ ,  $p < 0,000$ ) та Інтернет речей ( $\beta = 0,223$ ,  $t = 3,862$ ,  $p = 0,000$ ). Зроблено висновок, що технологічна інфраструктура та підключення стали вирішальними для сталого розвитку фінтех-стартапів. У зв'язку з цим настійно рекомендується, щоб менеджери фінтех-стартапів зосередили увагу на впровадженні ключових елементів поведінкової фінтех-екосистеми, таких як Інтернет речей, 5G і новітні технології, а також кібербезпека. Практична цінність дослідження полягає в наданні прикладних рекомендацій для менеджерів фінтех-стартапів щодо пріоритетного інвестування в технологічну інфраструктуру та підключення, що дозволить посилити довгострокову сталість і конкурентоспроможність компаній в умовах стрімкої цифрової трансформації фінансового сектору

**Ключові слова:** заходи кібербезпеки; 5G; Інтернет речей; цифрове підключення; ринки, що розвиваються; фінансові технології



## Integrated approach to accounting in the context of sustainable development and circular economy

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**Abstract.** In today's environment, ensuring sustainable development is one of the long-term goals of any state, and therefore consideration of new approaches and concepts remains relevant. The purpose of this study was to investigate approaches to accounting in the context of the circular economy. The study assessed some main approaches to financial reporting based on the principles of sustainable development and the circular economy, and conducted a comparative analysis of the similarities and differences. Conclusions were drawn regarding the role of existing standards in the activities of enterprises in the context of achieving sustainable development goals. The large number of existing international and national standards results in the absence of a single global approach that could meet the needs of all market participants. In addition, each approach focuses on a specific component of non-financial reporting disclosures, and therefore is more or less effective in different situations. An analysis of accounting approaches in countries such as Japan, Germany, Finland, the United States, Canada, Brazil, and Ukraine was conducted. It was found that in these countries, the general approaches are similar and based on international standards, while in some countries local laws may be applied, which form more specific reporting principles. The findings of the study highlighted the importance of a unified global approach to reporting that can meet the needs of the market. The practical value of the study lies in the possibility of using the results to develop public policy and corporate strategies in the field of sustainable development

**Keywords:** accounting efficiency; audit; financial reporting; environmental sustainability; social responsibility

### INTRODUCTION

In 2015, the United Nations adopted the Sustainable Development Concept as part of the adoption of the 2030 Agenda (Transforming our world..., 2015). This is a global action plan that covers 17 sustainable development goals and aims to ensure economic growth, social well-being,

and environmental protection. In view of this, there is a rapid search for new opportunities to improve the efficiency of this process. One of the ways to achieve this goal is through the circular economy, which is an economic model aimed at maximising the efficient use of resources and

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minimising waste. It is an alternative to the traditional linear economy, which is built on the principles of “take, use, throw away”. In a circular economy, resources and materials retain the value for as long as possible, and waste and emissions are minimised.

The main idea behind the circular economy is to create closed loops where products, materials, and resources are reused. The circular economy is based on several key principles: preservation and restoration of natural capital, which means using resources in such a way that these resources can be renewed or replaced by alternative, more sustainable sources; optimisation of resources to ensure the most efficient use; creation of closed cycles where all materials are in a continuous cycle, i.e., waste is turned into raw materials for new products; minimisation of negative environmental impact, which means reducing harmful emissions. Implementation of circular economy approaches helps to increase resource efficiency, reduce negative environmental impact, and ensure sustainable economic development. These issues are in the focus of attention of the global scientific community.

S. Aureli *et al.* (2023) examined how management accounting systems can contribute to the transition to a circular economy by studying the implementation of sustainable circular business models in six companies specialising in innovative, environmentally friendly packaging solutions. The study found that circular initiatives lead to new organisational configurations and value networks, but managers often bypass traditional accounting functions in favour of informal accounting and life cycle analysis. These alternative approaches promote multi-stakeholder dialogue and a life cycle perspective, which is essential to the principles of the circular economy. The study results highlight the need to develop management accounting systems that go beyond financial performance to promote resource conservation and stakeholder engagement, and emphasise the importance of training accountants in sustainability and circularity.

The unification and standardisation of accounting standards is essential for creating transparent, understandable and comparable financial statements, which is especially important in the context of globalised markets. This avoids confusion due to the diversity of approaches in different countries, reduces audit costs and facilitates the process of analysing financial results for investors, creditors, and other stakeholders. As noted by M. Dubinina *et al.* (2022; 2023), the unification of norms in the EU is supported by directives aimed at reducing the diversity of accounting practices. In Ukraine, there is also a need to harmonise legislation to ensure compliance with international standards, facilitating integration into global economic processes.

The circular economy as an alternative to the linear economy on the example of the European Union countries was considered by T. Gorokhova *et al.* (2023). The analysis emphasised that this development model focuses on the efficient use of potential opportunities, promoting balanced social development, and prioritising environmental

protection. The transition to a circular economy is aimed at increasing global prosperity and social equality while reducing environmental risks. However, successful implementation requires conscious efforts by each country to create a favourable environment through the necessary reforms. The transition to a circular economy must be systemic, involving cooperation between all stakeholders at the local, regional, national, and international levels.

N.C. Hanumante *et al.* (2019) modelled the circular economy in a comprehensive planetary framework that integrates human, environmental, and industrial components to assess its global systemic impacts. By modelling 90 different implementation pathways at nine levels of resource consumption and population growth, the study showed how different circular economy strategies affect resource use and ecosystem resilience. The study findings demonstrate that the implementation of circular economy practices significantly delays or even prevents resource-driven system collapse, highlighting the critical need for large-scale implementation over the next 70-90 years. At the same time, the study also warns that overly aggressive circular economy measures could lead to the depletion of ecosystem services, emphasising the need for a balanced approach.

E. Costa *et al.* (2023) investigated how circular economy practices are implemented within alpine collective ownership (CO) in Italy and identified two main forms of circularity: network and forest. Network circularity focuses on promoting social cooperation and coordination between different institutions to support the local community and strengthen regional ties. Forest circularity points out the sustainable supply of wood, optimising the cascade use and processing of wood to minimise waste and environmental impact. The authors highlighted the important role of accounting in promoting these circular practices by proposing specific accounting indicators. These indicators are intended to help COs transform the economic model into a biodiversity-based circular economy, ensuring that resources are effectively redistributed to benefit both the community and forest ecosystems. Ultimately, the study demonstrates how integrating circular economy principles with sound accounting practices can contribute to sustainable development and resilience in alpine areas.

Opportunities and prospects for development in the field of bioproducts as an alternative to conventional plastics for creating a circular economy in Ukraine were investigated by T. Shevchenko *et al.* (2022). They described the significant potential in Ukraine both to develop the production of such high-tech products and to ensure the principles of operation of enterprises according to the principles of the circular economy.

Thus, economic science is actively researching issues related to the peculiarities of the implementation and functioning of the circular economy and the principles of sustainable development, but the accounting and reflection of these processes in accounting is not sufficiently covered. Therefore, the purpose of the current study was to assess the peculiarities of accounting approaches and to find

mechanisms to improve the efficiency of accounting for materials and resources for the rational use and ensure the environmental and economic sustainability of enterprises.

## MATERIALS AND METHODS

To achieve the research objective, a comprehensive approach was used, including qualitative and quantitative analysis. The main focus was on a comparative analysis of reporting systems that regulate financial and non-financial information disclosure in the context of sustainable development and the circular economy. Particular attention was paid to how these systems reflect the environmental, social, and economic aspects of companies' activities and contribute to the achievement of sustainable development goals. The study analysed several international standards governing non-financial reporting by companies. Among them are ISAE 3000 – International Standard on Assurance Engagements (2013), which regulates the audit of non-financial information, including social, environmental and ethical aspects; AA1000 Assurance Standard (n.d.), which focuses on taking into account the needs of stakeholders in reporting; GRI – Global Reporting Initiative (n.d.), which discloses economic, environmental and social aspects of activities in reporting; SASB – Sustainability Accounting Standards Board (SASB Standards, n.d.) – industry standards for disclosing non-financial indicators important to investors; and IIRC (International Integrated Reporting Council) (Integrated Reporting, n.d.), which integrates financial and non-financial aspects into reporting to reflect the real value of a company. The analysis of these standards was carried out by comparing the principles, requirements, and recommendations for integrating sustainable development and the circular economy into accounting. For this purpose, the general provisions of the standards were analysed using the deduction method, which allowed identifying the practical applicability to the work of enterprises in the context of integrated accounting. This made it possible to assess the possibilities of integrating the principles of the circular economy into the financial reporting system and determine the effectiveness of different approaches.

In addition to international standards, national standards of several countries were analysed: Japan – the Japan's Corporate Governance Code (2021) and environmental reports of the Ministry of Agriculture, Forestry and Fisheries (MAFF) (n.d.); Germany – the German Sustainability Code (Deutscher Nachhaltigkeitskodex, n.d.); Finland – the Finnish Accounting Act 1336/1997 (2017), which regulates non-financial reporting; and the United States and Canada – SASB Standards (n.d.) and Canadian Standards Association (n.d.). These national standards were compared with international standards to identify commonalities and differences in approaches to the circular economy and sustainable development. This allowed identifying how countries adapt global approaches to the local conditions and market requirements. This research was important for assessing the possibility of integrating international standards into local regulatory systems.

The case study method was used to study the practical experience of implementing these standards. The experience of reporting in such countries as Japan, Germany, the United States, Canada, Brazil, and Ukraine was studied. The analysis of these cases has helped to identify the best practices for implementing the principles of the circular economy in accounting and the impact on the efficiency of enterprises. The results of the comparison of reporting systems and the analysis of the cases became the basis for the development of recommendations for integrating sustainable development and the circular economy into the reporting practices of enterprises.

## RESULTS

The theoretical aspects of sustainable development cover many areas, exploring ways to ensure long-term harmony between economic growth, social well-being and environmental protection. One of the main concepts of sustainable development is the triple bottom line model, which includes economic, environmental and social components, known as the “three pillars of sustainable development”. The economic component of this concept focuses on economic development that does not damage natural resources and ensures equal access to economic benefits for all generations. It also includes the use of renewable resources and support for the efficient use of existing resources. The environmental component includes the preservation of natural ecosystems, biodiversity, and minimisation of the negative impact of human activity on the environment. This aspect emphasises the importance of renewable resources, as well as the need to control the use of non-renewable resources to prevent the depletion of natural resources. The social pillar of sustainable development aims to ensure equity, well-being, and access to basic needs for all people. This includes fighting poverty, ensuring equal access to education and healthcare, and protecting human rights. At the theoretical level, sustainable development also implies a transition to an economy that not only provides material growth but also improves the quality of life through social inclusion and environmental sustainability. An essential concept is the idea of ‘planet limits’, which reminds one of the need to stay within the Earth's ecological capacity to avoid critical disruptions in natural systems. The connection between the theoretical concept of sustainable development and the circular economy is significant, as both ideas are aimed at achieving a balanced development that takes into account economic, environmental and social aspects. The circular economy is a tool that can help to realise the goals of sustainable development by ensuring the harmonious coexistence of economic growth, improved living standards and environmental protection.

In the circular economy, eco-design is important, which means that products are designed in such a way that these products can be easily repaired, disassembled and recycled (Morseletto, 2020; Corvellec *et al.*, 2020). This concept considers the entire life cycle of a product, from raw material extraction to disposal. Another key aspect is the reduction

of resource consumption, which is achieved through the optimisation of production processes. Instead of purchasing goods, consumers in the circular economy are increasingly using rental, leasing or sharing services, which helps to extend the life cycle of products and reduce waste. Products that fail or are no longer in use are not thrown away, but are recycled or reused to create new products, helping to conserve resources and reduce the need to extract new materials. The circular economy strives to create systems where waste is minimised or eliminated, which is achieved through improved recycling processes, the introduction of closed loops of material use and increased responsibility for production and consumption. This model of economy has numerous benefits (Vaio *et al.*, 2022). It ensures economic sustainability by reducing dependence on primary resources, which can be expensive or limited, reducing costs and increasing business stability. Social responsibility within the circular economy contributes to the creation of new jobs in the areas of processing, repair and maintenance, and contributes to a higher standard of living through greener consumption. The environmental benefits of the circular economy include a reduced environmental impact through waste reduction, lower greenhouse gas emissions, and the rational use of natural resources (Bressanelli *et al.*, 2020).

An integrated approach to accounting in the context of sustainable development and the circular economy takes into account not only traditional financial indicators, but also the social, environmental, and economic aspects of a company's activities. This approach is aimed at creating a more complete and transparent picture of the company's activities, considering its impact on all stakeholders, the environment, and society as a whole. A key part of it is integrated reporting, as it covers not only financial indicators but also non-financial aspects such as environmental and social factors (Evans, 2023). This helps to create a more comprehensive picture of a company's sustainability. Integrated reporting includes traditional financial statements, such as balance sheet, income statement, and cash flow statement; environmental indicators, such as the amount of resources used, greenhouse gas emissions, waste management, and energy efficiency; social indicators, such as labour conditions, human rights, staff development, impact on local communities, and governance indicators, such as corporate governance, ethical standards, and responsibility to stakeholders (Mahbob & Hashim, 2022). Environmental aspects are taken into account in financial accounting to assess the company's environmental impact (D'Adamo *et al.*, 2021; Mahmood *et al.*, 2023). This may include emissions as part of production costs or possible liabilities in the event of environmental fines, assessment of natural resource costs and inclusion of these costs in the company's general expenses, waste management costs, including recycling or disposal, and assessment of energy efficiency, which may include the costs of implementing energy-efficient technologies.

The circular economy aims to reduce the use of natural resources, reuse materials, and minimise waste. In accounting, this can be done by accounting for the value of reuse

of materials (taking into account the value of materials that are reused or recycled), reducing waste disposal costs (saving money through the implementation of effective waste management systems), and introducing innovations (the costs of developing new products or processes that comply with the principles of the circular economy). There is no global consensus on which sustainability reporting principles should be used as the main ones. Each of the approaches proposed by an organisation or country has its own peculiarities and focuses more or less on certain components of the company's financial or non-financial position. One of these approaches is ISAE 3000 (International Standard, 2013), which regulates the audit of non-financial information, including social, environmental, ethical and other aspects of a company's activities. ISAE 3000 provides a framework for verifying non-financial aspects of operations, such as resource efficiency, environmental impact, waste management, and other indicators that are consistent with the principles of the circular economy. The standard creates the conditions for ensuring reliable and accurate non-financial information disclosed by companies in the reports, which is key to maintaining the trust of stakeholders such as investors, regulators, and society as a whole. The standard regulates the verification of a company's internal management systems, in particular in terms of resources and waste, which are critical to achieving the goals of the circular economy. However, the main specialisation of these principles is the disclosure of non-financial information of various kinds, and therefore these principles cannot be used as a complete single reporting for analysing the company's activities. Nevertheless, the information provided within its framework can be used to draw conclusions about the company's activities in the context of its impact on society or the environment.

In the context of the circular economy, SAE 3000 is becoming an important tool for verifying reports that disclose information about companies' sustainability strategies, achievements, and results. It is based on three main principles. The first is the principle of materiality. It ensures that a company's reporting addresses the most important issues. The second is the principle of completeness, which ensures that all relevant information about the company's activities within the circular economy is included in the report. The last is the principle of responsibility, which ensures that the company adequately responds to the expectations and needs of stakeholders in relation to the circular economy. In the agriculture sector, for example, ISAE 3000 facilitates the audit of non-financial aspects such as resource efficiency (water and soil management), environmental impact and waste management (organic waste, recycling). The standard ensures that agricultural companies report on the sustainability practices, which is important for maintaining the trust of stakeholders such as investors, regulators, and consumers.

One of the most widely used standards is the GRI (n.d.), which are internationally recognised standards for sustainability reporting. These standards provide a coherent framework for companies to disclose information on the

economic, environmental and social aspects of the operations. The main goal of the standards is to provide a universal approach to reporting that can be adapted to the specific needs and characteristics of companies in different industries. The GRI standards include key indicators that allow companies to assess and report on such aspects of the circular economy as material consumption, energy efficiency, waste management, environmental impact and stakeholder engagement (a report on the processes of interaction with stakeholders, including customers, suppliers, governments and public organisations, as well as on the consideration of the expectations in the implementation of circular practices). In other words, the GRI standards provide companies with an opportunity to demonstrate the achievements in implementing the circular economy, in particular through transparent disclosure, which is the basis for increasing trust among investors, customers and other stakeholders. This includes reporting on the use of natural resources, energy efficiency, waste management, and the environmental impact of production practices.

The SASB Standards (n.d.) focus on providing investors and stakeholders with material information about the impacts of sustainable development, particularly in the context of a circular economy. The SASB standards define key indicators that companies should use to disclose information about the environmental, social and governance practices that are relevant to the financial condition and performance. In the context of the circular economy, SASB standards help companies report on aspects such as resource efficiency (indicators to measure the efficiency of material resources in production processes), waste

management (volumes, types, and methods of waste disposal, as well as efforts to reduce waste), energy efficiency and environmental impact (disclosing information on energy consumption, use of renewable energy sources and environmental impact), innovation and business models (reporting on the implementation of new business models that support the concept of the circular economy, such as production-use-recycling models, renting instead of selling, or implementing reverse logistics for product collection and recycling), social impact (includes indicators to assess the social impact of business processes, such as the impact on jobs, health, and safety of employees).

In the context of the circular economy, the IIRC (Integrated Reporting, 2024) provides disclosures that show how a company creates and retains value in the long term, taking into account the principles of sustainable development. According to this principle, six types of capital are distinguished: financial, productive, intellectual, human, social, and natural. In the context of a circular economy, this means that companies should report on how these companies impact natural resources (natural capital), optimise the use of material and production resources (production capital), and how these companies integrate knowledge and innovation (intellectual capital) into the business processes. IIRC emphasises the importance of creating long-term value for all stakeholders. Integrated reporting under the IIRC standard includes disclosures on a company's strategy, risk and opportunity management, and how these aspects are linked to the principles of the circular economy. The similarities and differences between these approaches are shown in Table 1.

**Table 1.** Similar and different components of approaches to the formation of sustainable financial reporting

Approach	Unique components (what makes the approach special among others)
ISAE 3000	Independent verification of non-financial information and ensuring its reliability
	A wide range of audits, including information systems, internal controls and corporate governance
AA1000AS	Focus on integrating stakeholder needs and expectations into reporting
	Assessment of reporting compliance with the principles of materiality, completeness, and relevance
	Specialises in ensuring transparency of the reporting process in the context of sustainable development and the circular economy
GRI	Provides standards that allow comparing the results of various companies from different industries
	Focus on transparency of environmental, economic and social aspects of activities
	Focus on a wide range of stakeholders
SASB	Industry-specific approach to reporting, taking into account the specifics of the industry
	Integration of non-financial indicators with an emphasis on financial aspects of reporting
	Focus on information that is important to investors and shareholders
IIRC	Integration of six types of capital into one report (financial, production, intellectual, human, social, natural)
	Focus on creating long-term value and company development strategy
	Integrating information for a complete picture of the company's activities, including environmental protection and the circular economy

Source: compiled by the authors based on data from ISAE 3000 (2013), AA1000 AS (n.d.), GRI (n.d.), IIRC (n.d.), SASB (n.d.)

Thus, different approaches to financial reporting can be applied to achieve different goals of the circular economy. Nevertheless, there is no single approach to this type of reporting. Therefore, each country should create its own national standards based on one of these frameworks to achieve the goals being considered most important. In addition, companies themselves can decide which type of reporting to submit for the own purposes and capabilities.

All the approaches analysed above are used in one form or another in different countries around the world. Rather, it is rare that sustainability reporting is based on different standards than those already mentioned. For example, in Japan, GRI and SASB standards are the most widely used. Companies often use GRI for reporting to stakeholders, ensuring comparability of data on a global level, while SASB is only gradually gaining traction. As for local specifics, it is worth highlighting some of the regulations that the Japanese government has developed for sustainability reporting. For example, Japan's Corporate Governance Code (2021) contains provisions on environmental and social responsibility, drawing attention to the importance of reporting on the environmental and social aspects of companies' activities. The Japanese Ministry of Agriculture, Forestry, and Fisheries also publishes an annual report (MAFF, n.d.) analysing environmental performance in the agricultural sector, which also provides guidance and requirements for companies to report and manage environmental aspects of agricultural operations. There is also a certification system for organic products called JAS (Japanese Agricultural Standards) (MAFF, 2022), also issued by MAFF. It includes stringent standards for the use of pesticides, fertilisers, and crop cultivation methods that promote sustainable development. Reporting for JAS-certified farmers includes regular inspections and compliance reports. In accordance with these national norms, the specifics of reporting according to international standards are also formed.

The practice of the European Union countries also shows that countries prefer to present financial statements in accordance with international standards. Nevertheless, such countries still have certain norms or recommendations for submitting such reports, which are a kind of supplement to the existing standards. For example, in Germany, the national code of sustainable development (Deutscher Nachhaltigkeitskodex, DNK, 2024) is widespread. At its core, it is a voluntary instrument developed by the German Council for Sustainable Development. It offers a framework for companies to report on the sustainability activities, with a focus on environmental, social and governance aspects. In other countries, the norms as such are described only in the form of laws or legislative acts. In Finland, for example, the Finnish Accounting Act (Accounting Act 1336/1997, 2017) sets out requirements for non-financial reporting, including information on environmental, social and governance aspects. In Sweden, such regulations are partially described in The Swedish Annual Accounts Act (1995), which also obliges large companies to provide non-financial

information in the annual reports, including data on environmental, social and governance aspects.

In North and Latin America, the most commonly used standards in this region are the SASB standards, which are actually developed by an organisation from the United States of America. In Canada, the local standards are those developed by the Canadian Standards Association (CSA, n.d.). The organisation develops standards that promote safety, health, environment, and technical excellence. CSA operates both at the national and international level. Brazil also has certain regulations, namely Instruction CVM 480 (2009), issued by the Brazilian Securities Commission (CVM). It describes the requirements for disclosure of information on social and environmental performance of companies. Other countries in South America also have only certain legal provisions rather than the own standards.

In Ukraine, the situation is no different from the countries analysed above. Local companies often use international standards, such as the Global Reporting Initiative (GRI) or the Sustainability Accounting Standards Board (SASB), which are generally the most widely used in the world. The legal framework and guidelines consist of a number of laws, such as the Law of Ukraine No. 996-XIV "On Accounting and Financial Reporting in Ukraine" (1999), which sets out the basic requirements for accounting and reporting, and the Resolution of the National Commission for Securities and Stock Market Commission (NSSMC) "On Approval of the Regulation on Disclosure of Information by Securities Issuers" (2023) in the context of disclosure requirements for public companies, including non-financial social responsibility reporting, environmental and governance aspects.

## DISCUSSION

The study focused on the concept of the circular economy. It was noted that its foundation is the formation of a business cycle in which the company's waste is processed into finished products. Thus, a 'cycle' is formed in which waste is only a part of the used products. The conceptualisation of the circular economy was carried out as part of the study by J. Kirchherr *et al.* (2023). The researchers noted that most of the studies lacked the practical applicability of the circular economy. The conclusion emphasises the importance of reaching consensus on a definition of the circular economy for effective policymaking and cross-sectoral cooperation. However, it acknowledges that a final, universally accepted definition may be elusive due to the dynamic nature of technology, environmental conditions and socio-political contexts. The study shows that ongoing research and periodic revisions are necessary to keep the concept of the circular economy relevant and adaptable, fostering a shared understanding that can support its practical application.

In turn, E.H. Arruda *et al.* (2021) also explored the existing problems in the study of the circular economy. The conclusions of the study highlighted the connection between the shortcomings of the circular economy concept and the fact that it was not formulated by the scientific community and was not properly considered in the academic environment.

The main conclusions of the study indicate that in order to achieve a true circular economy, it is necessary to implement strategies to extend the life of the resource. This concept is often seen as a necessary component of sustainable development, with private companies playing a key role. In these works, scholars consider the circular economy in the same way as described in the current study (on accounting and reporting of non-financial information). Although the concept is indeed relatively young and may have problems in theoretical justification of some aspects, its implementation should lead to positive consequences in the context of achieving sustainable development goals in the long run. Therefore, the lack of a certain framework should not prevent the achievement of economic and social sustainability goals. The same conclusion was reached, in particular, by M. Borrello *et al.* (2020), who noted that despite criticism, the concept of the circular economy is gaining popularity in both academic and practical discussions as an alternative to current global industrial systems. In the opinion, despite the fact that the debate around the principles of implementing the circular economy concept has gained momentum in policymaking and sustainable development strategies around the world, there is still a need for a more diverse and practical discussion on the implementation of practices. Thus, the conclusions of the scholars agree with the main idea of the current study regarding the relevance of more active application of the concept in real life.

The study focused on possible approaches to the preparation of financial statements to disclose the principles of the circular economy. The challenges of the circular economy and accounting applications were discussed by M.A. Ibrahim (2021). The paper's findings highlighted the benefits of the circular economy, such as increasing economic value and promoting sustainability, but also identified several challenges to integrating it into current accounting practices. These challenges included the need for appropriate accounting information on natural capital, measuring environmental and social impacts, measuring performance in a circular economy, and the inadequacy of current accounting systems to report on renewable resources and environmental responsibility. It was concluded that the lack of standardised rules for reporting on the circular economy makes it difficult to make comparisons between economic units, as reporting is currently voluntary. In this regard, the researchers recommend the inclusion of renewable resources and waste in accounting reports, the introduction of several accounting methods to handle circular economy processes, and the conclusion of agreements on waste valuation if market prices are not available. The researcher also emphasises the need to disclose the risks associated with maintaining a linear economy and calls for the development of new accounting standards and indicators that reflect circular economy practices, allowing for better comparisons between economic units. The current study also drew attention to the disclosure of all these indicators, in particular, through various types of reporting. It was concluded that different approaches reflect these

indicators in different ways, and accordingly, allow for completely different final results. In turn, each company should choose an approach that would allow it to achieve its goals.

The current study did not provide recommendations specifically for reporting on energy efficiency or achieving social goals, although a significant number of approaches were considered that allow for the formation of sustainability reporting as such. Circular economy initiatives through energy metering and sustainable energy efficiency under the Integrated Reporting Framework were considered by A.H. Almagtome *et al.* (2020). The authors noted that the introduction of an integrated reporting system is a significant shift in the ability to provide corporate financial statements. Such reporting allows focusing on providing past, present and future information to create value in organisations. This is because traditional accounting systems, which primarily provide financial information, are insufficient to promote sustainable development, which requires both financial and non-financial data. With this in mind, the researchers proposed 16 variables for energy accounting and the state of energy efficiency at an enterprise. A study in the context of assessing social impacts was conducted by S. Scarpellini (2021). The scientist noted that in the current conditions for disclosing the impact on the social component of society's development by companies, the need to formulate such principles exists. The need to accurately measure and report on social impacts other than job creation was emphasised, especially in the context of new cyclical business models. It was proposed to use such indicators as social impact, job creation, new skills, tax revenues, transparency, environmental education, public health and cooperation (with the authorities, society, etc.). Thus, the implementation or the development of national standards based on them would allow achieving significant positive results in this area.

## CONCLUSIONS

The above work highlighted the importance of ensuring harmony between economic growth, social well-being and environmental protection, in particular through the implementation of the circular economy concept. A significant number of reporting standards have been considered, such as ISAE 3000, GRI and SASB, each of which contains unique approaches to sustainability reporting, especially within the framework of the circular economy for agricultural companies. The use of each approach depends on the needs and goals of the reporting company. The experience of sustainability reporting by individual countries, namely Japan, the European Union, the United States, Canada, Brazil and Ukraine, was also considered. Based on the experience, it can be seen that the basis for this type of reporting is widely used in global practice. Nevertheless, individual countries formulate the own norms and recommendations for submitting such reports.

The theoretical foundations of sustainable development emphasise the need for an integrated approach that harmonises economic growth, social justice and environmental care. One such approach could be the concept of a

circular economy, which is based on a closed-loop production cycle through innovative business models such as product leasing, product sharing and product life cycle extension. This approach not only reduces industries' dependence on limited resources, but also contributes to economic stability by reducing costs and creating new jobs in sectors such as repair, recycling, and resource management.

Accounting and reporting play a crucial role in the realisation of sustainable development and the circular economy. Integrated reporting, which combines traditional financial data with environmental and social indicators, offers a complete picture of a company's performance and impact on the ability to achieve sustainability goals. This approach is consistent with the principles of transparency and accountability, which are critical to building trust among stakeholders, including investors, customers, and regulators. Various standards such as ISAE 3000, AA1000AS, GRI, SASB and IIRC provide a framework for companies to report on the sustainability efforts. Each of these standards has its own unique features, focusing on different aspects of non-financial reporting, but all the standards contribute to a more holistic understanding of corporate impact on society and the environment.

Although these standards are globally accepted, there is no universal framework for sustainability reporting. Countries and organisations adapt the reporting methods to the

specific needs and regulatory environment. Most of the countries whose experience was studied in this paper have used international practices as a basis and developed the own reporting regulations, taking into account the specifics of a particular country. The same practice is widespread in Ukraine: international standards exist together with national legislation to improve the quality of sustainability reporting.

The role of accounting in the context of sustainability reporting is not only to track financial performance, but also to provide a broader view of how companies contribute to or impair the well-being of people and the planet. By applying the principles of circular economy and sustainability, companies can create long-term value that benefits all stakeholders, ensuring that economic growth does not come at the expense of environmental degradation or social inequality. In the future, it is important to develop more standardised and widely accepted reporting systems.

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## Інтегрований підхід до бухгалтерського обліку в умовах сталого розвитку та циркулярної економіки

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**Анотація.** В сучасних умовах забезпечення сталого розвитку є однією із довгострокових цілей будь-якої держави, а тому розгляд нових підходів та концепцій залишається актуальним. Ціллю даного дослідження було дослідити підходи до бухгалтерського обліку за умов упровадження циркулярної економіки. В рамках дослідження була проведена оцінка деяких основних підходів до формування фінансової звітності на основі принципів сталого розвитку та циркулярної економіки, проводився порівняльний аналіз їхніх схожих та відмінних складових. Було зроблено висновки стосовно ролі чинних стандартів у діяльності підприємств в контексті досягнення цілей сталого розвитку. Велика кількість наявних нині міжнародних і національних стандартів призводить до відсутності єдиного світового підходу, що міг би задовольнити потреби усіх учасників ринку. Крім того, кожен із підходів фокусується на певній складовій розкриття нефінансової звітності, а тому є більш чи менш ефективним у різних ситуаціях. Був проведений аналіз підходів до бухгалтерського обліку в таких країнах, як Японія, Німеччина, Фінляндія, США, Канада, Бразилія та Україна. Виявлено, що в цих державах загальні підходи схожі та ґрунтуються на міжнародних стандартах, водночас в окремих країнах можуть застосовуватися локальні закони, що формують більш специфічні принципи подачі звітності. Висновки дослідження підкреслюють важливість єдиного глобального підходу до звітності, що зможе задовольнити потреби ринку. Практична цінність дослідження полягає в можливості використання результатів для розробки державної політики та корпоративних стратегій у сфері сталого розвитку

**Ключові слова:** ефективність обліку; аудит; фінансова звітність; екологічна стійкість; соціальна відповідальність



## Methods of auditing cash at the enterprise

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**Abstract.** The relevance of the topic was due to the fact that in the context of economic instability, cash audit is becoming a key tool for monitoring the effectiveness of enterprise financial resources management, given their high liquidity and complexity of accounting. The aim of the study was to summarise the theoretical foundations of cash audit and develop practical recommendations adapted to the realities of Ukrainian enterprises. The research methodology was based on a combination of theoretical analysis and practical observations using the methods of induction, deduction, generalisation and source analysis, which ensured the identification of the main problems in the field of cash audit at the enterprise and the development of effective approaches to their solution. The article comprehensively examined the purpose of cash audit, outlined the main tasks of the auditor and systemises information resources, which will facilitate a high-quality audit and provide the auditor with the knowledge necessary for effective planning, conducting the audit, minimising errors and preparing reliable audit reports. Particular attention was paid to the audit procedures used at different stages of the audit, which will allow the auditor to deeply understand their specifics and effectively use them to obtain objective and reliable audit evidence. The article presented approaches to the classification of audit control methods used in Ukraine, with special attention paid to documentary verification and calculation and analytical techniques as key elements of ensuring a high-quality audit of cash at Ukrainian enterprises. An improved methodology was proposed, which included not only a general audit plan and programme, but also a detailed test of the accounting and control system. This will allow the auditor not only to verify the correctness of the cash flows, but also to assess the effectiveness of the internal control system. To facilitate and improve the quality of the audit, special working documents have been developed to help systemise information and ensure its reliability. The results of the study can be used not only in the practical activities of auditors, but also in the educational process of higher education institutions

**Keywords:** audit; cash transactions; procedures; audit stages; general plan; programme; working document

### INTRODUCTION

During periods of military instability, enterprises face massive challenges, including disrupted logistics, infrastructure losses, and declining consumer solvency. In such conditions, the need for effective control over the use of financial resources, especially cash, grows, requiring a review and improvement of audit approaches.

An analysis of scientific research indicates significant attention to cash audit issues in both Ukrainian and global scientific thought. Among Ukrainian scholars, O.B. Sili-vonchik & M.I. Skrypnyk (2021) investigated the methodology for planning stages of cash audit. They analysed various scientific approaches to accounting organisation and

audit methods, concluding that universal approaches are ineffective due to ignoring individual characteristics of enterprises. The authors emphasised the need to develop individualised methodologies for accounting, classification, and auditing cash, integrated into the overall enterprise management system. G.V. Bulkot & I.O. Mirko (2021), in turn, focused on the role of cash audit and ways to increase its effectiveness in ensuring cybersecurity. They stressed that audit must consider the need to protect confidential information and prevent unauthorised access to it due to digital threats, proposing the development of reliable secure servers and the involvement of qualified IT

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specialists. R.V. Boyko & Ya.V. Iliv (2024) noted the importance of effective financial resource management for the stability of trading companies. They revealed the purpose and objectives of cash resource audit, described approaches to its essence, sources of audit evidence, and proposed a detailed algorithm for verifying financial statements (Form 2 “Statement of Financial Results (Statement of Comprehensive Income)”) to identify possible fraudulent activities or errors. N.V. Kuzmenko *et al.* (2021) analysed the specifics of cash audit, highlighting theoretical aspects of its organisation. The authors emphasised the importance of documentary confirmation of facts in the auditor’s activities and propose using a test for checking the state of internal control and a detailed audit plan to improve its quality. In connection with the spread of electronic money, A.S. Stolpova (2020) investigated the methodological principles of its audit, including virtual currencies, concluding that audit objectives must take into account the novelty and technological complexity of electronic money, as well as the need to assess risks and the effectiveness of internal control when auditing virtual currencies.

Alongside the research of Ukrainian academics, global scientific thought also pays significant attention to this area, especially in the context of improving internal control effectiveness and overall audit quality. Specifically, a study by S.M. Fauziah *et al.* (2023), conducted at a broiler farming enterprise, revealed a significant positive correlation between internal audit of cash disbursements and internal control (correlation coefficient 0.721). The results of this work showed that internal audit effectively helps to identify significant discrepancies between budgeted and actual operating expenses. This underscores the importance of audit procedures for identifying control deficiencies, ensuring the accuracy of cash accounting, and minimising risks, including fraud. Continuing the consideration of practical aspects of applying audit to cash, a study by B.A. Harared *et al.* (2024) focused on the application of operational audit to assess the effectiveness of internal control specifically over cash receipts and disbursements at Clinic XYZ. The results showed that the effectiveness of internal control was 59.34%, indicating the presence of significant shortcomings, such as the absence of written policies and procedures and an insufficient number of supporting documents. This study provided specific recommendations for improving cash management, emphasising the importance of audit as a tool for identifying weaknesses in the cash internal control system and developing measures to strengthen it.

In terms of the direct application of audit procedures to cash, the study by K. Retnaningrum & S. Trisnaning-sih (2025) was valuable. They analysed the implementation of audit procedures for cash and cash equivalents accounts in a non-profit foundation. The results showed that audit procedures were performed in accordance with established standards, despite some operational obstacles. This work emphasises that a thorough audit of cash is critically important, as it is a frequent target of fraud, and demonstrates the practical application of audit methodology to ensure

the reliability of information about this key asset. Continuing this line, the study by S. Ashok & K. Baskaran (2019) is dedicated to audit and accounting procedures with a particular focus on petty cash. They highlighted the crucial importance of proper petty cash audit for the overall financial condition of an organisation, indicating the influence of factors such as the nature of operations, company size, and the risks of misappropriation, theft, and errors during reconciliations. This study provided a basic understanding of petty cash audit and its impact on cash balances, overall liquidity, and the financial position of an enterprise, reaffirming the need for a carefully developed and applied audit methodology for all forms of cash. Additionally, the impact of overall audit quality on the management of financial assets, particularly cash, was highlighted in a study by A.I. Hunjra (2025). This work, conducted on a sample of non-financial firms in South Asia, empirically confirmed that high audit quality, along with the effectiveness of the audit committee, significantly reduces a company’s cash reserves. This indicates that quality auditing activities, which are directly based on clearly developed audit methodologies, contribute to increased transparency, accountability, and, consequently, more efficient and optimised management of cash resources at an enterprise, reducing the need for excessive cash accumulation.

Based on the provided conclusions, previous studies consider various aspects of cash auditing, including planning, cybersecurity, financial resource management, theoretical foundations, and the audit of electronic money. However, the comprehensive impact of the unstable economic environment on the organisation and methodology of cash auditing remains insufficiently explored. Although some authors do touch upon issues of risks and control, the specifics of conducting audits in conditions of economic instability, which may include currency rate volatility, inflationary processes, and disruption of economic ties, require separate and detailed study. There is also a need to adapt existing methodologies to the unique challenges arising in conditions of military actions, which significantly increase uncertainty and risks for enterprises’ financial flows.

The aim of the article was to improve organisational and methodological approaches to auditing enterprise cash in conditions of economic instability caused by military actions. The main objectives were: to analyse modern approaches to auditing, to systematise sources of audit evidence, and to develop an adapted audit plan taking into account the specifics of crisis conditions.

## MATERIALS AND METHODS

In the process of studying the theoretical and methodological foundations of cash audit at enterprise, a set of scientific methods was applied. The research is based on theoretical analysis aimed at studying and systematising scientific works of Ukrainian scientists on the problems of organising and conducting cash audit, cash accounting and financial stability of enterprises. Particular attention was paid to the analysis of approaches to determining the

purpose of cash audit. For this reason, various interpretations of the purpose of the audit presented in the scientific literature were studied and compared. In particular, the works of the following authors were analysed: N.Y. Radionova & K.O. Zhura (2017); O.E. Nezdoyminoga & O.G. Krasota (2019); A.R. Okonchuk & A.R. Radionova (2021). The application of the comparative method identified common and distinctive aspects in the definition of the purpose of cash audit by different authors, as well as the most common audit objectives. The results of this analysis were systematised in the form of a table reflecting the main emphases made by each researcher.

Along with the theoretical analysis, the study used logical analysis to reveal the essence of cash audit as an important element of the internal control system and ensuring the financial stability of the enterprise. Inductive and deductive methods were used to formulate generalisations based on the analysis of certain scientific provisions and to draw logical conclusions about the organisation of the audit process.

The study of audit procedures took into account the provisions of International Standards on Auditing (ISA) 315 (2019), ISA 330 (2017) and ISA 500 (2020). The application of ISA 315 and ISA 330 allowed for a clear separation of risk assessment procedures and subsequent audit procedures (substantive and control testing), which provided a more structured approach to planning and performing cash audits. ISA 500 (2020) was used to detail the content of audit procedures, such as inspection, external confirmation, observation, recomputation, re-performance, inquiry and analytical procedures, which contributed to increasing the reasonableness of audit opinions.

An important stage of the research was a detailed analysis of the legal framework of Ukraine regulating the accounting and audit of cash. The following documents were studied: Resolution of the Board of the National Bank of Ukraine No. 148 (2017), Resolution of the Board of the National Bank of Ukraine No. 51 (2018), Order of the Ministry of Finance of Ukraine No. 879 (2014), Law of Ukraine No. 851-IV (2003), Law of Ukraine No. 1591-IX (2021), Order of the Ministry of Finance of Ukraine No. 73 (2013). The analysis of these documents made it possible to determine the legislative requirements for the organisation of cash accounting, control and audit procedures in Ukraine.

A tabular method was used to systematise information on the main sources of audit evidence and the list of audit

procedures used in the audit of cash. This provided a visual representation of the classification of information sources (internal and external) and types of audit procedures with examples of their practical application. The modelling method was used to develop a structured approach to the audit of cash. This is reflected in the development of Table 4 “Plan for conducting a cash audit at an enterprise”, which presents a three-stage model of the audit process, covering the organisational and preparatory, main and final stages. The comprehensive application of the methods of theoretical analysis, comparison, logic, induction and deduction, analysis of the regulatory framework, tabular method and modelling provided an in-depth study of the theoretical and methodological aspects of cash audit and became the basis for further conclusions and developments.

## RESULTS AND DISCUSSION

Maintaining business stability in a time of war, when logistics are disrupted, infrastructure is destroyed and the purchasing power of the population is declining, is an extremely difficult task. In such circumstances, managers must look for innovative solutions to ensure business sustainability. Those companies that can optimise the use of their resources will have a better chance of not only surviving but also strengthening their market position. In this context, control over cash, which is the most liquid asset, is of particular importance. Therefore, a high-quality audit of cash is a necessary tool to ensure financial stability and prevent the risks of errors and fraud in accounting.

The organisation of an audit begins with a clear definition of its purpose and the formulation of specific tasks. Typically, the auditor determines the purpose and draws up a list of tasks to be performed during the audit at the preparatory stage, taking into account the terms of the agreement concluded with the client. The latter confirms that an agreement has been reached between the auditor and the client. From a methodological point of view, the auditor should have an understanding of the purpose and objectives of the cash audit before the start of the relationship with the client, i.e. a certain basis that will only need to be adjusted later (Alieksieiev & Mazur, 2020). This will allow to speed up the organisational work and proceed directly to the audit itself. The views on the composition of the cash audit objective found in the economic literature are presented in Table 1.

**Table 1.** Approaches to determining the purpose of a cash audit

Author	N.Y. Radionova & K.O. Zhura (2017)	Y.V. Podmeshalska et al. (2019)	T.O. Meikhova & A.S. Vertovkina (2019)	O.E. Nezdoyminoga & O.G. Krasota (2019)	O.G. Ryabchuk & I.R. Korotaeva (2018)	A.Yu. Kozachenko (2021)	A.R. Okonchuk & A.R. Radionova (2021)	L.M. Kulnich & L.Yu. Patramanska (2016)
Purpose			+			+		+
1. Installation: ♦ legality								

Table 1. Continued

Author \ Purpose	N.Y. Radionova & K.O. Zhura (2017)	Y.V. Podmeshalska et al. (2019)	T.O. Melikhova & A.S. Vertovkina (2019)	O.E. Nezdoyminoga & O.G. Krasota (2019)	O.G. Ryabchuk & I.R. Korotaeva (2018)	A.Yu. Kozachenko (2021)	A.R. Okonchuk & A.R. Radionova (2021)	L.M. Kulinich & L.Yu. Patramanska (2016)
♦ reliability	+	+	+	+	+	+	+	+
♦ appropriateness			+			+		+
♦ completeness	+	+		+	+		+	
♦ timeliness of reflection	+	+		+			+	
♦ impartiality		+						
♦ correctness	+	+	+	+			+	
♦ compliance with applicable laws and regulations			+		+	+		+
♦ Identity of information in primary documents and accounting registers		+						
2. Obtaining sufficient audit evidence to form an opinion		+				+		

Source: created by the author

As can be seen from Table 1, each of the reviewed works focused on establishing the reliability of data on cash flows. Usually, reliability of information refers to the reflection of the actual state of affairs, as well as the absence of material errors and bias. Such qualitative characteristics as completeness, correctness, legality and timeliness are often mentioned. A number of scholars, namely Y.V. Podmeshalska *et al.* (2019), A.Yu. Kozachenko (2021), L.M. Kulinich & L.Yu. Patramanska (2016), the purpose of the audit is to provide a reasoned opinion in the report, which requires a sufficient evidence base. Decisions on the sufficiency of audit evidence are made on the basis of the auditor's professional judgement, which imposes a significant responsibility on the auditor.

The approach described above is acceptable, since the provision of audit services ends with the preparation of a report, the final part of which contains a conclusion (positive, conditionally positive, negative) or a refusal to formulate it. The most common reasons for not issuing an opinion are the lack of sufficient evidence and/or a violation of the principle of independence. The aim of the cash audit is to provide the auditor with a reasonable opinion on the legality, reliability, timeliness, correctness, appropriateness and compliance with the applicable laws and regulations of the information on the availability and movement of cash reflected in the accounting records.

The main areas of the cash audit are as follows:

- ♦ assessment of the state of payment discipline and internal control system of cash transactions;
- ♦ verification of cash safety, timely and complete posting of cash and its intended use;

- ♦ verification of compliance with the established cash balance limit, availability of a document approving the procedure for its calculation;

- ♦ control over the availability of a full liability agreement with the cashier;

- ♦ verification of compliance with the terms of cash inventory, correctness of documentation of its results;

- ♦ determining the areas of use of non-cash funds, their legality and purpose;

- ♦ determining the number and types of bank accounts of the company, the correctness of their opening, and the specifics of banking services;

- ♦ controlling the accuracy and correctness of filling in primary documents;

- ♦ checking the absence of errors in the reflection of information on cash on synthetic and analytical accounts;

- ♦ determining whether the relevant information in the primary documents, accounting registers and financial statements is identical;

- ♦ confirming the accuracy of the data on cash presented in the financial statements of the entity.

Audit evidence is obtained from both internal (the most important part) and external sources. Internal sources are important because they are directly related to the company's operations and provide detailed information about business transactions and internal controls. However, to ensure the objectivity and confirmation of internal sources, the auditor should also obtain information from external sources that are independent of the company and can provide additional confirmation or identify potential discrepancies. Such a comprehensive approach to

collecting audit evidence allows the auditor to form a reasonable and reliable opinion on the company's financial statements. The main information sources for the audit of cash are presented in Table 2.

**Table 2.** Key information sources for cash audit

Name of the group	List of components
Internal administrative documents	Order on accounting policy (regarding the accounting of cash desk and bank account operations); Order on approving the procedure for calculating the cash till limit
Documents for recording cash transactions	Cash receipt voucher (No. KO-1); Cash payment voucher (No. KO-2); Register of cash receipt and payment documents (No. KO-3); Cash book (No. KO-4); Book of cash issued and received by the senior cashier (No. KO-5); Cash disbursement statement; cash receipt
Accounting documents Cashless payments	Payment instructions, bank statements
Acts and reports	Act of inventory of cash and cash equivalents; Report on the use of funds issued for business trips or against accountability; Act of reconciliation of mutual settlements; Act of audit of financial and economic activities
Accounting registers	Journal 1, statements 1.1, 1.2, 1.3; Register of uncollected wages
Financial statements	Balance Sheet (Statement of Financial Position) (Form No. 1); Statement of Cash Flows (Form No. 3 / 3-n); Notes to the Annual Financial Statements
Regulatory and legal acts	Resolution of the Board of the National Bank of Ukraine No. 148 (2017); Order of the Ministry of Finance of Ukraine No. 879 (2014); Law of Ukraine No. 851-IV (2003); Law of Ukraine No. 1591-IX (2021)

Source: created by the author

Various procedures are applied in the course of an audit. From the perspective of international practice, the methodology of which is set out in ISA 315 (2019) and ISA 330 (2017), they are divided into risk assessment procedures and subsequent audit procedures (substantive and

control tests). ISA 500 (2020) provides a detailed description of the content of inspection, external confirmation, observation, recalculation, re-performance, enquiry and analytical procedures (Table 3). They are grouped according to the context in which they are used by the auditor.

**Table 3.** Audit procedures for the audit of cash

Names of audit procedures	Examples of use
Observations	Overseeing the process of inventorying cash and cash documents stored in the company's cash desk; monitoring the documentation of transactions with accountable persons
Confirmation	Confirmation of the amount of the current account balance; confirmation of the intended use of funds, the terms of agreements concluded between the company and a third party
Inspection	Checking entries in the cash book, compliance with the storage periods for primary documents, compliance with safety rules when working with cash equipment
Request	Sending letters of request for data reconciliation to the company's counterparties; verbal requests to employees regarding cases of issuing money for reporting, payment of salaries (from the cash desk or to a bank card)
Recalculation	Verification of the correctness from the mathematical point of view of determining the net cash flow and its balance at the end of the period in the Cash Flow Statement (form No. 3/3-n); determination of the correctness of the calculation of the balance at the end of the day in the Cash Book (No. KO-4)
Re-execution	Re-distribution of cash flows by type of activity (operating, financing, investing); re-determination of exchange rate differences on foreign currency transactions
Analytical procedures	Analysis of liquidity and solvency indicators for several years, comparison with industry averages; factor analysis of net cash flow; determination of the plausibility of links between financial and non-financial data (number of new customers, hours worked, market share, volume of transactions per day, etc.)

Source: created by the author

According to approaches adopted in Ukraine, organoleptic, computational-analytical, documentary, and methods of generalisation and implementation of control results are distinguished. General scientific methodological techniques are also singled out. This method of grouping is described in the works of L.V. Gutsalenko *et al.* (2014), L.L. Hevlych & I.G. Hevlych (2017), and N.V. Kotseruba (2018).

Control over the actual state of objects is realised on the basis of organoleptic (sensory) techniques, which include inventory taking, control measurements, observation, expert examination, and experiment. Some of them are generally not used in the audit of cash and cash equivalents. For example, control measurements of works are usually resorted to during an audit of expenses or settlements with suppliers and contractors to establish facts of

volume distortion, overpricing or underpricing, inclusion of non-budgeted expenses, etc.

Computational-analytical audit techniques include economic analysis, statistical calculations, and economic-mathematical methods and models. This group of methods, along with forms of documentary verification, is widely used in auditing cash operations. Economic analysis allows for uncovering the reasons for deviations in reported figures and identifying signs of irregularities. For presenting information on cash flow by type of activity, a separate report (Statement of Cash Flows (Form No. 3/3n)) is provided. As T.A. Pereymyvovk (2007) noted, during the study of economic activity, “it is very important not to make a mistake in assessing the impact of factors (negative or positive), when ultimately the value of one factor can be outweighed by the value of other factors with an opposite assessment”. An auditor who expresses their professional judgment on the financial statements of an economic entity must not only take into account the current state but also the enterprise’s immediate prospects. That is, based on, for example, various models for predicting the likelihood of bankruptcy, assess the riskiness of activities.

Documentary verification, in its essence, can be formal, arithmetic, regulatory and legal, cross-checking, analytical, and chronological. I.V. Beshulya & L.L. Hevlych (2013) proposed dividing documentary methods into three groups: 1) examination of an individual document (register, reporting form); 2) comparison of accounting documents (registers, reporting forms); 3) examination of data reflecting the movement of homogeneous valuables. The content of operations accompanied by cash movement can be examined by the auditor both in chronological order and in a systematised manner. If documentation is checked in chronological order, there is usually a need for simultaneous work with different types of it. It is much more convenient to study documents by groups of economically homogeneous operations.

Cross-checking is used to confirm the state of settlements with counterparties and the corresponding movement of funds in the bank account. T.Ya. Matkivska & O.M. Bondarenko (2020) noted that this type of verification can also be carried out with the bank serving the enterprise to gain confidence in “the presence of open accounts.” Auditors also resort to arithmetic calculation of all totals in a document, which allows for identifying errors made during its preparation. For example, in the cash disbursement statement, provided in Appendix 1 to Resolution of the Board of the National Bank of Ukraine No. 148 (2017), the total amount in the fourth column of the table, the volume of actually disbursed cash per statement, and the amount of deposited funds are checked.

The national approach provides for a clear distinction between documentary and factual control, while the international approach combines them within inspection. During documentary verification, it is common to resort to re-performance, recalculation, inquiry, and external confirmation, although each of these procedures has a slightly different

name in domestic practice. According to the international view of the audit process (ISA 500, 2020), there is no separate group for methods of generalisation and implementation of control results, as these are considered obvious and not related to the examination stage. The most complete match in content is observed for the observation procedure, which is included in the organoleptic group in national practice.

Each audit is conditionally divided into several stages. Most researchers who have studied the organisation of cash audits have settled on the option of distinguishing only three stages, namely: preparatory, main, and concluding. Such information is contained in the works of N.Y. Radionova & K.O. Zhura (2017), O.G. Ryabchuk & I.R. Korotava (2018), T.O. Melikhova & A.S. Veriovkina (2019). The second most frequent distribution is into four stages. The aforementioned three are supplemented by a physical verification stage, also called factual, which is proposed to be conducted after performing preparatory procedures, i.e., the first stage. This position is held by Y.V. Podmeshalska *et al.* (2019) and I.D. Golyash & B.N. Menkiv (2019).

There are also scholars who distinguish six or more stages of cash audit. For example, M.D. Korinko (2014) compiled a list of auditor actions during the verification of cash operations of an economic entity, combining them into six stages. In his opinion, such a verification should begin with “a sudden audit of the cash till with a full sheet-by-sheet recalculation of all money and other cash documents located in the enterprise’s cash till”. A.Yu. Kozachenko (2021) provides similar information in her article. According to M.Yu. Gulko (2020), eight stages of organisation and direct conduct of the audit of monetary assets, the main component of which is cash, should be distinguished. The author provided the highest degree of detail for the previously mentioned stages. For example, he divided the preparatory stage into the following three: “preliminary examination of client’s activities; drawing up an audit plan; constructing a scheme of the audit process sequence”. It is more appropriate to disclose these processes as part of the first stage of the audit, rather than separating them.

Other approaches are also found in economic literature. Yu.V. Shavrina & T.L. Sliunina (2024), although they distinguished four stages of audit, like Y.V. Podmeshalska *et al.* (2019), according to their vision, the audit should begin with an organisational stage, during which the auditor collects and analyses information about the enterprise’s activities, its structure, management and accounting system, assesses the feasibility of the audit, and concludes the service agreement. Only after this does the transition to the preparatory stage occur, where an audit team should be created, a general audit strategy developed, and an audit plan, programme, and schedule developed. The main stage was renamed to technological without changing its essence, as was the concluding (final) stage.

The option of dividing the cash audit process into three stages is sufficient: organisational-preparatory, main, and concluding. There is no need to single out a physical (factual) verification stage as a separate group, as the process of

observing the inventory of cash and cash documents in the till is a type of audit procedure, which, although it significantly affects the quality of the conclusions drawn, is not

more important than other types, such as inquiry, recalculation, analytical procedures, etc. The general appearance of the cash audit plan is presented in Table 4.

**Table 4.** Plan for conducting a cash audit at an enterprise

Name of the audit stage	Content
Organisational-preparatory	<ul style="list-style-type: none"> <li>◆ familiarisation with the specifics of the company's business;</li> <li>◆ verification of the absence of circumstances that may be grounds for refusal to conduct the audit of the company's financial statements;</li> <li>◆ studying the general industry indicators of similar enterprises;</li> <li>◆ determination of the audit risk;</li> <li>◆ calculation of the materiality level;</li> <li>◆ preparation of the audit plan and programme;</li> <li>◆ conclusion of an audit services agreement.</li> </ul>
Main	<ul style="list-style-type: none"> <li>◆ performing audit procedures in accordance with the previously prepared audit programme;</li> <li>◆ completion of working documents.</li> </ul>
Concluding	Summarising the results of the audit: <ul style="list-style-type: none"> <li>◆ analysis of the violations and abuses found;</li> <li>◆ coordination of the identified violations with the management and their correction;</li> <li>◆ preparation of the audit report.</li> </ul>

Source: created by the author

The first step is to investigate the issue of the absence of a conflict of interest and compliance with the principle of auditor independence. For example, if the key audit partner and the chairman of the company's Supervisory Board are family members of the first or second degree of kinship, the objectivity of the opinion presented in the audit report will be questionable. The audit entity thoroughly familiarises itself with the specifics of the company's business. Information on the main and additional activities, main sales markets, main counterparties of the company, organisational structure, accounting policy, etc. is studied. The task of the company acting as the client is to provide all the necessary documentation. This may include, first of all, the company's Charter, Certificate of State Registration, certificate from the Unified State Register of Enterprises and Organisations of Ukraine (US-REOU), Order on Accounting Policy, Order on Approval of the Procedure for Calculating the Cash Balance Limit,

Regulation on the Internal Audit Service, financial statements and audit reports for previous years, etc.

At the organisational and preparatory stage, the internal control system is also assessed. If a high level of efficiency is found, this will reduce the labour intensity of the subsequent audit, the sequence of tasks of which is recorded in the programme. The elements to be examined are usually the internal environment, controls in place, risk management, information and communication, etc. A commonly used method of assessment is testing.

By testing the internal control system, the auditor evaluates its effectiveness, identifies deficiencies in cash accounting, determines audit risk, assesses the qualifications of employees who perform cash transactions, and establishes the effectiveness of the control procedures adopted by the company (Table 5). The results obtained, among other things, allow the development of the programme to choose the right method of conducting the audit: spot, full or combined.

**Table 5.** Test of the company's accounting and internal control system

No.	Question Content	Answer Options		Notes
		Yes	No	
1	Were any deficiencies, irregularities, or abuses identified in previous audits?			
2	Does the Accounting Policy Order sufficiently disclose the specifics of accounting for cash and cash equivalents?			
3	Does the company have a schedule of cash and cash equivalents document flow?			
4	Do accounting employees leave frequently?			
5	Is there a full liability agreement with the cashier?			
6	Are there proper conditions for storing cash and cash documents in the company's cash desk?			
7	Has the procedure for calculating the cash balance limit been approved?			
8	Does the company comply with the cash balance limit?			
9	Has the company been fined for violating the provisions of the Regulation on conducting cash transactions in the national currency?			
10	Are the cash books numbered and laced in the prescribed manner?			

Table 5. Continued

No.	Question Content	Answer Options		Notes
		Yes	No	
11.	Is the timeliness of the employee's return of unused funds provided for reporting controlled?			
12	Is the cash register inventory carried out more than once a year?			
13	Does the company carry out unscheduled inventories?			
14	Are there any agreements on opening bank accounts?			
15	Did the company conduct mutual verification of settlements with counterparties in the reporting period?			
16	Are the rules for determining the effect of changes in foreign exchange rates, as set out in NP(S)BO 21/IAS 21, adhered to when settling with foreign counterparties?			
17	Is the revaluation of end-of-day monetary items, for which transactions occurred during the day using the NBU exchange rate, performed?			
18	Do accounting staff monitor legislative changes regarding accounting and taxation?			
19	Are the retention periods for primary documents related to cash and cash equivalents adhered to?			
20	Is the verification of synthetic and analytical accounting data performed before preparing financial statements?			
21	Is the consistency of accounting register indicators and financial statements checked?			
22	Do you consider the internal control system at the enterprise to be effective?			

Source: created by the author

After analysing the results obtained during the assessment of the company's internal control model, an audit programme is drawn up. It discloses information about the timeframe for completing the tasks and the persons responsible for the quality of the audit, as well as audit procedures, sources of information, indices of working documents, etc. It is advisable to start an audit of cash with a surprise inventory. The external auditor should act as an observer in this process. Prior to the physical inspection, the cashier provides the chairman of the inventory committee with a receipt stating that all cash received has been posted and cash issued has been written off, and that all receipt and expense documents have been submitted to the accounting department. Non-cash payments are also subject to inventory. They are subject to a special procedure, which involves counter reconciliations with counterparties. The actual existence of cash in transit, i.e. cash belonging to the entity but not yet credited to the relevant current or other bank account, can be confirmed by comparing the amounts recorded in sub-accounts

333 "Cash in transit in national currency" and 334 "Cash in transit in foreign currency" in accordance with Instructions no. 291 (Ministry of Finance of Ukraine, 1999), with the information contained in receipts from banks, post offices, and copies of the accompanying statements for transferring proceeds to the bank to collectors.

The audit of cash transactions is usually carried out using a continuous method, with special attention paid to compliance with cash discipline. Although this method is the most labour-intensive, it also minimises the risk of errors not being detected. The continuous type of audit is used in situations where the auditor believes that the use of the sampling method will not be sufficiently effective to obtain the necessary audit evidence. This is because the sampling method may not detect significant irregularities in such a sensitive area of accounting as cash transactions, where the risk of fraud is significant. An exception is possible only for cash transactions that are of a large-scale nature. The cash audit programme is set out in Table 6.

Table 6. Cash audit programme

No.	List of issues to be checked	Audit methodological techniques	Audit evidence	Term
1	Checking the compliance of accounting data and the actual availability of cash and cash documents on hand	Supervision of the inventory process	Cash Book, Cash Receipt Voucher (CRV), Cash Payment Voucher (CPV), Act on the Results of Inventory of Available Funds Held	
2	Checking the establishment of and compliance with the cash balance limit in the company's cash desk	Documentary, arithmetic	Cash Limit Calculation, Order on Approval of Cash Limit Calculation Procedure, Order on Accounting Policy, Cash Book, CRV, CPV	
3	Verification of compliance with legal requirements for the employment of a cashier	Documentary, regulatory and legal	Full Material Liability Agreement, Cashier's Job Description	

Table 6. Continued

No.	List of issues to be checked	Audit methodological techniques	Audit evidence	Term
4	Checking the intended use of cash at the enterprise	Documentary, cross-checking, arithmetic	Disbursement documents, advance reports, CPV, cheques, receipts, data from accounts 30, 31, 372, 66	
5	Verification of compliance with restrictions on cash payments	Documentary, regulatory and legal, cross-checking	CRV, CPV, Cash Book (No. KO-4), Book of Cash Issued and Received by the Senior Cashier (No. KO-5), etc.	
6	Verification of timeliness and completeness of return of unused part of the cash issued under the report by employees	Documentary, arithmetic	Reports on the Use of Funds Issued for Business Trips or against Accountability (travel tickets, invoices, payment bills, cheques), disbursement documents, CPV	
7	Checking compliance with the conditions for storing cash and other valuables in the company's cash desk	Inspection	Act on Checking Adherence to the Procedure for Cash Operations	
8	Verification of compliance with the rules for maintaining a cash book (numbered, laced, sealed, and free of corrections)	Documentary, inspection, substantive testing	Cash Book (Form No. KO-4)	
9	Checking the procedure for spending cash proceeds	Documentary, arithmetic, substantive testing, regulatory and legal	Bank statements, payment instructions	
10	Checking for discrepancies in settlements with counterparties	Cross-checking / Reconciliation	Act of reconciliation of mutual settlements	
11	Verification of the correctness of exchange rate differences at the date of the transaction and at the end of the reporting period	Documentary, arithmetic, substantive testing	Payment instructions, bank statements, Order on accounting policy, NBU data	
12	Verification of the correctness of documentary registration of cash receipt and transfer (payment) transactions	Documentary, substantive testing, arithmetic, regulatory and legal	Payment instructions, bank statements, CRV, CPV, Cash Book (No. KO-4), Book of Cash Issued and Received by the Senior Cashier (No. KO-5), etc.	
13	Review of analytical cash accounting for compliance with turnover and synthetic account balances	Documentary, substantive testing	Trial balance, Journal 1, statements 1.1, 1.2, chart of accounts, etc.	
14	Checking the consistency of information provided in the financial statements and accounting registers	Documentary, substantive testing	Journal 1, statements 1.1, 1.2, 1.3; Register of uncollected wages, financial statements (Forms No. 1, 3, 5)	
15	Verification of the identity of the respective figures in the Balance Sheet, Cash Flow Statement and Notes	Documentary, substantive testing	Balance sheet, cash flow statement, notes to the annual financial statements	
16	Summarising the results	Analytical	Working documents, auditor's report	

**Source:** created by the author in accordance with the requirements of the Resolution of the Board of the National Bank of Ukraine No. 148 (2017)

This programme will allow the auditor to approach the audit in an organised manner and obtain the evidence necessary to formulate an audit report, the main part of which is an opinion on the reliability of the financial statements. The auditor may issue one of four types of opinion: unqualified, qualified, adverse or abstain from expressing an opinion. The latter option is possible, for example, if the auditor's independence is violated or if sufficient and appropriate evidence cannot be collected. If the auditor decides to express a qualified opinion because certain minor inaccuracies or irregularities have been identified that have a limited impact on the financial statements, the reasons should be disclosed in a separate paragraph of the report. In

addition to the report, the internal audit results also include recommendations for correcting identified errors and optimising the accounting and internal control system. Such information is provided to management for consideration.

The most common violations identified during a cash audit include the following: Abuse of office (misappropriation, embezzlement of part of the funds received in the course of excessive write-offs or non-receipt); exceeding the permissible limit of cash payments, the established cash limit; untimely and/or incomplete return of funds provided for reporting by employees; mistakes in calculations (incorrect determination of exchange rate differences, total cash transactions for the day in the Cash Book, amount of deposited

salary, etc.); lack of mandatory details in primary documents; incorrectly formed account correspondence; untimely and/or poor quality cash inventory, etc. The auditor must generally adhere to the principles of confidentiality and professional secrecy, i.e. not disclose information obtained during the audit, including any violations identified, to third parties.

An important element of the cash audit is the reconciliation of mutual settlements, which allows to verify the accuracy of the information on the status of debts and to ensure that the data on the balance of non-cash funds is correct. First of all, the reconciliation is carried out with the main counterparties with whom the company has the

largest volume of settlement transactions for the period under review. This process also includes those debtors with whom there has been no contact for a long time, but whose debts remain outstanding. For the purposes of summarising the information obtained as a result of reconciliations with counterparties, for the sake of clarity of its display and ease of analysis, it is proposed to use a summary statement of reconciliation acts with counterparties (Table 7). Such data, especially if collected over several periods, will allow identifying the transactions in which errors are most often made, identifying the party responsible for the discrepancies, and the most problematic debtors and creditors.

**Table 7.** Summary statement of reconciliation acts with counterparties

No.	Counterparty name	Document confirming the debt		Amount of debt, UAH		According to the Act of Reconciliation of Mutual Settlements		Disagreements
		Date	Name and number of the document	By supporting document	According to the analytical accounting statement	UAH	Date	
1	2	3	4	5	6	7	8	9
Debtors of the enterprise:								
Creditors of the company:								

Source: created by the author

The auditor usually also pays attention to verifying the information on the company’s bank accounts, namely the legality of their opening, the existence of a cash management agreement, and compliance with the closure procedure, if such an event has taken place. Obtaining confirmation

from banking institutions regarding account balances is a key procedure for confirming the accuracy of information in the company’s accounting records. Therefore, it is important to know which accounts are open to the company and in what amount (Table 8).

**Table 8.** Form of the auditor’s working document for verification of information on bank accounts

Bank where the account is opened	MFO of the bank	Account type	Currency type	Account number	Account opening agreement		Account closure details			Analytical account for accounting		Usage activity	
					Account No.	Date	Reason	Date	Reference	Account No.	Name	Date of the last transaction operations	Balance of funds
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Source: created by the author in accordance with the requirements of the Resolution of the Board of the National Bank of Ukraine No. 162 (2022)

It is also necessary to pay close attention to the reasons for closing previous bank accounts (on the company’s own initiative; on the bank’s initiative due to the absence of transactions for 3 years with a zero balance; by decision of the body responsible for the termination of the legal entity, etc. Of course, a legal entity may not have such accounts. In this case, columns 8, 9 and 10 of

the proposed form of the auditor’s working document for verifying information on bank accounts will remain blank (or a dash may be placed in them).

Information about the analytical account used to record transactions on an account opened with a banking institution is required to obtain assurance that there is no contradiction with the requirements of applicable law (for

example, that transactions to transfer funds from a current account in foreign currency are not recorded on the 3<sup>rd</sup> order account 3111). The data in columns 13 and 14 are intended to assess the need for this account. If, for some reason, it is not used by the business entity for a long time, it is necessary to consider closing it. In addition, the account opening agreement may provide for the write-off of the fee for settlement services for an inactive account.

When auditing cash transactions, one of the most important tasks is to examine the correctness of the primary documents reflecting the issuance and acceptance of cash. It is necessary to perform not only arithmetic calcu-

lation, but also a formal check, which involves reviewing the document for all mandatory details, the list of which is set out in Resolution of the Board of the National Bank of Ukraine No. 148 (2017). The author has created a variant of the auditor's working document form, which will be convenient for recording the results of the review of cash receipt orders. In the last line of the form, for each column, except for 16, 17 and 18, it is needed to calculate the sum of empty cells that indicate the absence of a requisite. This will make it possible to identify which requisite is most often overlooked and to determine the number of primary documents filled in with errors (Table 9).

**Table 9.** Form of the auditor's working document for verifying the correctness of filling in cash receipt vouchers

No. p/p	Name of requisites													Operation amount, UAH with coins			
	Enterprise Name	USREOU Code	Voucher Number	Date of compilation	Purpose Code	Amount		Basis	Received from	Corresponding account, sub-account	Analytical Account Code	Seal	Signature		By receipt order (form No. KO-1)	By the Cash Book (form No. KO-4)	Deviation
						In figures	In words						Cashier	Chief Accountant			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Total															X	X	X

**Source:** created by the author in accordance with the requirements of the Resolution of the Board of the National Bank of Ukraine No. 148 (2017)

A working document form for monitoring the correctness of filling out cash vouchers (form KO-2) was developed on a similar principle. The only difference is in the set of details: instead of the surname, name, patronymic (surname) of the person from whom the order was accepted, the surname of the person to whom the cash should be issued

against signature is checked; the initials and signature of the head of the enterprise are added (there may be no signature if the documents, statements and accounts attached to the form No. KO-2 contains his authorisation), as well as the cash recipient; the name, number, date and place of issue of the recipient's identity document are indicated (Table 10).

**Table 10.** Form of the auditor's working document for checking the correctness of filling in the cash vouchers

No. p/p	Name of requisites													Amount of the transaction, UAH per co.					
	Enterprise Name	USREOU Code	Voucher Number	Date of Compilation	Purpose Code	Amount		Basis / Grounds	Issued to / To whom issued	Corresponding account, sub-account	Analytical Account Code	Information about the document identifying the recipient	Signature			Recipient	According to the payment voucher	According to the Cash Book	Deviation
						In figures	In words						Cashier	Chief Accountant	Head				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total																	X	X	X

**Source:** created by the author in accordance with the requirements of the Resolution of the Board of the National Bank of Ukraine No. 148 (2017)

Every enterprise that makes cash payments faces the issue of setting a cash limit. If it is not approved by an appropriate administrative document, the cash balance limit will automatically be considered zero. Any excess, except as provided for by law, will result in penalties being imposed on the company, so it is important to ensure that the limit is not exceeded during the audit. The exception is the days when salaries are paid from the cash desk. Funds received for this purpose may be kept in excess of the limit for three days.

Currently, due to the martial law, it is necessary to take into account circumstances that make it impossible to timely deposit the excess cash amount to a bank branch. This may be due to active hostilities on the territory, as well as emergency power outages. Paragraph 48 of Resolution of the Board of the National Bank of Ukraine No. 51 (2018)

provides for the possibility of transferring cash to the bank with a delay due to force majeure circumstances, while taking measures to remedy the situation as soon as possible (returning the over-limit amounts). This nuance was taken into account when developing the form of the auditor's working document, which can be used to identify the fact of exceeding the cash balance limit (Table 11). It also does not contain a requirement for mandatory documentary evidence of force majeure, but it is advisable for a company to have it to avoid possible misunderstandings with regulatory authorities. This can be a printed notice from the regional power company on its official website about an emergency power outage in the region, a bank's notification of a temporary pause in the operation of its branches, or an explanatory note from the cashier.

**Table 11.** Form of the auditor's working document for checking the cash limit

Date	Cash till limit, UAH	Cash balance at the end of the day, UAH	Including cash balance per payment statements on payroll days		Exceeding the established cash till limit		
			within term	exceeding the term	Due to the enterprise's fault, UAH	Due to force majeure	
						UAH	documentary confirmation
1	2	3	4	5	6	7	8

Source: created by the author

Enterprises with foreign currency assets disclose in Form 5 "Notes to the Annual Financial Statements" of the Order of the Ministry of Finance of Ukraine No. 904/5125 (2000), among other things, information on non-operating foreign exchange gains and losses. Such detail is not quite sufficient for users of the financial statements, so in order to increase the information content of the financial statements, it is advisable to separately disclose the amounts of exchange rate differences arising from investing and financing activities in Form 5. For these purposes, it is necessary to ensure the accumulation of information in the following analytical section of

the 3<sup>rd</sup> order to sub-accounts 744 "Income from non-operating exchange rate differences" and 974 "Losses from non-operating exchange rate differences": 7441 "Income from exchange rate differences arising from investing activities", 7442 "Income from exchange rate differences arising from financing activities", 9741 "Losses from exchange rate differences arising from investing activities" and 9742 "Losses from exchange rate differences arising from financing activities". As a result, the Notes to the annual financial statements (Form 5) in terms of information on exchange rate differences will look like the following Table 12.

**Table 12.** Supplements to sections V and VI of the notes to the annual financial statements

Row code	Name of the indicator
600	Non-operating exchange rate differences
601	Foreign exchange differences from investing activities
602	Foreign exchange differences from financing activities
...	...
700	Electronic money

Source: created by the author

According to the traditional approach, which is set out, among other things, in Order of the Ministry of Finance of Ukraine No. 73 (2013), electronic money is not classified as cash. However, given their ability to perform the functions of a means of payment, a measure of value and circulation, it is advisable to consider reflecting them in Section VI of Form 5

"Notes to the Annual Financial Statements" in a separate line, for example, 700, without including them in the final line 690. This will increase the information content of the reporting, since when replenishing an e-wallet from the company's current account, the funds remain available for paying for goods and services online, albeit with certain restrictions.

During an audit, one of the most common methods of obtaining assurance about the absence of errors in a business entity's financial statements is to check the identity of information in comparable items. For cash, these are the lines of the Balance Sheet, Cash Flow Statement and Notes to the annual financial statements in terms of the balance at

the beginning (except for Form 5) and end of the period. If the information is different, it means that at least arithmetic errors were made when filling out the forms, which should be corrected. To identify which forms have discrepancies, if any, and the amount of the deviation, the form of the working document shown in Table 13 can be used.

**Table 13.** Form of the auditor's working document to verify the identity of financial statement items containing information on cash

Indicator	According to accounting data						According to auditor's data						Data discrepancies					
	Balance Sheet		Statement of Cash Flows		Notes to annual financial statements		Balance Sheet		Statement of Cash Flows		Notes to annual financial statements		of compiled reporting forms			of accounting and auditor		
	line code	amount, thou. UAH	line code	amount, thou. UAH	line code	amount, thou. UAH	line code	amount, thou. UAH	line code	amount, thou. UAH	line code	amount, thou. UAH	Form No. 1 and Form No. 33	Form No. 3 and Form No. 5	Form No. 5 and Form No. 1	per Form No. 1	per Form No. 3	per Form No. 5
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<b>Balance at year start</b>	1165		3405		X	X	1165		3405		X	X		X	X		X	X
<b>Balance at year end</b>	1165		3415		690		1165		3415		690							

Source: created by the author

The completed table serves as a reliable working document that records the audit procedure performed, the data obtained, and the discrepancies identified (or not identified). This is important for confirming the validity of the audit opinion. In case of discrepancies, the table helps to quickly identify between which reporting forms there is a discrepancy (for example, between the Balance Sheet and the Cash Flow Statement), which facilitates further investigation of the reasons for their occurrence. The documented results of the audit in the form of a table can also be used to communicate more effectively with management about the identified discrepancies and the need to correct them. Due to the clear structure of the table, the auditor can use his/her time more efficiently by focusing on the analysis of the identified discrepancies rather than on chaotic search and comparison of data in different documents. The use of Table 13 is a practical and effective tool for the auditor, which contributes to a better, faster and more informed cash audit.

The developed form of the working document that verifies the identity of information on cash in different forms of financial statements is an important step in ensuring the reliability of the auditor's opinion. However, a comprehensive methodology for auditing cash flows at an enterprise requires a broader understanding of both the theoretical

foundations of the Statement of Cash Flows and the practical aspects of applying accounting policies.

Thus, I. Sadovska *et al.* (2022) offer a valuable addition to the methodology of cash flow audit. Although the authors focus on the formation of a management model of the Statement of Cash Flows, their research has a direct impact on the audit. Firstly, the researchers note "insufficient analytical nature of the Statement of Cash Flows and lack of reasonable practices regarding the appropriateness and reliability of its individual items", which directly indicates areas of increased risk for the auditor. This confirms the need not only for arithmetic verification, but also for an in-depth analysis of the company's accounting policy. Secondly, the authors compare in detail the correspondences and differences between international (International Accounting Standard 7 "Statement of Cash Flows", 2012) and national standards (Order of the Ministry of Finance of Ukraine No. 73, 2013) on the definition of cash and cash equivalents, as well as the classification of cash flows by type of activity (operating, investing, financing). These differences are key for the auditor. For example, the classification of bank overdrafts or dividends paid may differ. The audit methodology should take into account the standards under which the company operates and whether its accounting

policies correctly reflect these features. In contrast to the focus on verification of already submitted data, I. Sadovska *et al.* (2022) delve into the processes of generating this data, offering a management model of the report that can be used by the auditor for deeper analysis and identification of hidden risks. This, in turn, will allow for the development of more targeted audit procedures.

The study of A. Bubelo & O. Razborska (2024) is of key importance for the cash audit methodology, as it emphasises the crucial role of an effective internal control system in managing cash and increasing investor confidence. The authors analyse the international experience of internal control systems (COSO, ISO 31000), which is critical for the auditor. The data identity check, which is provided by the developed form of the working document (Table 13), is only an external consistency check. However, its results may indicate weaknesses in the internal control system that lead to errors. For example, the identified discrepancies may be the result of deficiencies in the processes of authorisation, processing or recording of cash transactions. A. Bubelo & O. Razborska (2024) delve into the essence of these processes, offering a comparative analysis of the practices of the United States, Germany and Poland. For the auditor, this means that when developing a cash audit programme, special attention should be paid not only to verifying balances, but also to assessing the components of the internal control over cash flows, such as the control environment, risk assessment (including fraud risks), control actions, information and communication, and monitoring. Implementation of international experience in internal control, according to the authors, will allow enterprises to ensure reliable protection of financial resources. Accordingly, the audit methodology should include procedures for testing the effectiveness of these controls, which is the next logical step after verifying the identity of the data.

A.P. Semenets (2017) complements the methodology of cash audit by extending it to modern forms of cash payments. The author substantiates the organisational and methodological provisions of the external audit of electronic money transactions, including the definition of the purpose, objectives, subjects and objects of the audit, as well as sources of information. According to A.P. Semenets (2017), the main purpose of the audit of electronic money transactions is to provide an unbiased opinion on the reliability of financial statements. This is fully consistent with the overall objective of the cash audit. The importance of this work for cash audit methodology lies in the need to adapt audit procedures to new technologies. While traditional cash auditing focuses on cash on hand and cash in bank accounts, electronic money (such as PayPal, e-wallets, etc.) requires specialised approaches. Therefore, the cash audit methodology should be expanded to include the audit of electronic money transactions, which includes: determining the object of audit; sources of information; risk assessment; review of internal controls; and the use of specialised IT tools.

Z.B. Lytvyn *et al.* (2022) focus on internal cash flow control, which is an integral part of any audit. The authors

detail the key aspects of internal control: from defining its essence as a system for ensuring the efficiency and legality of cash transactions, to focusing on risks (fraud, inefficiency), the need for control at all stages of cash flow (planning, use), the importance of documentation and information support, and the role of staff responsibility. Incorporating these aspects into the cash audit methodology allows the auditor to perform a more in-depth and systematic assessment, going beyond identity checks or arithmetic reconciliations, and to identify potential errors and fraud more effectively, providing the company with recommendations for improving its cash management system.

## CONCLUSIONS

The study was aimed at disclosing the peculiarities of organisation and methodology of cash audit in the unstable economic environment caused by the war. The aim of the article, which was to identify the key aspects of cash audit as a tool for ensuring financial stability of business in a crisis, was achieved. The article analyses in detail various approaches to determining the purpose of cash audit, identifies the main areas of audit and systemises the main information sources used in the audit process. International methods and procedures for auditing cash, as well as methods and procedures used in Ukraine, and different views of scientists on the number and content of the stages of the audit are considered. Based on the analysis, the author proposes an optimal structure of the cash audit process, including organisational and preparatory, main and final stages, and develops an appropriate audit plan and programme. Particular attention was paid to the practical aspects of the audit, including the development of forms of auditor's working documents to verify information on bank accounts, the correctness of cash receipt and cash payment orders, control over the cash limit and the identity of financial statement items containing information on cash.

Summarising the results, it should be noted that a high-quality cash audit plays a critical role in ensuring the financial stability of enterprises, especially in times of war and economic instability. A well-designed audit programme allows the auditor to approach the audit in an organised manner and obtain the necessary evidence to form a reasonable audit opinion on the reliability of the financial statements. The audit may reveal various irregularities, such as misuse of funds, exceeding the cash limit, late return of accountable funds, errors in calculations and document preparation. The proposed forms of working documents are a practical tool for identifying such violations and improving the efficiency of audit procedures. Reconciliation of mutual settlements with counterparties and analysis of bank accounts are important elements of the audit, which allow to confirm the reliability of information on cash.

The proposed approach to organising and conducting a cash audit, as well as the developed forms of working documents, can serve as a practical tool for auditors and managers, contributing to increased transparency of financial statements, minimising risks and timely

detection and correction of errors. The results of the study are important for improving the quality of audit services and strengthening financial discipline at enterprises in a difficult economic situation.

Promising areas for further research in this area are the development of adapted cash audit methods, taking into account the specific risks arising in the context of the ongoing war, including logistical constraints and inflationary processes, as well as the study of the impact of digital technologies, in particular the use of electronic money and online payment systems, on the cash audit process and the development of appropriate tools and procedures

for their verification. In addition, it is important to study issues related to the detection and prevention of cash fraud in a war economy.

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## Методика аудиту грошових коштів на підприємстві

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**Анотація.** Актуальність теми зумовлена тим, що в умовах економічної нестабільності аудит грошових коштів стає ключовим інструментом контролю за ефективністю управління фінансовими ресурсами підприємства, враховуючи їхню високу ліквідність та складність обліку. Метою роботи було узагальнення теоретичних засад аудиту грошових коштів та розроблення практичних рекомендацій, адаптованих до реалій українських підприємств. Методологія дослідження ґрунтувалася на поєднанні теоретичного аналізу та практичних спостережень із застосуванням методів індукції, дедукції, узагальнення й аналізу джерел, що забезпечило виявлення основних проблем у сфері аудиту грошових коштів на підприємстві та розробку ефективних підходів до їх вирішення. Всебічно досліджено мету аудиту грошових коштів, окреслено основні завдання аудитора та систематизовано інформаційні ресурси, що сприятиме якісній перевірці та надасть аудитору знання, необхідні для результативного планування, проведення аудиту, мінімізації помилок і підготовки достовірних аудиторських звітів. Особливу увагу приділено аудиторським процедурам, які застосовуються на різних етапах перевірки, що дозволить аудитору глибоко розуміти їхню специфіку та ефективно використовувати для отримання об'єктивних і достовірних аудиторських доказів. У роботі було представлено підходи до класифікації аудиторських методів контролю, що застосовуються в Україні, при цьому особливу увагу приділено документальній перевірці та розрахунково-аналітичним прийомам як ключовим елементам забезпечення якісного аудиту грошових коштів на українських підприємствах. Запропоновано удосконалену методику, яка включає в себе не лише загальний план та програму аудиту, а й детальний тест системи обліку та контролю. Це дозволить аудитору не просто перевірити правильність відображення грошових коштів, а й оцінити ефективність системи внутрішнього контролю. Для зручності та підвищення якості аудиту розроблено спеціальні робочі документи, які дозволяють систематизувати інформацію та забезпечити її достовірність. Результати дослідження можуть бути використані не лише в практичній діяльності аудиторів, а й в навчальному процесі закладів вищої освіти

**Ключові слова:** аудиторська перевірка; касові операції; процедури; етапи аудиту; загальний план; програма; робочий документ



## Problems and prospects of investment climate development in Ukraine

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**Abstract.** Deepening institutional instability, increasing regulatory uncertainty, and growing infrastructure imbalances in the context of a full-scale war in Ukraine have created a threat to the sustainability of the investment environment, which has led to the need to rethink the factors of its formation and adapt to the conditions of post-crisis transformation. The purpose of the study was to identify the factors of the dynamics of the investment climate in Ukraine in 2020-2024, while simultaneously forming strategic guidelines for its improvement in the context of the post-war recovery. The methodological basis of the study was founded on an analytical and descriptive approach using elements of comparative, structural, functional, and institutional analysis. As a result of the study, five interrelated approaches to the interpretation of the investment climate – institutional, legal, economic, infrastructural and social – were identified, which allowed forming a five-level analytical model of the investment environment, presented in the format of a structural typology. Based on the analysis of the Rule of Law (-0.80 in 2022), Control of Corruption (-0.88 in 2022) and Corruption Perceptions Index (growth from 30 to 35 points in 2020-2024), it is determined that institutional quality is a key predictor of fluctuations in the volume of foreign direct investment (from 7.9 billion USD in 2021 to 0.2 billion USD in 2022). Critical barriers to creating a favourable investment climate are identified – regulatory instability, fiscal fragmentation, infrastructure degradation, and institutional vulnerability. Strategic directions for modernising the investment environment, including strengthening legal certainty, deregulation, restoring infrastructure and institutional support for investors, are substantiated. The proposed approaches were based on the successful practices of Poland, Estonia, Latvia, Georgia, and Romania, where structural reforms have ensured the growth of long-term investment in strategic sectors. The results obtained show the defining role of institutional quality as a critical factor of investment attractiveness in a transformational economy. The practical value of the study is to form an analytical basis for improving state investment policy aimed at increasing institutional capacity, reducing regulatory risks and stimulating long-term investment

**Keywords:** institutional capacity; regulatory environment; regulatory risks; macroeconomic stability; infrastructure support; transformational economy

### INTRODUCTION

After 2020, the relevance of research on the investment climate in countries with transformational economies has increased against the background of a complicated security situation, increased regulatory risks, and macroeconomic instability. The deterioration of institutional capacity, increased legal uncertainty, and infrastructure fragmentation led to the need to review methodological approaches to assessing investment attractiveness. Thereby, the

intensification of the integration course into the European Union (EU) has led to the need to ensure transparency of public administration, regulatory coherence, and predictability of the regulatory environment, which has exacerbated the need for institutional modernisation.

One of the areas of investment environment research in Ukraine was the transformation processes caused by the war. The study conducted by D. Lisna *et al.* (2024) analysed

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the impact of military operations on the structure of investment in key sectors of the economy, and regulatory adaptation to martial law, in particular, simplification of licensing procedures. It is noted that the military actions led to a redistribution of investment in favour of sectors critical to national security – in particular, logistics, defence industry, and agricultural production – which resulted in the outflow of capital from less stable industries. In the context of the historical dynamics of investment policy, L. Kozhura *et al.* (2024) concentrated on assessing the impact of reforms until 2020 – in particular, privatisation, deregulation, and the introduction of tax incentives. The authors demonstrated that these measures had a positive effect on stimulating short-term investment, especially in the light industry, trade, and small business sectors, by reducing entry barriers and improving access to resources. A separate group consists of studies that focus on the quantitative or industry-specific measurement of investment activity. A publication of O. Baula *et al.* (2024) proposes an econometric model of the dependence of economic growth on the level of investment, where the input variables are indicators of gross domestic product (GDP) and consumer price index. According to the simulation results, an increase in investment activity is accompanied by GDP growth in a stable price environment, which indicates a multiplicative effect of investment.

I. Tomashuk *et al.* (2024) and V. Rudevskaya *et al.* (2024) paid close attention to assessing the investment potential of the agro-industrial complex as a strategic direction in conditions of economic instability. In the first study, the agricultural sector is identified as resistant to external shocks due to the high concentration of the resource base, stable demand for products, and export potential. The second section emphasises the interest of foreign capital in the agricultural sector as one of the most dynamic areas of investment. Another analytical field covers state and regional policy instruments. In the study by R. Boiko *et al.* (2024), the effectiveness of special economic zones (SEZ) and local investor incentive programmes was investigated, with a focus on adapting instruments to the needs of individual territories. The authors state that individualised approaches based on territorial specialisation can generate additional investment interest at the expense of local preferences. In particular, the importance of partnership between local authorities and investors in creating a stable institutional environment was underlined.

O. Herus (2024) analysed government mechanisms for raising capital through coinvestment tools, risk insurance, and the development of cluster initiatives. The author pays special attention to the role of the state in creating favourable conditions for private capital through the creation of joint projects with a clearly defined distribution of responsibilities and benefits. The study also examines the importance of the cluster approach as a means of concentrating investment flows in strategically important sectors. Generalised estimates of investment attractiveness are presented by S. Dombrovska (2025), who used aggregated

indices such as the Global Competitiveness Index and Doing Business to assess the business climate of Ukraine. The author recorded a negative trend in such components as the effectiveness of institutions, protection of property rights, ease of starting a business, and executing contracts, which indicated an increase in regulatory uncertainty and a weakening of guarantees of legal certainty for investors. In the socio-demographic aspect, the investment potential of the country is considered in the publication of M. Ruzhen'skiy *et al.* (2024), tracing the relationship between labour mobility, education level, and territorial placement of capital. The authors prove that regions with a higher level of educational potential and labour mobility are more attractive to investors due to the availability of qualified labour resources and higher adaptability to technological changes. This, in turn, encourages the concentration of capital in socially developed territories.

A separate area includes research focused on the innovation vector of development. V. Bokovets *et al.* (2024) analysed the investment potential of the IT sector, high-tech manufacturing, and science, offering indicators of the effectiveness of relevant government policies. Comprehensive financial and institutional support from the EU is described by Yu. Ivanov *et al.* (2024), spotlighting the EU4Business and Deep and Comprehensive Free Trade Areas (DCFTA) programmes. However, the processes of internal regulatory adaptation to *acquis communautaire* did not become the subject of detailed analysis. The experience of EU countries in terms of institutional impact on investment decisions is highlighted in a paper of J. Bijańska & K. Wodarski (2024), indicating that the stability of regulation in the field of renewable energy in Poland has had a positive impact on the volume of capital investment. The evaluation of the analysed sources showed that most of the studies focused on industry-specific aspects of investment activity or applied tools for stimulating capital investment, without a holistic analysis of the institutional structure of the investment climate. The analysed papers mainly concentrated on quantitative assessments of investment dynamics, sectoral priorities, individual incentive mechanisms, or regional investment features, often in isolation from the systematic review of institutional factors. The impact of the rule of law, stability of contractual obligations, transparency of management decision-making, and mechanisms for building investor confidence in the medium- and long-term horizon remained insufficiently covered. There was no systematic approach to assessing the effectiveness of regulatory policy adaptation to the requirements of EU integration, which created a research gap in justifying the role of the institutional environment as a determinant of investment policy. Bridging this gap was the task of the proposed study.

The study aimed to establish the institutional, legal, and structural factors that influenced the formation of the investment climate in Ukraine in 2020–2024 and determine strategic guidelines for its improvement in the context of post-war transformation. The following research tasks were

solved to achieve this goal: systematisation of theoretical approaches to the interpretation of the investment climate as a complex economic and institutional category was conducted; the main barriers that prevented attracting capital in the context of destabilisation of the security, regulatory, and infrastructure environment were identified; the nature of the influence of the state's institutional capacity on the dynamics of foreign direct investment was analysed.

## MATERIALS AND METHODS

The conducted study is analytical and descriptive by type, using elements of comparative, structural, functional, and institutional analysis. The methodological basis of the study provided for a systematic combination of qualitative and quantitative approaches. The time horizon covered 2020-2024, a period characterised by radical transformations in the institutional, economic, and security environment of Ukraine. This time period allowed tracking the dynamics of changes in the investment climate in the context of gradual destabilisation, the beginning of recovery, and political adaptation to new geo-economic realities. The subject area covered institutional and legal barriers that limited the attraction of long-term investment capital. Special attention was paid to the assessment of the instability of the regulatory field, the ineffectiveness of anti-corruption practices, and the lack of contractual protection mechanisms. The theoretical basis was based on the concepts of the rule of law, regulatory quality, control of corruption, foreign direct investment, and institutional efficiency, which provided an interdisciplinary foundation for analysing the investment climate and identifying the directions of its structural transformation.

The empirical base of the study is built on official statistical and analytical materials published by the World Bank Group (2024), OECD (2019), and the United Nations Conference on Trade and Development (UNCTAD) (2015). The data of the international organisation Transparency International (n.d.) regarding the dynamics of the Corruption Perception Index were considered as one of the key indicators of institutional sustainability. In addition, materials from the European Commission (n.d.a) and European Investment Bank (n.d.), containing information on instruments of external investment support and financing of recovery and sustainability programmes, were used. Data from the National Bank of Ukraine (n.d.), the Ministry of Infrastructure of Ukraine (2020), and the State Tax Service of Ukraine (2025), which reflect macro-financial dynamics, infrastructure status, and tax regulation of investment activities, were involved in the analysis. In addition, analytical resources of the Ministry of Economy of Ukraine (n.d.) and the government office for coordination of European and Euro-Atlantic integration on strategic planning, regulatory adaptation, and European integration priorities were used.

The study also accounts for the experience of countries with transformational economies – Poland, Georgia, Romania, Latvia, Estonia – to identify typical scenarios of institutional adaptation and study mechanisms for stimulating foreign direct investment in the context of reforms. The

information base was formed according to the data of the Polish investment and trade agency (n.d.), The Bridge Between Europe & Asia (n.d.), A gateway of business... (n.d.). Analytical materials by the Investment and development agency of Latvia (n.d.), Building a successful Estonia! (n.d.) were also utilised. The choice of these countries was justified by the similarity of structural challenges, historical belonging to transition economies, and the presence of comprehensive reforms that enabled them to reach a new level of institutional capacity. The comparative approach allowed assessing the potential applicability of the developed tools in the context of Ukraine. The method of comparative analysis was used to compare the quantitative and qualitative indicators of Ukraine with similar indicators in the analysed countries that have quite successfully implemented institutional changes. This method allowed identifying both gaps in the functioning of the regulatory environment and potential growth points that have already demonstrated effectiveness in the countries of Central and Eastern Europe. The comparison covered institutional characteristics (rule of law, control of corruption, government efficiency indices), investment flow indicators, and the effectiveness of implementing institutional reforms.

The institutional analysis provided an examination of the deep structural conditions that determine investment activity, particularly, mechanisms for protecting property rights, the quality of the judicial system, transparency of public administration, and the stability of the regulatory framework. The application of this method provided for identifying system restrictions that remained relevant throughout the study period and tracing their direct connection with investor behaviour. The institutional approach is also used to review models of administrative stability and regulatory adaptability in the regional context. The interpretation of the results obtained was based on the logic of inter-level interaction of factors: from general macroeconomic determinants to institutional and legal mechanisms at the sectoral and territorial levels. A combination of a normative approach with an analytical interpretation of empirical data was used to summarise the information. Determining the cause-and-effect relationships between the quality of the institutional environment and the dynamics of direct investment allowed formulating reasonable conclusions and recommendations on priority areas of state investment policy.

## RESULTS AND DISCUSSION

### **Theoretical and structural foundations of the formation of the investment climate as an economic category**

The concept of investment climate in economics is defined as a set of political, legal, economic, social, and institutional factors that shape a country's ability to attract and effectively use investment resources. This concept is not limited to purely economic indicators, but covers the entire range of determinants that influence investors' decisions on the placement of capital. In scientific discourse, several approaches to the interpretation of this category were

formed, but a common feature of most of them remained the recognition of the expediency of systematic and interdisciplinary analysis of its components. The structural organisation of the investment environment was covered in a study by Z. Abdullaev (2025), where three key areas of influence on the quality of investment climate were identified – institutional, regulatory, and infrastructure. This approach provides for a focus on legal certainty, procedural stability, and functional interaction between government agencies and investors at different stages of the investment process. Taking these aspects into account highlighted the need for an integral vision of the factors that shape the in-

vestment environment and justified the approach to multi-level analysis of the impact on investment decisions.

It was advisable to present them in the format of a structural model to systematise the factors that determine the investment climate. This approach has pinpointed the leading vectors of impact on the investment environment and created the basis for a comprehensive understanding of the interdependencies between institutional, economic, legal, and social conditions. Table 1 presents an adapted multi-level model of the investment climate, formed on the basis of modern approaches used by leading international organisations.

**Table 1.** Structure of the investment climate

Level	Components	Content
Institutional	Rule of law, government effectiveness, control of corruption	Quality of the legal system, level of independence of judicial proceedings, efficiency of public administration, availability of anti-corruption infrastructure
Legal	Regulatory quality, contract enforcement	Stability of the regulatory framework, transparency of regulatory procedures, efficiency of contract execution
Economic	Macroeconomic stability, taxation, access to finance	Inflation rate, debt burden, tax policy, availability of bank and stock financing
Infrastructure	Logistics performance, digital readiness	Quality of transport and digital infrastructure, access to energy resources
Social	Human capital, public trust, social cohesion	Level of education and training, social cohesion, trust in institutions

**Source:** compiled by the author based on United Nations Conference on Trade and Development (2015), OECD (2019), World Bank Group (2024), Transparency International (n.d.)

The structure of the investment climate presented in Table 1 indicates the need for an interdisciplinary approach to its assessment. The institutional and legal levels form the basis of the regulatory environment, ensuring predictability of regulatory mechanisms, compliance with contractual obligations and guarantees for the protection of investors' rights. These components are fundamental to building trust on the part of both national and transnational investment entities. The economic and infrastructure levels determine the ability of the economy to integrate and effectively implement investment projects. Indicators of this capability are fiscal policy, credit access, macroeconomic stability, and logistics infrastructure. The growing role of digital technologies leads to an increase in the importance of digital infrastructure in assessing investment attractiveness, especially in the context of the transition to a post-industrial development model.

Social factors determine the long-term stability of the investment climate, acting as the basis for the projected functioning of economic systems. The availability of qualified human capital, the level of public confidence in government institutions and the overall level of social cohesion affect the perception of the country as a promising investment destination. In combination with other structural levels, these factors provide an opportunity for a comprehensive strategic analysis. Generalisation of the determinants of the investment climate was conducted according to the classification into direct and indirect, internal and external. The study conducted by D. Hernandez (2024)

proved that effective typologisation of these factors is a prerequisite for modelling investment behaviour in the context of growing global instability. Direct factors include tax regulation, government incentives, monetary policy, and access to infrastructure. The level of education, the state of the environment, the quality of local governance, and other social determinants are mediated. External factors cover global economic processes, the political situation, trade restrictions, sovereign risk ratings, and country confidence indicators.

Approaches to assessing the investment attractiveness of territories involve a combination of qualitative and quantitative methods. One of the most common tools is composite indicators, which aggregate data from various areas, in particular, ease of doing business, investment risk ratings, and the global competitiveness index. These indices form a generalised indicator for international investors to compare countries and assess the level of risks. A. Qazi (2024) determined that institutional quality and infrastructure, as separate components of global competitiveness, have a statistically significant impact on sustainable development prospects, which increases their importance in assessing the investment climate. A special place in the assessment of investment attractiveness is occupied by the institutional assessment, which includes indicators of management quality, effectiveness of anti-corruption policy, regulatory stability, and the political system. A paper of Ü. Çalışkan (2019) has presented that institutional capacity directly correlates with foreign direct investment, particularly

in countries with transformational economies, where institutional risks are crucial for investment behaviour.

For a systematic understanding of the influence of structural factors on the investment climate, it was advisable to generalise the key determinants in the format of

analytical typology. This approach allowed simplifying the study research and identifying critical areas that require correction of the regulatory environment. Table 2 presents a systematisation of the corresponding factors by source of origin and influence vector.

**Table 2.** Classification of investment climate formation factors

Type of factors	Direction of impact	Examples
Internal straight lines	Regulatory, economic	Tax policy, inflation rate, legal investment regime, availability of tax benefits
Internal mediated	Institutional, social	Quality of education, institutional stability, level of corruption, health care
External straight lines	Geopolitical, financial	Participation in international trade agreements, currency fluctuations, external financing conditions
External mediated	Global trends, image aspects	The country's reputation among investors, the presence of international sanctions, indicators in global ratings

**Source:** compiled by the author based on United Nations Conference on Trade and Development (2015), OECD (2019), World Bank Group (2024), Transparency International (n.d.)

Table 2 presents four main types of factors that systematically influenced the investment climate. Internal direct factors include tax regulation, exchange rate stability, and regulatory policy, which have a direct impact on investment activity. These factors are in the sphere of state regulation and may change under the influence of reforms. Internal indirect factors are prolonged and reflect the general institutional context, the level of education of the population, and the quality of functioning of state institutions. External determinants act as constraints or catalysts for investment behaviour that do not depend on the direct impact of internal reforms. Direct external factors are formed under the influence of global economic trends, regional conflicts, and changes in the geo-economic balance. Indirect external factors include the country's image, its position in international rankings, the degree of integration into global institutions, and the level of trust on the part of transnational actors. The above typology helped distinguish the areas in which public policy can provide effective regulation from those determined by external conditions, and requiring adaptation strategies.

Systematisation of the conceptual content of the investment climate has created a theoretical basis for analysing its practical implementation in Ukraine. The investment climate was considered a multi-factor phenomenon, which is based not only on macroeconomic stability but also on the efficiency of the functioning of institutions, the level of legal certainty, and the ability of the state to guarantee compliance with the established rules. In the process of forming investment policy, there was a need to account for general economic parameters along with the specifics of institutional capacity, flexibility of the legal field to transformational challenges, and the availability of

effective mechanisms for implementing regulatory requirements. As demonstrated in a study by A. Nilufar (2024), it is the combination of regulatory instruments with state control mechanisms that ensures both the initial attraction of investment and creates conditions for long-term capital retention by stabilising the institutional environment. This approach created the basis for further analysis of the real barriers that affected the dynamics of investment in 2020-2024, and provided for outlining the institutional prerequisites for effective economic transformation.

**Challenges and limitations of the development of the investment climate in Ukraine in 2020-2024**

The period 2020-2024 was characterised by deep economic transformations caused by a combination of internal dysfunctions and external shocks, primarily of a military nature. Increased institutional instability, fiscal imbalance, infrastructure degradation, and increased security risks have immensely complicated the functioning of the investment environment. These factors led to a change in the investment behaviour of economic entities in the direction of avoiding risks, reducing the volume of capital investments and reorienting investment flows to more stable jurisdictions. An analytical model was developed to systematise the main restrictions that affected investment activity in Ukraine, presented in Table 3. With the purpose of typologising key investment barriers, data on their nature, scope, mechanisms of action, and consequences were summarised. This approach identified the most critical areas that required regulatory intervention and outlined the potential for risk mitigation in the medium term based on institutional, legal, and infrastructural adaptation.

**Table 3.** Main barriers to investment in Ukraine in 2020-2024

Barrier	Barrier type	Quantitative and contextual characteristics	Mechanism of influence	Implications for investors
Military operations	Exogenous, physical	Direct infrastructure losses in 2022 amounted to more than USD 135 billion. Significant reduction in physical security	Destruction of logistics and energy facilities, displacement of personnel, disruption of market access	Withdrawal from the market of affected areas, growth of insurance costs, curtailment of physical investments

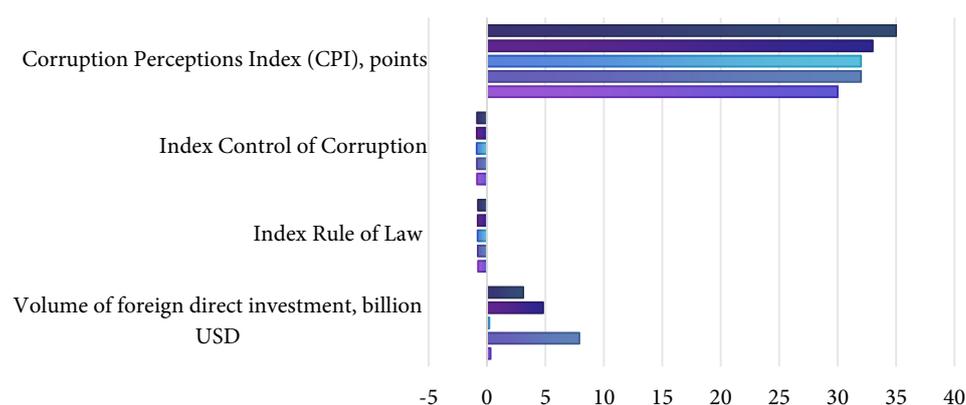
Table 3. Continued

Barrier	Barrier type	Quantitative and contextual characteristics	Mechanism of influence	Implications for investors
Institutional instability	Endogenous, regulatory	Low indicators of management quality: rule of law -0.79; control of corruption -0.87; effectiveness -0.65	High level of legal uncertainty, inefficient application of norms, limited judicial protection	Reduction in legal protection guarantees, minimisation of long-term investments, and increase in transaction costs
Infrastructure constraints	Endogenous, technical	More than 25 thousand km of roads damaged or destroyed; instability in access to energy and digital services	Loss of transport accessibility, disruption of energy supply, digital degradation in the regions	Restrictions on project implementation, increased operating costs, regional concentration of investments
Fiscal pressure	Endogenous, financial	More than 60 amendments to the tax code for 2020-2024; instability of the fiscal burden	Frequent changes in rates, unpredictability of tax regimes, instability of tax planning	Reduction of the investment horizon, fiscal risks, rejection of long-term programmes

**Source:** compiled by the author based on Ministry of Infrastructure of Ukraine (2020), World Bank Group (2024), National Bank of Ukraine (n.d.)

The first level of analysis showed the dominance of exogenous risks, primarily associated with the consequences of war, which have a direct destructive impact on the infrastructure potential of the state. Military actions have become a key factor of destabilisation, which has led not only to a decrease in the level of physical security but also to a violation of economic activity in a large part of the territory. Losses of infrastructure, production capacity, and human capital have limited the possibility of implementing large-scale and local investment projects. The second level of restrictions was formed due to low institutional capacity, which was manifested through critical values of indicators of the rule of law, effective governance, and corruption control. According to Worldwide Governance Indicators (World Bank Group, 2024), during 2020-2024, Ukraine consistently showed negative dynamics in terms of the rule of law, control of corruption, and government efficiency, which pointed to a lack of legal predictability and administrative stability. This situation increased the level of regulatory uncertainty and limited investment planning.

Fiscal and technical barriers complemented the overall risk profile. Frequent changes in tax legislation made long-term financial planning impossible, while damage to transport infrastructure led to increased logistics costs and reduced market availability. The combination of these restrictions resulted in a decrease in the investment attractiveness of Ukraine in the period 2020-2024, which actualised the need to review approaches to regulatory policy and infrastructure modernisation. Quantitative indicators reflecting changes in the macroeconomic environment, legal regulation, institutional quality, and investor expectations were analysed to identify the dynamics of investment attractiveness of Ukraine in 2020-2024. Figure 1 shows the change in foreign direct investment volumes and the dynamics of the Worldwide Governance Indicators (World Bank Group, 2024) and Corruption Perceptions Index (Transparency International, n.d.), which enabled tracing the impact of security and regulatory factors on the formation of the investment climate.



**Figure 1.** Dynamics of key indicators of investment attractiveness of Ukraine in 2020-2024

**Source:** compiled by the author based on World Bank Group (2024), Transparency International (n.d.), European Investment Bank (n.d.)

The dynamics of foreign direct investment in Ukraine in 2020-2024 were characterised by a high level of volatility, which indicates the instability of the institutional and

security environment. In 2021, capital investment increased to USD 7.9 billion, which was in line with the trend towards a macroeconomic recovery after the pandemic. However,

in 2022, a sharp reduction to USD 0.2 billion was recorded, due to the outbreak of a full-scale war and the accompanying increase in risks for investors. In 2023, there was a partial recovery to USD 4.8 billion, but in 2024, the volume of foreign direct investment fell again to USD 3.1 billion, which confirmed the instability of the investment climate in the context of a prolonged military crisis.

Institutional indicators remained at a systemically low level throughout the study period. In particular, the rule of law and control of corruption indicators did not show substantial improvement, which indicates chronic instability in the field of legal regulation and uncertainty in procedures for protecting investors' rights. The slight increase in these indices in 2024 could not change the general trend, which was characterised by weak legal predictability, limited effectiveness of institutional investment protection mechanisms, and low effectiveness of anti-corruption policies. In this context, the Corruption Perception Index (CPI) is also indicative, which showed a slow positive trend – from 30 points in 2020 to 35 points in 2024. Despite formal growth, this level remained below the global average, indicating deep structural problems in the governance system that continued to constrain foreign capital inflows due to a lack of confidence in the Ukrainian jurisdiction. In parallel with institutional risks, infrastructure constraints remain remarkable. If in 2020–2021 there was an active expansion of infrastructure potential, in particular, through large-scale road construction within the framework of state programmes, then from 2022 the situation changes dramatically due to a full-scale war. The destruction of transport, energy, and digital infrastructure in the regions affected by the fighting leads to an increase in operating costs for businesses, disruption of supply chains, complication of logistics operations, and a general decline in the implementation of investment projects, especially in the manufacturing and service sectors. Such a set of challenges – institutional and material – forms an objective basis for a deeper analysis of the determinants of investment activity in a transformational economy, which

makes it necessary to move to an empirical examination of the relationship between the qualitative characteristics of public administration and the dynamics of attracting foreign direct investment.

#### **The role of the institutional environment in creating a favourable investment climate**

Institutional quality determines the ability of the state to form a stable, predictable, and legal environment for the implementation of economic interaction, which has a direct impact on the behaviour of investors in transformational economies. It is institutional factors that are the primary basis for ensuring a balance between the regulatory capacity of the state and protecting the interests of business entities. In cases where legal obligations are not fulfilled, there are no effective tools to protect investors' rights, and the transparency of management procedures remains limited, the level of trust in the regulatory environment decreases, which also increases investment risks.

The decline in the predictability of public policy in the context of political and economic turbulence leads to the dominance of short-term investment strategies aimed at minimising potential losses. On the other hand, the functioning of institutional safeguards, such as the stability of the regulatory environment, proper enforcement, accessibility of administrative procedures, and the availability of dispute resolution mechanisms, contributes to the formation of positive expectations regarding the security and profitability of long-term investments. Thus, the institutional architectonics of the investment climate determines not only the intensity of capital raising but also its sectoral and regional structure. A functional model of the institutional component of the investment climate was generalised to structure the conditions that affect the positive perception of the regulatory environment on the part of investors. Table 4 shows the main components of the institutional environment, their applied importance for the implementation of state investment policy, and expected economic effects if they function properly.

**Table 4.** Institutional conditions for creating a favourable investment climate

<b>Institutional component</b>	<b>Functional value</b>	<b>Potential effect for investors</b>	<b>Examples of implementation tools</b>
Rule of law	Ensuring predictability of law enforcement	Reduction of asset loss risks, stability of solutions	Independence of the judicial system, effective administrative appeal
Regulatory quality	Transparency and stability of the regulatory environment	Simplified market access, reduced transaction costs	Deregulation, electronic registers, standardisation of procedures
Protection of property rights	Guarantees of inviolability of property and intellectual assets	Growing confidence in long-term investments	Legal guarantees, protection in international arbitration
Enforcement of contracts	Mechanisms for implementing obligations under contracts	Reduction of the investment risk horizon	Commercial legal proceedings, notarial jurisdiction
Transparency of governance	Openness of state information and decisions	A decrease in the unexpected regulatory interventions	Public registers, open data, participation in decision-making
Control of corruption	Minimising informal influences on government decisions	Improving the country's reputation assessment	Anti-corruption agencies, e-procurement

**Source:** compiled by the author based on United Nations Conference on Trade and Development (2015), OECD (2019), World Bank Group (2024)

These institutional components form the basis of investor confidence in the state's regulatory environment. The established relationship between rule of law and protection of property rights provides legal certainty, which reduces the risk of loss of control over assets. In combination with effective mechanisms for fulfilling contractual obligations, the institutional capacity of the state to guarantee the stability of the rules is created, which is considered as a determining factor in the decision-making process on capital-intensive investments. Components related to regulatory quality and governance transparency determine the quality of the administrative environment. Their effectiveness helps to reduce barriers to entry to the market, optimise decision-making procedures, and lower the time spent on operating activities. In countries with a high level of regulatory quality, investments with a long-term implementation horizon prevail, in particular, in the manufacturing

sector and infrastructure projects. The control of corruption component is instrumental in shaping the reputational attractiveness of the investment environment. Minimising the level of informal influence on decision-making helps to increase the predictability of regulatory policy, which was especially important in the context of political turbulence. In this context, anti-corruption policy is deemed an integral element of the institutional environment that ensures the long-term sustainability of investment activity. In countries with transformational economies, institutional reforms have created the basis for creating a positive investment image. The results of the implemented changes in individual countries show a decrease in the level of institutional uncertainty and positive dynamics of foreign direct investment inflows. Examples of such decisions that have had a notable impact on the investment environment are summarised by key institutional areas in Table 5.

**Table 5.** Examples of institutional solutions in countries with transformational economies in the context of investment climate formation (2020-2024)

Country	Institutional reform	Key implementation tool	Results for the investment environment
Poland	Improving the judicial system	Updating the selection and evaluation procedures for judges	In 2020-2023, the average term for reviewing business cases decreased from 230 to 175 days; the share of Foreign Direct Investment (FDI) in industry increased by 9%
Georgia	Digitalisation of regulation	Introduction of the integrated business house platform	From 2020 to 2024, the number of new companies in the IT (Information Technology), logistics, and tourism industries founded by foreigners increased by 190%; the volume of FDI in these sectors increased by 2.8 times
Latvia	Optimisation of court proceedings	Electronic case tracking system	The average duration of contract cases decreased from 310 to 205 days; the share of long-term investment contracts increased by 12%
Estonia	Deepening digital governance	Expansion of the e-Residency platform, implementation of e-Business	In 2020-2024, the share of registrations of companies by non-residents exceeded 75%; the volume of investment in the digital sector increased by 28%; the FinTech sector reached 3.5% of GDP
Romania	Strengthening the anti-corruption infrastructure	National Anticorruption Directorate	The Corruption Perception Index (CPI) increased from 44 (2020) to 48 (2023); the volume of FDI in infrastructure projects increased by 54%
Ukraine	Improving the protection of investors' rights	Law of Ukraine No. 1116-IX "On State Support for Investment Projects with Significant Investments in Ukraine" (2024)	In 2021-2024, more than 30 applications were submitted to support investment projects; the share of investment in the field of information technology increased by 17%, but the WGI index (World Giving Index) remained below -0.75

**Source:** compiled by the author based on World Bank Group (2024), Commission Staff Working Document "Ukraine 2024 Report. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions. 2024 Communication on EU enlargement policy" (2024), European Investment Bank (n.d.), Polish investment and trade agency (n.d.), The Bridge Between Europe & Asia (n.d.), A gateway of business... (n.d.), Investment and development agency of Latvia (n.d.), Building a successful Estonia! (n.d.)

A comparative analysis of countries that have successfully implemented institutional changes has shown a high sensitivity of the investment environment to even targeted but consistent reforms. Solutions aimed at simultaneously reducing administrative barriers and strengthening legal certainty, as was observed in the cases of Georgia and Estonia, yielded the highest effectiveness. These countries were characterised by rapid implementation of regulatory changes aimed at simplifying procedures and building trust in the institutional environment. Successful practices had a common structural feature – a systematic approach to institutional modernisation. The reforms were accompanied

by digitalisation of services, deregulation of administrative procedures, and an increase in the level of transparency in the functioning of government bodies. Such transformations provided not only improved market access but also created an image of the state as a reliable partner for long-term economic cooperation, which is a crucial factor for attracting strategic investors.

In the context of Ukraine, the implementation of such institutional decisions has met with a number of limitations related to political cyclicality, fragmentation of public administration and a low level of law enforcement. The existing barriers were caused by the imperfection of

formal indicators and the limited access of investors to institutional resources, such as effective legal protection mechanisms, administrative support, and operational interaction with public authorities. Combined with the fragmentation of reforms, even a partial improvement in international rankings has not eliminated critical risks for long-term investment decisions.

### Prospects for improving the investment climate in Ukraine: Justification and strategic guidelines

In the context of the ongoing post-crisis recovery and activation of European integration processes, increasing the investment attractiveness of Ukraine requires the introduction of an integrated approach that combines institutional modernisation, infrastructure development, and improvement

of the regulatory framework. The high level of political, security, and regulatory risks actualises the need to create a predictable environment for attracting investment in strategically important sectors of the economy. Strategic guidelines are structured into five functional blocks to determine the priority areas of investment climate reform: institutional environment, institutional stability of policies, infrastructure base, regional development, and investment legislation. Within each of them, the expected results of future transformations are outlined, and the tools that can ensure their effective implementation are proposed. The corresponding systematisation presented in Table 6 will serve as an analytical basis for the formation of a national investment strategy in the context of post-war reconstruction and adaptation to the challenges of prolonged uncertainty.

**Table 6.** Priority areas for improving the investment climate of Ukraine in strategic areas

Direction of reform	Specified priorities	Expected result	Potential implementation tools
Institutional environment	Improving the rule of law, transparency of governance, fighting corruption	Reduced legal entropy, increased investor confidence	Judicial reform, e-justice, open registers
Infrastructure development	Restoration of transport, digital, and energy infrastructure	Simplifying logistics, reducing transaction costs	public-private partnerships, international funds, digitalisation of procurement procedures
Investment legislation	Harmonisation with EU acquis, protection of investors' rights, contractual stability	Strengthening the regulatory framework for investment activities	New investment code, international arbitration, mechanism for resolving investment disputes between an investor and the state
Institutional stability of policies	Formation of long-term management standards and procedures	Maintaining the sustainability of institutions even when governments change	Electronic documentation, regulatory hubs, policy evaluation
Regional development	Stimulating interregional competition for investors	Attracting resources to less developed areas	Rating of regions, special economic zones, local investor support offices

**Source:** compiled by the author based on OECD (2019), World Bank Group (2024), Commission Staff Working Document "Ukraine 2024 Report. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions. 2024 Communication on EU enlargement policy" (2024), Ministry of Economy of Ukraine (n.d.)

The proposed system of priorities demonstrates the need for coherence of reforms in interdependent areas. Institutional transformations should be accompanied by infrastructure modernisation, while the effectiveness of improving the legal framework will remain limited without ensuring the physical availability of market resources. The presented structure indicates that only interaction between these blocks can provide conditions for sustainable investment growth. Of particular importance are areas focused on long-term sustainability: the preservation of institutional memory and the development of interregional competition will form mechanisms of internal motivation to support reforms, which will help to avoid a relapse of administrative inefficiency. The formation of a favourable investment environment is not limited to achieving positive indicators, but involves deep adaptation of management approaches to the needs of an international investor. Improving the legal regulation of investment activities is based on the principles of harmonisation with the legislation of the European Union. Codification of legal guarantees, standardisation of investor protection procedures,

elimination of regulatory imbalances and introduction of dispute resolution mechanisms adapted to international arbitration standards remain key guidelines. Legal certainty in the field of investment will be a prerequisite for restoring confidence in the state's economic policy.

Infrastructure modernisation is defined as a basic factor in activating investment processes. The restoration of logistics, energy, and digital infrastructure will require the involvement of public-private partnership mechanisms and the use of international financial support tools. With proper institutional support, such projects can become a catalyst for the multiplicative effect of attracting private capital. The creation of specialised zones of economic activity remains an effective form of concentration of investment resources: industrial parks, logistics centres, and digital clusters. Their activities should be based on simplified regulatory procedures, special tax regimes, and high-quality legal support. The practice of Central European countries confirms the effectiveness of such tools in the context of economic recovery after crisis shocks. The formation of a strategic vision for the development

of the investment climate involves taking into account both internal structural challenges and external obligations within the framework of the European integration course. Considering the goals of post-war reconstruction and Ukraine's progress towards gaining membership in

the European Union, Investment policy should continue to be based on a multi-level logic of adaptation. Table 7 summarises the key strategic vectors of public policy in the field of attracting investment in the context of economic transformation.

**Table 7.** Strategic guidelines for Ukraine's investment development in the context of recovery and European integration

Strategic goal	Implementation focus	Expected effect	Coherence with European initiatives
Restoring critical infrastructure	Mobilisation of international technical assistance, public-private partnership	Stimulating investment in logistics and energy	European Green Deal (n.d.), Connecting Europe Facility (Regulation (EU) 2021/1153 of the European Parliament and of the Council "Establishing...", 2021)
Diversification of investment areas	Creating industry clusters, supporting IT and agricultural exports	Creating new growth points	The Digital Europe Programme (n.d.), Common Agricultural Policy (n.d.)
Institutional alignment with the EU	Harmonisation of the regulatory and judicial system	Increasing transparency and confidence indices	Enlargement Package (Commission adopts 2024..., 2024), Rule of Law (European Commission, n.d.b)
Regional development	Stimulating local initiatives, inter-municipal cooperation	Attracting foreign direct investment in border and peripheral regions	Cohesion Policy (n.d.), Smart Specialisation Strategies (About S3..., n.d.)
Export-oriented modernisation	Integration into value chains, foreign economic activity infrastructure	Strengthening external economic integration	Deep and Comprehensive Free Trade Agreements (n.d.), Rules of origin in the Pan-Euro-Mediterranean Convention (n.d.)

**Source:** compiled by the author based on Commission Staff Working Document "Ukraine 2024 Report. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions. 2024 Communication on EU enlargement policy" (2024), European Commission (n.d.a), European Investment Bank (n.d.), Ministry of Economy of Ukraine (n.d.)

The presented strategic guidelines indicate the transition from emergency anti-crisis measures to the formation of a long-term investment attraction policy integrated into the structure of national economic recovery. Of particular importance are mechanisms of interaction with European institutional structures, which provide additional guarantees for investors and strengthen coordination between domestic and foreign economic policies. The emphasis on institutional alignment allows adapting the legal environment to European Union standards and reducing the risks associated with non-transparency of regulation. Reforming the judicial system, strengthening anti-corruption mechanisms and introducing digital administrative services form the basis for increasing confidence on the part of international financial institutions.

The formation of a cluster structure of investment activity, which provides for a combination of industrial, digital, and agricultural potential, should contribute to the structural restructuring of the economy in accordance with the priorities of sustainable development. This approach helps to adapt regional models of raising capital to the single space of the EU internal market and integrate with global value chains. Coordination of institutional transformation between executive authorities, the legislative sector, local self-government, business, and civil society determines the ability of the state to implement a consistent investment policy. Creating conditions for Inter-level interaction will ensure organisational stability

of institutional changes and form the basis for long-term investment stability. The analysis of the investment climate in Ukraine confirmed the need to consider it as a multi-level category covering institutional, legal, economic, infrastructural, and social determinants. The structural and factor approach allowed identifying internal and external factors that determine the functional ability of the environment to raise capital. The assessment of the state of Ukraine's investment climate during 2020-2024 showed the dominance of risks associated with military destruction, institutional instability, fiscal burden, and regulatory fragmentation. The dynamics of foreign direct investment, the rule of law, control of corruption, and CPI indicators demonstrated a critical dependence of investor behaviour on the quality of the institutional environment. The analysis of the experience of countries with transformational economies, such as Estonia, Georgia, Poland, and Romania, highlighted the importance of consistency in the implementation of reforms. Summarising the results allowed identifying key areas for improving the investment climate in Ukraine, including: strengthening law enforcement, digitalisation of administration, restoration of infrastructure potential, creation of specialised investment activity zones, and harmonisation of regulatory norms in accordance with European Union standards.

Based on the results of a multi-factor analysis, the relationship between the level of institutional development, and the dynamics of attracting foreign direct investment

testified to the critical sensitivity of investors to the quality of the regulatory environment in a transformational economy. In particular, the systemically low rule of law, regulatory quality and control of corruption indicators in 2020-2024 demonstrated the failure of the national institutional system to ensure predictability of public policy, protection of property rights, and compliance with contractual obligations. The high level of military risks and fiscal burden increased the impact of regulatory instability, which led to cautious or negative investment behaviour of external actors. The conditions under which a decrease in FDI volumes was recorded during periods of increasing legal uncertainty confirmed that institutional factors were the main triggers for changing investment decisions in situations of uncertainty. The presence of structural dysfunctions in the field of governance and regulation has formed negative expectations about the possibility of long-term capitalisation of investments. The importance of the results was to prove the need to integrate institutional modernisation with infrastructure restoration and adapt the legal framework to the requirements of *acquis communautaire*, which corresponded to the strategic guidelines of state policy in the context of post-crisis development and European integration processes.

The study confirmed the leading role of institutional factors in shaping the investment climate on the example of Ukraine in 2020-2024. Institutional instability, which was manifested due to the low values of the rule of law, control of corruption, and government efficiency indicators, had a remarkable deterrent effect on the volume of foreign direct investment (FDI). In the context of this issue, the results of the study by S.J. Lee *et al.* (2024) were analysed, which used principal component analysis (PCA) and panel regression modelling on a sample of 178 countries to determine that in high-income countries, social indicators were the main factor in attracting FDI, while in developing countries, economic factors dominated. Therewith, the impact of institutional indicators in both groups of countries was statistically insubstantial. The findings partially contrasted with the results of the study, where the institutional environment itself showed a high negative correlation with the dynamics of investment during the period of military instability, which may be due to the crisis specifics of the analysed period and the need to expand the time limits in further research. The study also revealed a significant impact of institutional stability and infrastructure development on the level of investment activity in Ukraine in 2020-2024. The problems of regional inequality and limited access to infrastructure as factors hindering the attraction of foreign direct investment were confirmed in the paper of N. Roshdieh & G. Farzad (2024), where increasing the level of fiscal decentralisation was shown to contribute to the growth of investment activity through improving infrastructure provision at the local level. The results obtained correlate with the above conclusions, emphasising the importance of reallocation of financial resources in favour of regional infrastructure development in transformational economies.

The analysis of institutional determinants of investment attractiveness of Ukraine demonstrated the need to strengthen the quality of the regulatory environment, control corruption, and ensure political stability as basic prerequisites for attracting foreign direct investment. Similar conclusions were formulated by H. Khan *et al.* (2024), who determined that for developing countries, it is the indicators – control of corruption, political stability, and voice and accountability that are the determining factors for raising capital. The comparison of the results showed compliance with global trends, which confirm the critical role of the institutional environment in the processes of forming the investment climate. The results of the analysis were also confirmed in a study by S. Gupta *et al.* (2024), which examined the impact of institutional quality on foreign direct investment inflows in BRICS group countries (Brazil, Russia, India, China, and South Africa). It was found that indicators such as control of corruption greatly increased the investment attractiveness of Brazil, India, and South Africa. The findings are consistent with general trends that highlight the critical importance of improving the institutional environment for stimulating investment processes in countries with transformational economies.

In the context of exploring factors influencing investment activity, the conclusions of M. Islam & A. Beloucif (2023) were considered, where the main determinants of foreign direct investment were systematised based on the analysis of more than a hundred empirical studies. It was proved that, along with the size of the market, factors such as the quality of infrastructure, the level of human capital development and macroeconomic stability have a major impact. Comparison with the results obtained showed that in the conditions of Ukraine, it was institutional and infrastructural factors that determined the level of investment attractiveness, which was consistent with global scientific trends. The analysis of the results of the study of the institutional environment and the processes of recovery of investment activity after the crisis correlated with the approaches proposed in the study by O. Peter & C. Osazuwa (2024), where a conceptual model for assessing the impact of post-conflict reconstruction interventions was developed. The critical importance of contextual factors, such as the participation of international organisations and historical background, was emphasised, which corresponds to the need for integrated consideration of institutional conditions in the process of restoring the investment climate. The study also highlighted the importance of long-term planning and multi-level coordination for the sustainable recovery of the investment environment, which is consistent with the conclusions of B. Rohwerder (2024), dedicated to the lessons of post-war reconstruction. It was discovered that hasty and insufficient systemic recovery leads to the consolidation of temporary dysfunctions, which correlates with the risks identified in the analysis of institutional barriers and infrastructure constraints in Ukraine in 2020-2024.

When interpreting the results obtained, approaches proposed by O.E. Ajewumi *et al.* (2024) were considered,

which examined the role of international funding and institutional reforms in the post-conflict reconstruction of African countries. The importance of synchronising external financial support with the development of local institutional capacity is established, which corresponds to the conclusions of the study on the need to integrate national reforms with European and global investment initiatives. The results of the study, which confirmed the importance of developing the institutional environment and human capital for boosting investment activity during the recovery period, are consistent with the findings of J. Branch *et al.* (2025). In this paper, it was proved that the development of educational institutions in post-conflict regions contributed to economic activity, social cohesion, and long-term development, which was consistent with the conclusions about the role of institutional strengthening through intellectual infrastructure in stimulating investment processes. The analysis of the results also highlighted the importance of improving the regulatory environment and ensuring the stability of legal norms to increase investment attractiveness, which correlated with the approaches of P. Thinius (2025). The change in the paradigm of the rule of law in the European Union through the introduction of budget convention mechanisms was justified, which showed the role of effective mechanisms for monitoring compliance with legal norms in increasing investment attractiveness. Special attention was paid to institutional mechanisms for creating transparency, stability, and predictability of the regulatory environment, which corresponded to the approaches of F. Bulfone *et al.* (2024), who stressed the role of convention as an instrument of modern industrial policy. The establishment of clear rules and standards was identified as a critical factor in ensuring the effectiveness of investment policy in the context of economic transformation, which coincided with the conclusions of the analysis.

In the process of analysing the results of the study, special attention was paid to the role of infrastructure development as a factor in attracting foreign investment, which corresponded to the conclusions of K. Tsaurai (2025). The author proved that the development of transport, digital and financial infrastructure had a considerable positive impact on the volume of foreign direct investment in the BRICS group countries. Comparing the results obtained with the above conclusions showed that increasing the availability of digital technologies and financial services, combined with the modernisation of physical infrastructure, is a critical factor for stabilising and activating investment flows in transformational economies. As part of the study, a major influence of institutional quality on the formation of the investment climate was established, which was consistent with the conclusions of M. Husnain *et al.* (2024). In this paper, it is proved that institutional quality, along with foreign direct investment and domestic capital investment, has a positive impact on the economic growth of Latin American countries in the long term. The comparison of the results confirmed that for the conditions of a transformational economy, strengthening

political stability, effective governance and creating a favourable business environment are necessary prerequisites for boosting investment activity and ensuring sustainable economic development.

The study concentrated on the importance of the institutional environment and accompanying economic factors for stimulating investment inflows, which found a correlation with the conclusions of O. Bertrand & M.A. Betschinger (2024). The study authors determined that infrastructure and non-infrastructure assistance from developed countries has a positive impact on private firms' decisions to enter emerging markets, helping to reduce political and market risks. The comparison of the results indicated that successful mobilisation of investment capital in the context of post-crisis recovery is impossible without comprehensive development of institutional capacity, modernisation of basic infrastructure and integration of external financial incentives into national reconstruction strategies. The analysis confirmed the crucial role of institutional, infrastructural, and macroeconomic factors in shaping the investment climate of Ukraine in 2020-2024. It is established that military risks, regulatory instability, poor quality of governance, and a high level of fiscal burden have become the main barriers to attracting foreign direct investment. The results of the study are consistent with scientific approaches on the importance of institutional quality, infrastructure development, and long-term planning to stimulate investment activity in transformational economies, which justified the feasibility of comprehensive reform of the legal, regulatory and infrastructure environment in the post-crisis recovery process.

## CONCLUSIONS

As part of the study, it was established that the formation of the investment climate in Ukraine in 2020-2024 was influenced by a complex interaction of institutional, infrastructure, legal, and security factors. The key constraint for attracting investment capital remained the poor quality of the institutional environment, which was manifested in insufficient law enforcement, unstable regulatory policy, and a low level of corruption control. During the period under review, the rule of law index remained in the range of -0.76 to -0.77, while the corruption control index ranged from -0.85 to -0.88 on the Worldwide Governance Indicators scale, indicating continued institutional vulnerability. The level of perception of corruption did not exceed 35 points on the CPI index, which confirmed limited investor confidence in the state policy in the field of integrity.

Infrastructure factors played an equally important role in shaping investment attractiveness at the regional level. Regions with developed logistics, transport, and digital infrastructure had a great advantage in raising capital, which emphasised the spatial heterogeneity of investment activity. Imbalances in the level of infrastructure provision caused an outflow of potential investors from depressed territories and concentrated capital in more affluent areas. The total volume of foreign direct investment in 2022 decreased to

0.2 billion USD compared to 7.9 billion USD. In 2021, it reflected the increased dependence of investment dynamics on logistics and security conditions. In particular, during periods of worsening military risks, there was a reduction in new investment contracts and a shift in emphasis to short-term, less risky forms of investment. The legal environment remained fragmented and unpredictable, creating additional transaction costs for investors. Frequent changes in tax, currency, and investment legislation, the lack of unified institutional coordination, and a weak mechanism for implementing contractual guarantees limited long-term planning opportunities and constrained investment in high-risk industries, in particular, in the manufacturing industry. In general, the results of the study showed the need for a transition to systematic institutional modernisation, including strengthening the rule of law, stabilising the regulatory field, developing the infrastructure base, and harmonising investment legislation with the legal norms of the European Union. Such measures are critical for creating a stable investment environment in the context of a long period of post-crisis reconstruction.

The study allowed formulating an integral analytical model of the impact of institutional, infrastructural, and legal interaction on the parameters of investment activity. It is established that institutional and infrastructure modernisation are complementary conditions for stimulating the inflow of foreign direct investment, and the adaptation of legislation to EU standards is a fundamental element of legal predictability. The results allowed for formulating sound recommendations on the need to accelerate institutional

reforms, with an emphasis on improving governance transparency, ensuring the stability of legal regulation, strengthening political stability, and reforming infrastructure policy. During the implementation of the research strategy, a number of essential limitations were recorded, which were directly manifested in the analysis process. This primarily relates to the deep destruction of infrastructure during the war period, which made it impossible to implement investment projects in many regions and led to uneven investment activity. In addition, investors' limited access to key institutional resources – legal protection, administrative support, and operational interaction with government agencies was established. A substantial barrier was also the fragmentation of public administration and cyclical policy decisions, which prevented the formation of long-term expectations on the part of international investors. In further research, it is advisable to focus on examining the interaction between the digital transformation of public administration, security indicators, and investment behaviour of international companies in the context of prolonged post-crisis reconstruction.

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# Проблеми та перспективи розвитку інвестиційного клімату в Україні

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**Анотація.** Поглиблення інституційної нестабільності, посилення регуляторної невизначеності та зростання інфраструктурних диспропорцій в умовах повномасштабної війни в Україні створили загрозу для стійкості інвестиційного середовища, що зумовило потребу у переосмисленні чинників його формування та адаптації до умов посткризової трансформації. Метою дослідження було виявлення чинників динаміки інвестиційного клімату України у 2020-2024 роках, з одночасним формуванням стратегічних орієнтирів його вдосконалення в умовах післявоєнного відновлення. Методологічна основа дослідження ґрунтувалася на аналітико-описовому підході з використанням елементів порівняльного, структурно-функціонального та інституційного аналізу. У результаті дослідження було виокремлено п'ять взаємопов'язаних підходів до інтерпретації інвестиційного клімату – інституційний, правовий, економічний, інфраструктурний та соціальний, – що дозволило сформувати п'ятирівневу аналітичну модель інвестиційного середовища, представлену у форматі структурної типології. На основі аналізу індексів Rule of Law (-0,80 у 2022 р.), Control of Corruption (-0,88 у 2022 р.) та Corruption Perceptions Index (зростання з 30 до 35 балів у 2020-2024 р.) встановлено, що інституційна якість є ключовим предиктором коливань обсягів прямих іноземних інвестицій (від 7,9 млрд дол. у 2021 р. до 0,2 млрд дол. у 2022 р.). Ідентифіковано критичні бар'єри для формування сприятливого інвестиційного клімату – нормативну нестабільність, фіскальну фрагментованість, деградацію інфраструктури та інституційну вразливість. Обґрунтовано стратегічні напрями модернізації інвестиційного середовища, що включають посилення правової визначеності, дерегуляцію, відновлення інфраструктури та інституційний супровід інвесторів. Запропоновані підходи спираються на успішні практики Польщі, Естонії, Латвії, Грузії та Румунії, де структурні реформи забезпечили зростання довгострокових інвестицій у стратегічних секторах. Отримані результати засвідчили визначальну роль інституційної якості як ключового чинника інвестиційної привабливості в умовах трансформаційної економіки. Практична цінність дослідження полягає у формуванні аналітичної основи для удосконалення державної інвестиційної політики, спрямованої на підвищення інституційної спроможності, зменшення регуляторних ризиків та стимулювання довгострокового капіталовкладення

**Ключові слова:** інституційна спроможність; регуляторне середовище; регуляторні ризики; макроекономічна стабільність; інфраструктурне забезпечення; трансформаційна економіка

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