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Optimising the focus of digital technologies in the context of implementing a sustainable development strategy for the international business environment

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Abstract. The active spread of digital technologies shapes the pace of dynamics and trends in the development of the international business environment: on the one hand, the flexibility of the business sphere is increasing, on the other hand, new challenges are emerging for the stability of the business environment, the competitiveness of traditional sectors of the economy, including economic and information security. The purpose of the article was to study the digital innovation activity of the business environment by comparing and modelling the impact of independent variables on the gross domestic product of the EU and Ukraine. The methodological basis used in the study was the tools of economic-mathematical and correlation analysis, comparative, quantitative, tabular analysis and synthesis, SWOT analysis. The article conducted a comparative analysis of the value of indicators of international rankings reflecting the level of digital development of the Visegrad countries and Ukraine for 2017-2023; assesses the digital and technological components of the overall international competitiveness ranking of Ukraine, Poland, the Czech Republic, Hungary and Slovakia. By using econometric analysis, the use of a linear dependence function that descibed in detail the dynamics of economic development was substantiated; a multifactorial economic and mathematical model was built to determine the strength of the relationship between the indicators of digital and innovative business activity in Ukraine and the main macroeconomic indicator is GDP; a SWOT analysis of the impact of digitalisation on the achievement of global sustainable development goals by the international business environment was carried out; the directions of the new focus of digital technologies in the context of real-world development were substantiated. The practical significance of the results lies in the fact that the main scientific provisions have been brought to the level of methodological developments that can be used by: business entities – when choosing to use digital technologies, increasing their own competitiveness in the international arena; entities generating innovations – when developing digital innovations, developing innovation hubs; government authorities – when developing a regulatory framework for the implementation of digital innovations to achieve global sustainable development goals, development of digital infrastructure, and regulation of investment operations

Keywords: global sustainable development goals; business entities; digital innovation activity; digitalisation; Industry 4.0; Industry 5.0

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Introduction

Much of the current research, publications, and analytical materials are devoted to the digital transformation of the global economy, but a number of aspects require more thorough analysis. In particular, the areas of restructuring and modernisation of institutions that ensure the digital transformation of the global economy (regulatory framework for digital production and digital markets, training of personnel with a high level of digital competencies), as well as the conditions and factors for the effective development of digital technologies, and the creation of an appropriate technical infrastructure, the formation of which requires both effort and investment, require theoretical understanding and applied analysis. Of particular relevance is the consideration of aspects of the digital transformation of the international business environment through the prism of achieving global development goals based on the principles of sustainability.

Optimisation of digital technologies in the context of sustainable development of international business is a key task, as digital transformation increases business efficiency, reduces emissions and optimises resources. In 2020-2023 saw a significant transformation of the global economy, with a focus on achieving sustainable development goals through digitalisation. International businesses have been actively adopting digital technologies to increase competitiveness and sustainable growth, so digitalisation is covering all aspects of business, contributing to the creation of new models and innovations. The number of studies assessing the impact of digitalisation on economic growth increased in 2019-2023, and the authors also considered the impact of digital technologies on various aspects of economic growth, especially in the context of sustainable growth and development.

The authors of P. Jones & M. Wynn (2021) determined that the increasing attractiveness of digital technologies and the growing trend of their use in shaping trends in sustainable economic development, which is the basis for further global development of society as a whole. Their research is based on the inductive method, which is based on the analysis and evaluation of publicly available company reports. The result of the researchers' work was the formation of six areas of sustainable development.

G. Secundo *et al.* (2022) noted that the international business environment has suffered significant losses from the COVID-19 pandemic, which has led to a significant transformation of the model of competitive behaviour of corporations. In 2022-2023, companies continue to face and respond adequately to external stakeholder pressure. One of the current trends is the focus on employee health and the environment. As a result, more and more companies are becoming open and voluntarily commit to providing information on their strategies.

Particularly noteworthy are the studies of such scholars as T. Shtal & K. Pliekhanova (2023), who analysed in detail the Digital Competitiveness Index, Ukraine's place in the overall index, and assessed the importance of its components, such as the level of knowledge, technology and readiness for the future, including sub-factors, which made it possible to identify the strengths and weaknesses of Ukraine's digitalisation. Ya. Stolyarchuk *et al.* (2022) emphasised that Ukrainian innovative entrepreneurship is based on key processes for the innovative development of the global economic system, based on the use of the principles and trends of such a phenomenon as Industry 4.0. As a result, the systemic development of innovative entrepreneurship implies, on the one hand, the maximum mobilisation and use of the national scientific and technical potential, in particular through its further integration into European innovation networks. I. Kryvyovyazyuk *et al.* (2019) focused on the strategy of business environment development through strategic decisions made by managers of transnational companies (TNCs) and affecting the efficiency of their activities. V.M. Kudryavtsev (2022) in his research focused on identifying key trends in the impact of digitalisation on the economic, social and environmental components as a guarantee of sustainable and resilient economic growth at all levels.

A separate area of research is devoted to increasing energy efficiency through the use of digital technologies to monitor and manage energy consumption in manufacturing and other industries aimed at reducing emissions and increasing sustainability, among which the publications of F.P. Appio *et al.* (2021) are worth highlighting. L. Xu *et al.* (2023) focused on smart resource management using the Internet of Things and data analytics to effectively manage resources such as water, electricity, and raw materials.

F. Ciulli & A. Kolk (2023) proposed a new approach to 'augmenting' the (potential) role of certain new technologies in addressing specific sustainability challenges. Their examples illustrate the relevance of this approach for multinational corporations and for the development of innovative research areas that expand the existing understanding of digital globalisation.

Among the modern directions of optimising the focus of digital technologies in the context of sustainable development and activation of the business environment are digital logistics and e-commerce, which are reflected in the research of N.E. Krasnostanova & T.A. Yakymenko (2023). Another area of research that represents the focus of digital technologies on the implementation of a sustainable development strategy in the business environment is the transformation of the fourth industrial revolution. Industry 4.0 tries to combine the physical aspects of the world of real things with information prototypes that are being formed as structural elements of Industry 5.0. The new paradigm is based on the principles of the official functioning of Artificial Intelligence both in everyday life of society and in optimising business flows by global economic entities

and implementing the Internet of Things. In support of these theses, R.A. Mouha (2021) noted that the Internet of Things, on the one hand, is designed to provide both social and economic benefits for developing countries. On the other hand, it can focus on the following key areas: healthcare, environmental management and audit, environmental management, agriculture, water quality and availability. These postulates are the basis of the UN Sustainable Development Goals, which means that the IoT will serve as a promising tool for achieving them (United Nations. Ukraine, 2024). In addition, it is worth noting that there are also challenges associated with the IoT, as potential threats to society and the economy need to be taken into account and addressed in the context of preventive measures.

All of this requires an in-depth analysis of the digital and innovative activity of business entities, identification of trends in the development of the business environment and substantiation of the impact of independent factors representing the digitalisation sector on the GDP of Ukraine and a number of EU countries from the perspective of using econometric modelling, which is the main purpose of this study. This will help to identify the potential of digitalisation of the economy in the context of ensuring economic growth through digital tools, as well as to substantiate the priority vectors of the international business environment to achieve global sustainable development goals.

Materials and Methods

The study used methods of scientific knowledge that contributed to obtaining objective results and conclusions, including the empirical method, which allowed collecting relevant data and analysing specific observations; the theoretical method, which is based on the analysis and consideration of existing theories, concepts and models to formulate new hypotheses and identify areas for further research; the analytical method allowed breaking down complex problems into smaller parts for better understanding and revealing the essence of the digitalisation phenomenon. The synthesis method and SWOT analysis were also used to determine the impact of digitalisation on the Sustainable Development Goals, as well as comparative, quantitative and tabular analysis methods. A linear equation of dependence of the vector of the digital and innovation component of international competitiveness was used to reflect the relationship between the amount of innovation expenditures and direct investment in the country's economy, which has the following form:

$$Y = a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + u. \quad (1)$$

In substantiating the indicators of adequacy of the multivariate analysis equation, the Fisher's criterion was calculated using the formula:

$$F_{calc} = \frac{R^2}{1-R^2} * \frac{n-m-1}{m}. \quad (2)$$

When using software products for bivariate analysis, the results are presented in the form of linear, logarithmic, polynomial, power, and exponential equations.

The main data used for the analysis were statistical materials of the State Statistics Service of Ukraine (2019; 2020), in particular, the following indicators were used to build a multivariate regression equation: the number of enterprises with access to the Internet, the share of enterprises using social media in the total number of enterprises, the share of enterprises purchasing cloud computing services in the total number of enterprises, the dynamics of GDP knowledge intensity, the number of innovatively active industrial enterprises, the share of enterprises that in assessing the dynamics of international rankings, including the World Digital Competitiveness Ranking, the Global Connectivity Index, the Digital Economy and Society Index, and the Global Competitiveness Index, the analytical materials of the International Institute for Management Development (World Digital Competitiveness Ranking, 2018-2023), GSM Association, European Commission, World Economic Forum (The Global Competitiveness Report, 2017-2021) were used as a basis.

The collected and processed statistical data made it possible to describe the state, structure, and dynamics of the relevant indicators of digital innovation in Ukraine and the Visegrad countries, as well as to diagnose the level of correlation with the factors determining international competitiveness.

Results and Discussion

The modernisation of the global economy to ensure its sustainable development trajectory necessitates the generation of effective digital technologies based on innovative products. The main requirement for the formation and development of digitalisation processes is their versatility and inclusiveness.

Efficiently functioning digital technologies have an impact on the economic, environmental and social development of the business environment, namely on institutional micro-units, national economies at the macro level, and contribute to the development of global business. The formation of digital technologies and the creation of effective mechanisms for their functioning are urgent tasks not only in the practical plane, but also in the fundamental aspect of modern science. Digitalisation without fundamental changes in modern business models will intensify environmental threats and make sustainable development impossible. That is why it is desirable to promote the development of digital transformations in accordance with approaches based on environmental restoration and ensuring the goals of global sustainable development based on the latest technologies, science and innovation.

The increased use of digital technologies in the international business environment is contributing to the transformation of the nature of global competition, which is reflected in the blurring of traditional industry

boundaries and intensification of inter-industry competition; and the increased expectations of consumers to receive personalised, high-quality products in a relatively short period of time. Companies that ignore the current challenges of digitalisation are losing their international competitiveness due to the redistribution of value added in favour of digital companies. Digitalisation of business models is leading to the destruction of traditional industries. The labour market is undergoing a significant transformation, as more and more people leave their full-time jobs to work from home or take up temporary short-term positions as independent contractors. The importance of the digital transformation of the business environment is reflected in fundamental changes in investment processes. The integration of new technologies can change the nature of international activities of MNCs and the impact of foreign branches on host countries.

Sustainable development takes place in the context of accelerating scientific, technological and social progress. That is why rapid and adequate changes in the institutional environment in general and the formation of a sustainable and high-quality international business environment are necessary. In the report by T.V. Pysarenko (2023), the main results of the state of scientific and scientific and technical activities were identified based on the data of the State Statistics Service of Ukraine. The formation of a productive institutional environment will guarantee a reduction in transaction costs, and an effective institutional infrastructure will be provided by various programmes for the development of the digital society.

The transformations caused by the spread of digital technologies are changing the rules and norms established in the industrial economy. The popularisation of such digital phenomena as blockchain, social media and digital platforms necessitates the search for new principles of interaction in international business. That is why timely digital technologies create significant opportunities for increasing economic and social efficiency for the business environment, as well as the foundation for implementing the principles of the sustainable development concept (Official website of Diia, 2021).

The introduction of innovation and information approaches can provide a higher level of efficiency and productivity with less resource consumption. However, some authors argue that "there is a synergy between Industry 4.0 and sustainable production, considering the former as a means of developing environmentally friendly products and processes that will change production and consumption patterns" (Kudryavtsev, 2022).

Some researchers note that digitalisation is associated with a significant degree of uncertainty, forcing businesses to introduce organisational changes and take into account numerous interconnections in their decision-making processes. A significant number of scientific studies on sustainability and digitalisation point to the complexity of their combined study. This is due to the fact that these processes do not necessarily overlap and may have different goals: sustainable development clearly involves the transformation of the industry structure, while digitalisation is a progressive technological trend without necessarily being linked to the sustainable development goals (Kudryavtsev, 2022).

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At the micro level, i.e. the firm level, the relationship between digital transformation and sustainability has been studied by scholars such as A.-M. Gomez-Trujillo & M.A. Gonzalez-Perez (2021). They focused on the fact that digital transformation is a driving force in ensuring sustainability. In order to take into account the significant changes brought about by the digital revolution, it is necessary to expand its digital capabilities and balance social, economic and environmental impacts. This trend in research has been deepened by the following scholars F. Ciulli & A. Kolk (2023), who focused on the advantages and disadvantages of digitalisation in the context of its impact on multinational corporations and taking into account the sustainable development of the business environment of the identified international market players.

The results of the research by V. Varriale *et al.* (2024) showed that there is a close correlation between the sustainable development goals and the introduction of artificial intelligence, geospatial technologies, blockchain, the Internet of Things, and 3D printing into the business strategy of enterprises. The authors prove that the technological choice has a high level of influence on the implementation of digital technologies aimed at achieving the SDGs.

As of 2024, the scientific literature is dominated by opinions on considering digital technologies as a paradigm shift in production that combines new technologies designed to maximise productivity with efficient use of resources (Negroponte, 1995); integration of sustainability and digitalisation (Bag *et al.*, 2021); and orientation of industrial evolution towards digitalisation as a means of ensuring sustainable development (Appio *et al.*, 2021).

The 21st century is characterised by the international business environment's focus on the introduction of digital technologies, which is not accidental, but due to the growing expectations of consumers, the network nature of production at the international level, and the difficult financial and economic situation in the global

environment. It is advisable to address these issues with the help of digital technologies, which have proven to be effective over time. Digital technologies are the basis for the emergence and implementation of innovative services and products. Businesses and citizens are already interacting in the modern digital world, which is most convenient for them.

It is worth analysing the state of digitalisation of the economy in the international dimension. International organisations such as the United Nations, the Group of Twenty (G20), the OECD, the European Commission, the World Bank are actively analysing the development of the digital economy. The IMD World Digital Competitiveness Ranking (2019-2023) is informative. This 2023 ranking classifies 64 countries according to the level of their perception and use of digital technologies as a factor in transforming the state's relations with the population and business, changes in business models of companies and society in general. According to the methodology, countries are ranked by their digital competitiveness based on three groups of factors, which include 3 sub-factors each (51 criteria in total, with a maximum value of 100.0): the pace of development of scientific potential, availability of financial capital and technological conditions, quality of the regulatory framework, and the ability of businesses to adapt to a changing environment. The values of the World Digital Competitiveness Ranking 2023 (2024) indicated that national digital competitiveness is the result of investment in education to provide the skills required by the modern labour market.

More technologically digital is the GSMA Mobile Connectivity Index (2022), which brings together the mobile ecosystem to identify needs, develop and implement innovations that are the basis for creating a favourable business environment and driving social change. The GSMA operates in three main areas: Connecting for Good, Industry Services, and Solutions and Outreach. The GSMA Mobile Connectivity Index analyses the performance of 170 countries (99% of the world's population) and provides a summary assessment of the key drivers of mobile internet adoption: infrastructure, accessibility, consumer readiness, content and services in the context of their development in terms of market supply and demand, user experience and growth potential.

The Digital Economy and Society Index (2023), developed by the European Commission and assessing only the countries of the European Union, allows to assess the digital competitiveness of each EU member state and determine which countries need investment or measures to improve their digital development. This index is a composite index that aggregates a set of relevant indicators structured around the dimensions of connectivity, human capital, internet use, digital integration and digital public services. This index has been calculated since 2014, and until 2017, DESI scores ranged from 0 to 1, and since 2018, it has been calculated on a percentage scale (the higher the value, the better the country's performance). Since Ukraine is not a member of the EU, it is not indexed by this indicator. The expediency of considering the dynamics of the Digital Economy and Society Index (2023) is due to the fact that the objects of this study, in addition to Ukraine, are the countries of the Visegrad Group that are members of the EU.

A number of other indexes are used in the international business environment, which in one way or another determine the qualitative and quantitative indicators of the level of digitalisation of the international business environment: The Broadband Internet Access Index, the Digital Intelligence Index, the Cisco Digital Readiness Index, the Ease of Doing Digital Business Index. Methods for calculating these rankings vary. However, a set of quantitative sub-indices reflect the level of perception of digital technologies.

In order to reflect the relationship between the level of digitalisation of a country's economy and its level of international competitiveness, it is advisable to assess the country-specific value of the Global Competitiveness Index. It is worth noting that the index is formed on the basis of 12 key indicators, which are calculated for a different number of countries, taking into account current trends (The Global Competitiveness Report, 2017-2021).

Table 1 shows the values of the ratings reflecting the level of digital development of countries for Ukraine and its neighbouring countries that are members of the Visegrad Group. This choice of countries is based on the implementation of Ukraine's European integration course and the experience of these countries to enhance these processes.

Table 1. *Dynamics of international rankings reflecting the level of digital development of the Visegrad countries and Ukraine (2017-2023)*

Indicator	Country	Years						
		2017	2018	2019	2020	2021	2022	2023
World ranking of digital competitiveness of countries	Poland	65.87	68.56	73.71	69.23	60.94	63.09	66.53 (39 place)
	Czech Republic	70.55	71.49	71.81	67.46	65.22	75.54	79.42 (24 place)
	Hungary	58.50	57.10	65.47	55.91	55.23	65.25	58.25 (47 place)
	Slovakia	59.28	56.54	62.62	53.26	54.20	59.64	58.31 (46 place)
	Ukraine	44.00	51.29	55.26	48.81	50.07	-	-

Table 2, Continued

Indicator	Country	Years						
		2017	2018	2019	2020	2021	2022	2023
Global Connectivity Index	Poland	73.63	76.48	76.55	77.73	78.71	80.13	-
	Czech Republic	75.05	77.21	77.74	80.68	81.33	82.27	-
	Hungary	73.53	78.82	78.38	80.22	80.96	81.66	-
	Slovakia	71.60	74.85	75.64	79.24	80.06	82.03	-
	Ukraine	57.58	65.11	63.50	67.24	67.74	65.92	-
Digital Economy and Society Index	Poland	0.43	37.7	40.7	45.0	41.0	40.5	-
	Czech Republic	0.5	45.3	47.6	50.0	47.4	49.1	-
	Hungary	0.46	40.1	43.2	45.4	41.2	43.8	-
	Slovakia	0.46	41.9	42.9	45.2	43.2	43.4	-
Global Competitiveness Index	Poland	4.59	68.2	68.9	68.8	68.6	68.9	60.48
	Czech Republic	4.77	71.2	70.9	70.9	71.0	71.1	83.48
	Hungary	4.33	64.3	65.1	65.3	65.1	65.7	59.85
	Slovakia	4.33	66.8	66.8	66.9	66.9	67.2	53.84
	Ukraine	4.11	57.0	57.0	56.8	56.0	54.8	-

Source: *based on The Global Competitiveness Report (2017-2021), World Digital Competitiveness Ranking (2018-2024)*

According to global statistics, in 2020-2023, Ukraine will not be able to fully exploit the potential of digital technologies for the development of the Ukrainian economy. Compared to its Eastern European neighbours, Ukraine has the lowest scores in global rankings and indices. Moreover, even this level was ensured mainly by the high performance of such rating components as education and scientific concentration (Semenog, 2020; Shtal & Pliekhanov, 2023).

The next step was to assess the impact of the digital and technological component on the international competitiveness of the selected research objects. To accomplish this task, the econometric analysis was used to determine the dependence function that was the most correct and described economic growth taking into account independent factors. The econometric analysis was based on a study of four global indices reflecting the level of digital development of countries for 2017-2023, as shown in Table 1. The use of the Microsoft Office Excel software allowed to identify indicators characterised by a high level of correlation.

The linear equation for the dependence of the vector of the digital and innovation component of international competitiveness (the sum of innovation costs and direct investment in the country's economy) is as follows:

$$Y = a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + u, \quad (3)$$

where Y – vector of the innovation and digital component of international competitiveness; X_1 – the vector of the digital competitiveness index of countries; X_2 – the vector of the global connectivity index; X_3 – the vector of the digitalisation index of the economy and society; X_4 – the vector of the global competitiveness index; u – the vector of the stochastic component.

The corresponding regression equations for each of the countries under study are presented in Table 2.

Table 2. *Regression equation for the dependence of the digital innovation component vector on independent variables*

Country	Equations of the multivariate model
Czech Republic	$Y = 16.82 * X_1 + 172.011 * X_2 + 5.698 * X_3 + 14.39 * X_4 + 12.54$
Hungary	$Y = 18.2598 * X_1 + 0.9254 * X_2 + 3.0289 * X_3 + 6.3581 * X_4 - 1258.365$
Slovakia	$Y = 6.57423 * X_1 + 19.374 * X_2 + 18.367 * X_3 + 0.25849 * X_4 + 154.301$
Poland	$Y = 18.632 * X_1 + 28.6957 * X_2 + 26.358 * X_3 + 7.1864 * X_4 - 2.358$
Ukraine (X_3 was not taken into account due to lack of data for Ukraine)	$Y = 1.859 * X_1 + 487.320 * X_2 + 3.845 * X_4 + 14.801$

Source: *calculated by the authors*

Table 2 shows that the index of digital competitiveness of countries (X_1) has the greatest impact due to its high coefficient. For the Visegrad countries, along with X_1, it is worth mentioning X_3, which also has a positive value greater than 1. Based on the methodology presented in previous studies (Liutak *et al.,* 2023), the model built is adequate to the statistical data and is correct for further analysis. A summary analysis of the multiple correlation coefficients is presented in Table 3.

Table 3. *Validation of models based on multiple correlation coefficients*

Country	Multiple correlation coefficient *(R)*	Coefficient of determination *(R^2)*	Fisher's criterion $F_{calc} = \frac{R^2}{1-R^2} * \frac{n-m-1}{m}$
Czech Republic	0.84716	0.71768	12.71040
Hungary	0.84582	0.71541	12.56913
Slovakia	0.95487	0.91178	51.67649
Poland	0.88514	0.78347	18.09149
Ukraine	0.79573	0.63319	8.63104

Source: *calculated by the authors*

The analysis of the table data shows that the models are adequate due to the fact that the calculated coefficients correspond to a normal distribution. To deepen the study, a multifactorial economic and mathematical model was built. This equation will allow to calculate the strength of the relationship between independent indicators of digital and innovative business activity and the main resulting factor – Ukraine's GDP. The relevant initial data collected on the basis of statistical indicators are presented in Table 4.

Table 4. *Empirical data for building a model of the dependence of the resultant indicator on the identified factors*

Year	GDP, million UAH	Number of enterprises with access to the Internet	Share of enterprises using social media in the total number of enterprises, %	Share of the number of enterprises that purchase cloud computing services in the total number of enterprises, %	Dynamics of GDP research intensity, %	Number of innovatively active industrial enterprises, units	Share of enterprises engaged in innovations, %	Expenditures on innovations for the purchase of machinery, equipment and software, UAH million	Volumes of venture capital investment, million USD
	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
2013	1522700	39254	20.8	3.7	0.70	1715	16.80	5546.3	37
2014	1586900	40111	23.1	5.2	0.60	1609	16.10	5115.3	42
2015	1988500	40747	25.7	6.8	0.55	824	17.30	11141.3	146
2016	2383200	38825	25.8	7.0	0.48	834	18.90	19829.0	80
2017	2983882	39582	26.1	7.2	0.45	759	16.20	5898.8	265
2018	3558706	43303	29.7	9.8	0.47	777	16.40	8291.3	323
2019	3974564	43785	30.1	10.3	0.43	782	16.58	10185.1	542
2020	4194102	-	-[2]	-[4]	0.41	809	17.13	8788.2	571
2021	5459574	44508	-[3]	10.2	0.29	784	16.42	9325.4	832
2022	5191028	42785	29.1	9.8	0.33	734	16.08	9158.3	218

Note: *[1,4] data collection and calculation for 2020 was not carried out in accordance with the updated approved statistical methodology, which takes into account the requirements of Commission Regulation (EU) No. 2019/1910 of 07.11.2019 on the use of ICT and e-commerce; [2, 3] data for 2020, 2021 were not collected and calculated in accordance with the updated approved statistical methodology, which takes into account the requirements of Commission Regulations (EU) 2019/1910 of 07.11.2019 and 2020/1030 of 15.07.2020 on the use of ICT and e-commerce (frequency of the indicator is once every two years)*

Source: *prepared according to State Statistics Service of Ukraine (2019; 2020), Official website of State Statistic Service of Ukraine (2024)*

To accomplish this task, the indicators that indicate the quantitative and qualitative parameters of the level of digitalisation of Ukraine's economy and its innovation capacity were used (Fig. 1).

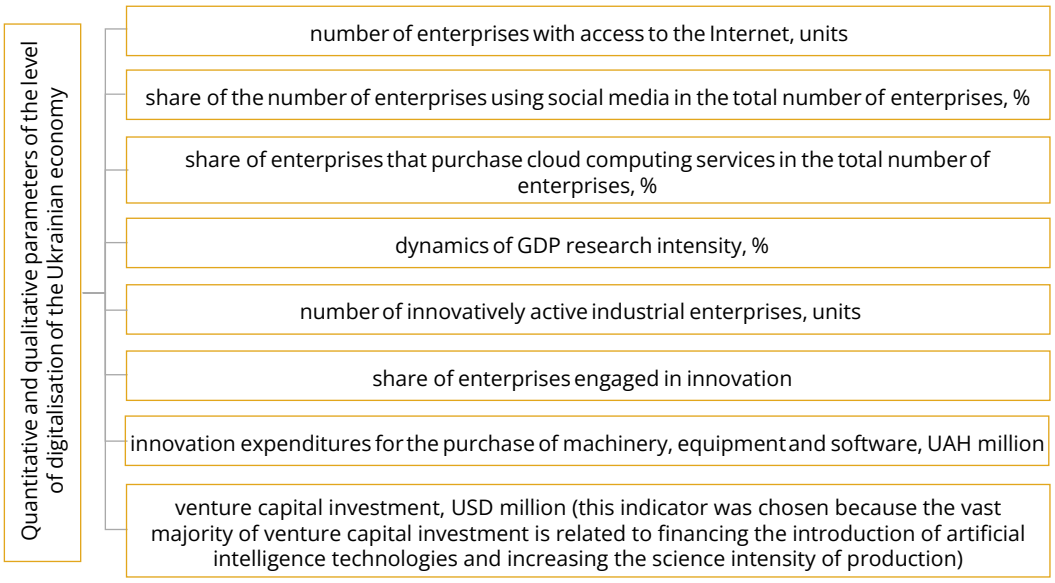

Figure 1. *Quantitative and qualitative parameters of the level of digitalisation of the Ukrainian economy*
Source: *developed by the authors*

To build the equation of the multivariate model of the dependent variable GDP (Y) on the independent indicators of the performance of digital business activity in Ukraine, software products (the Data Analysis package extension of Microsoft Excel) were used. As a result of using software products, the equation of multifactorial dependence of GDP was obtained:

$$Y = 312.5843 * X_1 + 8.2174 * X_2 + 43.5877 * X_3 + 3214.2859 * X_4 - 379.413 * X_5 + 12.73625 * X_6 + 17.356987 * X_7 + 953.57X_8 - 913321.46. \quad (4)$$

The adequacy and reliability of the obtained model was checked taking into account the two main coefficients, namely the correlation coefficient (which corresponds to the value of 0.8773) and the determination coefficient (0.7697). As can be seen from the equation, the most significant impact on the resulting indicator is made by such independent variables as:

- number of enterprises with access to the Internet;
- dynamics of GDP research intensity (%);
- venture capital investment (USD million).

The calculations revealed that the growth of these indicators will lead to an increase in the level of digitalisation and innovation of the Ukrainian economy and, as a result, GDP growth and economic well-being. In order to provide more thorough recommendations on how to use the potential of digitalisation and innovation in the business environment to increase the country's GDP growth rate, it is advisable to assess the significance of these indicators in more detail. Accordingly, the next step in the study is to build two-factor regression models (Table 5). Table 5 shows that the impact of the number of enterprises with access to the Internet on GDP is described by a power law equation, while the dynamics of GDP knowledge intensity and venture capital investment is described by a polynomial equation.

Table 5. *Equation of dependence of GDP impact on digital and innovation factors*

Linear equation	Logarithmic equation	Polynomial equation	Power equation	Exponential equation
Number of enterprises with access to the Internet				
$y = 125.88462x + 566447.765$ $R^2 = 0.23655$	$y = 214412.86560 \ln(x) - 54877.047$ $R^2 = 0.43255$	$y = 12.5447x2 + 184.47712x + 254221.52$ $R^2 = 0.65578$	$y = 196553.44213 * X^{0.27987}$ $R^2 = 0.81774$	$y = 425474.845699 e^{0.00544x}$ $R^2 = 0.32547$
Dynamics of GDP research intensity, %				
$y = 130879.85474x + 6985144.418$ $R^2 = 0.42587$	$y = -8549618.31347 \ln(x) + 32541376.77381$ $R^2 = 0.82925$	$y = 6781.06511x2 - 524687.29826x + 16544883.475$ $R^2 = 0.83458$	$y = 86654412277.34 470X^{-2.93444}$ $R^2 = 0.72441$	$y = 43566877.43318 e^{-0.04364x}$ $R^2 = 0.70544$
Venture capital investment volumes, USD million				
$y = -3225487.12144x + 33256321.513$ $R^2 = 0.85421$	$y = 95432.39326 \ln(x) - 547784.342$ $R^2 = 0.68544$	$y = 352144.74451x2 - 744751.32244x + 214121.52$ $R^2 = 0.91244$	$y = 145478.32556 x^{3.25415}$ $R^2 = 0.82533$	$y = 13457895.12477 e^{-3,12456x}$ $R^2 = 0.74584$

Source: *calculated and compiled by the authors*

Characterising the values of the coefficients of determination in the models describing the level of influence of digital innovation factors on GDP, it should be noted that the largest value is $R^2 = 0.91244$, which corresponds to the indicator 'Venture capital investment'. The article analyses the conformity of the model described by the equation based on the Fisher's criterion:

$$y = 6781.06511x2 - 524687.29826x + 16544883.47557. \quad (5)$$

The formula for calculating the Fisher's criterion:

$$F_{calc} = \frac{(0.83458)^2}{1-(0.83458)^2} * \frac{10-1-1}{1} = 18.361208. \quad (6)$$

According to the standard sample data, the tabulated value of Fisher's criterion is $F_{tab.} = 5.32$. According to the methodology, the fulfilment of the inequality $F_{sum.} > F_{tab.}$ (18.361208 > 5.32) indicates that the model is adequate with a 95% probability and can be used for forecasting.

According to the methodology described in previous studies by O. Liutak *et al.* (2023) and using the Excel software product 'Data Analysis', the value of the correlation coefficient – the statistical relationship between two variables, denoted by r[x; y] was calculated, which is 0.8344. This indicator shows that the relationship between the relevant independent factor and GDP is direct and strong.

Thus, it is reasonable to conclude that the factor "Dynamics of GDP science intensity, %" has the most significant impact on GDP among the indicators under consideration. The analysis showed that the processes of digitalisation, innovation and scientific technologisation have a significant impact on the optimisation of the activities of entities at all levels of the international business environment.

The global environment is actively using and implementing digital technological trends based on the global digitisation of processes, the use of new materials and new management systems. Human labour can be easily replaced by robotics, which reduces the time required to complete production operations and increases labour productivity. E-commerce is characterised by better efficiency compared to brick-and-mortar trading. Automation facilitates the production process, but along with its benefits, digitalisation also poses challenges for the international business environment. The spread of digitalisation is a generator of not only new opportunities but also significant threats for all segments of the population. Digital technologies can be disruptive, which will have a negative impact on productivity, employment and welfare in the future. These technologies may also displace workers from the labour market and exacerbate disparities in their access and use, leading to a new digital divide and growing inequality. Technologisation of production may also lead to an increase in unemployment, online fraud, and increased requirements for economic security for international business entities.

Table 6 provides a SWOT analysis of the impact of digitalisation on the international business environment through the prism of achieving the global sustainable development goals.

Table 6. *SWOT analysis of the impact of digitalisation on the achievement of global sustainable development goals by the international business environment*

Strengths	**Weaknesses**
Penetration of digital innovations into all areas of business and social life. Widespread use of online services. Growth of e-commerce and online sales. The use of digital economy technologies in the processes of greening the business environment. Access to various economic transactions 24/7. Expanding access to financial resources. Elimination of geographical restrictions in the international business environment. Growth in labour productivity and improvement of the quality of labour resources. Increased profitability of enterprises by reducing production and sales costs. Reduced time to bring new economic benefits to the market. The ability to establish quick feedback from customers. Improving the quality of international business results. Increased welfare of the population.	Declining profits and losses in a number of industries. High cost of digital transformation. Lack of or insufficient skills in using digital products among international business entities. Increased unemployment. Lack of a digital development strategy among international business entities. Increased requirements for economic security among international business entities. Dependence on technology. Countries with high levels of poverty. Insufficient level of trust in digitalisation processes.
Opportunies	**Threats**
Changes in consumer preferences towards a growing share of purchases through digital channels. Regulatory relief for ICT companies. Reducing energy consumption through the introduction of various smart technologies aimed at energy saving. Introduction of free access to the Internet. Reducing the cost of renting premises by transferring employees to remote work.	Increase in informal employment, reduction in the number of jobs, and rise in technological unemployment. Low level of digital infrastructure in developing countries and least developed countries. Insufficient broadband coverage in developing countries and least developed countries.

Table 6, Continued

Opportunies	Threats
Developing public-private partnerships to implement digital transformation projects. Reducing the digital divide between different countries. Providing a wider range of products. Emergence of new professions. Possibility of individualistic satisfaction of consumer needs. Improved living standards. Increased adaptability of international business to new market requirements. Reducing discrimination by promoting equal opportunities for people regardless of their gender, religion or age.	Increased likelihood of cyber attacks and unauthorised access to personal and corporate data. Internet fraud. Technological and operational risks. Underestimation of new trends and innovation culture. Increased likelihood of funds being withdrawn from the country to hide assets from regulators. Violation of consumer rights related to the spread of e-commerce.

Source: *prepared according to I. Kryvovyazyuk et al. (2021), N.E. Krasnostanova & T.A. Yakymenko (2023)*

Despite the identified threats and weaknesses, the inevitable development of the digital economy can be argued. The forms and timing of digitalisation processes depend on the capabilities of the country, economy, industry, and people. Digitalisation implies a strategic business transformation, when customer preferences and behaviour change, corporate technology solutions are defined, and the entire business changes. The declared goals of digital transformation of companies in the context of ensuring the implementation of the Sustainable Development Goals range from the introduction of individual digital tools to the creation of multi-level ecosystems. It is worth noting that they will largely determine the content, stages, elements of digital transformation, required investments and projected e-ecosystems, and the portfolio of digital initiatives (Vakhovych *et al.*, 2021).

The analysed digitalisation experience of the Czech Republic, Hungary, Slovakia and Poland shows that the most advanced countries in terms of digitalisation are developing and funding government programmes for the research and implementation of blockchain technologies, which are spreading in many areas of human activity, including intellectual property protection, finance, e-voting, document management, critical infrastructure protection, etc. This technology has the potential to be used to store data on loans, property rights and other important information. In addition, the sources pay attention to the technologies of interaction between economic entities, introducing the concept of virtual or "hybrid worlds" (merging of the real and virtual worlds). In the virtual world, it is possible to perform a "meaningful" action in the real world through the virtual world. At the same time, the digital economy is also seen as an economic activity in which the main factor of production is digital data, or an activity related to the creation, distribution and use of digital technologies and related economic benefits.

In 2022-2023, the Group began to promote the paradigmatic principles of Industry 5.0, which is an expanded version of Industry 4.0 with social and environmental aspects. A distinctive feature of Industry 5.0 is the flexibility of production processes and optimisation of environmental impact, as well as a focus on future harmonious development and human centricity through the prism of economic, technological, environmental and social development. That is why the new focus of digital technologies in the context of implementing a sustainable development strategy for the international business environment should be based on the principles of Industry 5.0. The concept of the fifth industrial revolution envisages the need to fully integrate social and environmental European priorities into innovative systemic technologies in six categories, the key of which, according to P.O. Skobelev & S.Yu. Borovik (2017), are human-machine interaction, bioinformation technologies, digital twins, artificial intelligence, energy efficiency and renewable energy technologies. The role of employees in Industry 5.0 is undergoing major changes. Employees are no longer seen as a cost to the company, but as an investment that ensures the company's growth and employee well-being. Under such conditions, human capital is more respected and valued. The key premise of Industry 5.0 is that technology serves people and people serve technology. An important concept of Industry 5.0 is the formation of an Internet ecosystem.

Conclusions

Thus, digital technologies can play a key role in implementing a sustainable development strategy, ensuring balanced economic, environmental and social progress. The study led to the conclusion that the digitalisation of the international business environment should be inclusive (complete and comprehensive) rather than targeted (improving the quality of individual systems and areas). This will have the greatest positive effect on the population and the economy. According to the experience of other countries, an increase in the share of the digital economy can lead to a 20% increase in GDP over a five-year period and a return on investment in digital transformation of up to 500%. However, this result will only be possible if digital initiatives cover all spheres of human life and are aligned with global sustainable development goals. Therefore, the removal of barriers to digital transformation should be achieved by combining the efforts of all levels of the global economy.

Alongside the development of digital infrastructure, it is important to prioritise digital transformation projects in international business. The implementation of digital projects requires organisational, managerial, and financial efforts on the part of the state, businesses, and citizens. Given the scale of such projects, their technical complexity, the need for significant capital investment, and the need for rapid deployment and coverage of large areas, it is advisable to introduce innovative and service models for financing the creation of new and reformatting existing business models. Prospects for further research will include assessing the impact of digital technologies on the achievement of sustainable development goals for developed and developing countries, in particular, using economic and mathematical tools to confirm empirical postulates. In the future, it is necessary to determine the role of digital tools in Ukraine's economic growth and competitiveness in the post-war reconstruction period.

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Conflict of Interest

None.

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Оптимізація фокусу цифрових технологій в контексті реалізації стратегії сталого розвитку міжнародного бізнес-середовища

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Анотація. Активне поширення цифрових технологій формує темпи динаміки та тенденції розвитку міжнародного бізнес-середовища: з одного боку, підвищується гнучкість бізнес-сфери, з іншого боку, формуються нові виклики для стабільності бізнес-середовища, конкурентоспроможності традиційних галузей економіки, зокрема економічної та інформаційної безпеки. Метою статті було дослідження цифрово-інноваційної активності бізнес-середовища на основі порівняння і моделювання впливу незалежних змінних на валовий внутрішній продукт країн ЄС та України. Методологічною базою, що була використана під час дослідження став інструментарій економіко-математичного та кореляційного аналізу, порівняльний, кількісний, табличний аналіз та синтез, SWOT-аналіз. У статті проведено порівняльний аналіз значення показників міжнародних рейтингів, що відображають рівень цифрового розвитку країн Вишеградської групи та України за 2017-2023 роки; проведено оцінку цифрової та технологічної складових загального рейтингу міжнародної конкурентоспроможності України, Польщі, Чехії, Угорщини та Словаччини. Шляхом використання економетричного аналізу було обгрунтовано використання лінійної функції залежності, яка детально описує динаміку економічного розвитку; побудовано багатофакторну економіко-математичну модель, що визначатиме силу зв'язку між показниками цифрово-інноваційної активності бізнесу в Україні та основним макроекономічним показником – ВВП; проведено SWOT-аналіз впливу цифровізації на досягнення міжнародним бізнес-середовищем глобальних цілей сталого розвитку; обґрунтовано напрями нового фокусу цифрових технологій в контексті реалізації стратегії сталого розвитку міжнародного бізнес-середовища. Практичне значення результатів полягає в тому, що основні наукові положення доведено до рівня методичних розробок, які можуть бути використані: суб'єктами господарювання – під час вибору для використання цифрових технологій, підвищення власної конкурентоспроможності на міжнародній арені; суб'єктами генерування інновацій – під час розробки цифрових інновацій, розвитку інноваційних хабів; органами влади – під час розробки нормативної бази щодо впровадження цифрових інновацій задля досягнення глобальних цілей сталого розвитку, розвитку цифрової інфраструктури, регулювання інвестиційних операцій

Ключові слова: глобальні цілі сталого розвитку; бізнес-суб'єкти; цифрово-інноваційна активність; діджиталізація; Індустрія 4.0; Індустрія 5.0

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Decision support system for identifying priority projects for the development of medical facilities in the hospital district

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Abstract. The relevance of the study is to solve the scientific and applied problem of creating tools for identifying priority projects for the development of medical institutions in a hospital district. The purpose of the article was to substantiate the system-value approach and develop a decision support system based on it to identify priority projects for the creation and development of medical institutions The methods of system-value analysis, multifactorial evaluation of medical projects, and computer modelling were used in the study. The analysis of scientific papers has shown that the development of a decision support system for priority projects of medical institutions in a hospital district is an important task that requires a system-value approach for integrated management. The expediency and features of the system-value approach, which allows to comprehensively identify priority projects for the development of medical institutions in the hospital district, are substantiated. The developed algorithm for the management process of identifying priority projects for the creation and development of healthcare facilities in the region was based on the proposed systemic value approach and involves 12 steps. It allows project managers to speed up the process of selecting priority healthcare projects. Based on the proposed value-based approach and algorithm, a decision support system was developed. The architecture of this decision support system includes a client-side (Frontend). It was developed using HTML and CSS for marking up and styling the page, as well as JavaScript for dynamically adding medical projects to the list, processing events, and sending requests to the server. The system uses jQuery for easy manipulation of DOM elements and Chart.js for graphing and visualising the results of identifying priority projects for the creation and development of medical facilities in the region. The use of the proposed decision support system for a given project environment ensured the identification of priority projects for the creation and development of medical institutions in the region. The practical value of the study lies in the implementation of a decision support system that allows project managers

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to identify priority projects for the creation and development of healthcare facilities, which increases the efficiency of management decisions and optimises the use of resources in the healthcare sector

Keywords: higher education institutions; panel data; econometric modelling; fixed and variable effects; pooled regression; employment

Introduction

The relevance of this study lies in addressing the scientific and practical challenge of creating tools to identify priority projects for developing medical institutions within a hospital district. This is essential for optimising resource utilisation and enhancing the quality of healthcare services. Researchers H.J. Smith *et al.* (2022) noted that in 2019-2024, healthcare systems in many countries face several challenges, including limited resources, ever-growing population needs, changing demographics, and frequent crises such as pandemics or military conflicts. In these conditions, healthcare facilities must effectively adapt to new requirements, ensuring high quality healthcare for the population. M. Miao *et al.* (2023) noted that one of the key aspects of the successful functioning of healthcare systems is the proper planning and implementation of management processes, including the identification of priority projects for the creation and development of healthcare facilities. However, management decision-making in such a complex and multifactorial project environment requires the use of modern technologies and methods.

In modern healthcare system, there is a need to automate management processes, especially those related to the creation and development of medical institutions in hospital districts. Medical institutions play a key role in providing quality medical care to the population. Decision-making on the establishment and development of healthcare facilities should be based on a systematic approach that takes into account various factors of the project environment. In particular, there is a need to take into account the availability and types of funding sources, the needs of the population, infrastructure capacity and the urgency of implementing healthcare projects.

G. Gristina (2022) pointed out that there is an increasing complexity of the tasks facing the healthcare system, as well as limited human and financial resources, which makes the development and implementation of decision support systems (DSS) not only appropriate, but also urgently needed. The use of DSS helps to increase the efficiency of project management, reduce the risk of wrong decisions and optimise resource allocation, which is important in the context of economic instability and a changing project environment.

An analysis of the scientific work by M. Gholamzadeh *et al.* (2023) on the development of the DSS in the healthcare sector showed that this area is actively researched and has important practical implications. At the same time, identifying priority projects for creating and developing healthcare facilities is becoming an increasingly relevant topic, especially in conditions of limited resources, which requires rational planning and implementation of modern management methods.

The scientific literature discusses various approaches to using DSS in the healthcare sector. Many researchers, in particular N.S. Mosavi & M.F. Santos (2022), focused on the use of DSS to optimise resources, plan infrastructure, analyse patient needs, and improve the quality of healthcare services. A. Tryhuba *et al.* (2021) presented approaches to the use of mathematical models and computer algorithms to determine optimal strategies for the development of institutions. The research proved that the use of DSS can significantly increase the efficiency of management decisions and reduce risks during project implementation.

However, despite the large number of studies in this area, the scientific and applied task of identifying priority projects for the creation and development of medical facilities in hospital districts remains unresolved. A. Tryhuba *et al.* (2018) noted that most scientific works focus on certain aspects of project management, such as financing or planning, without taking into account a comprehensive approach to identifying priority projects. Accordingly, there is a need for further research that would cover all the basic components of health facility development, as well as take into account the value for stakeholders.

R. Arthi & S. Krishnaveni (2024) pointed out that the DSS is an effective tool for solving complex management problems in the healthcare sector. They allow to provide a comprehensive analysis of possible development scenarios, optimise resource allocation and identify the highest priority projects for implementation in a given hospital district. In the study, the authors presented a binary classification model for a robust and energy-efficient healthcare decision support system that uses fog computing to optimise performance.

Thus, the development and implementation of the DSS to identify priority projects for the creation and development of medical institutions in a hospital district is an important scientific and applied task, the solution of which will ensure the creation of tools for managing these projects.

The purpose of the article was to substantiate the system-value approach and to develop, on its basis, a DSS for identifying priority projects for the creation and development of medical institutions, and also to consider its possibilities for improving the efficiency of management decision-making in the healthcare sector.

Materials and Methods

The system-value approach to identifying priority projects for the creation and development of medical facilities in a hospital district proposed in this study is to integrate system analysis and project value assessment from the perspective of different stakeholders (Fig. 1).

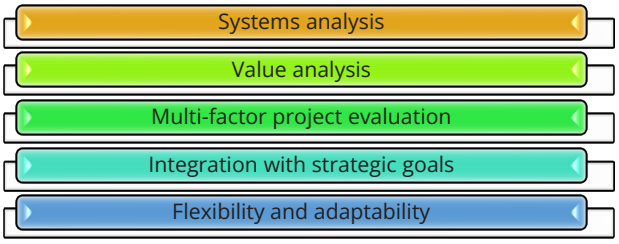

Figure 1. *Main components of the system-value approach to identifying priority projects for the creation and development of medical facilities in a hospital district*
Source: *developed by the authors*

This approach allows to assess not only the individual components of the projects, but also their impact on the healthcare system and society as a whole. The process of project identification is the key to identifying priority projects for the creation and development of healthcare facilities. In general, the process of identifying these projects can be represented by the following expression:

$$P_{in} \in (A_{st} \rightarrow I_{CC} \rightarrow F_{st} \rightarrow F_{pr}), \quad (1)$$

where P_{in} – the process of identification of projects for the creation and development of healthcare facilities in the region; A_{st} – analysis of stakeholders in projects for the creation and development of healthcare facilities in the region; I_{CC} – identification of contradictions and conflicts of interest between stakeholders in projects for the creation and development of healthcare facilities in the region; F_{st} – formulation of stakeholders' needs to change the current state of the healthcare system; F_{pr} – formation of projects for the creation and development of healthcare facilities in the region.

With regard to the use of system analysis in determining priority projects for the creation and development of medical institutions in a hospital district, it is proposed to consider the process of development of medical institutions as part of a complex health care system. This involves assessing the impact of medical projects on the overall performance of the hospital district's healthcare system according to the methodology of M. Konca & M. Top (2022). It involves analysing the relationships between projects.

To determine the key values for each stakeholder group (patients, medical staff, local authorities, investors, community), it is proposed to perform a value analysis using the methodology of Z. Zhang *et al.* (2023). It involves evaluating healthcare projects in terms of their contribution to achieving important social and healthcare goals, such as improving access to healthcare services, improving the quality of treatment, reducing mortality, or improving disease prevention. It is also important to use criteria for prioritising projects based on a balance between costs, expected benefits and community needs.

It is proposed to evaluate each healthcare project according to several parameters, such as cost, expected implementation time, impact on public health, economic benefit and innovation. As a result of using multicriteria analysis methods, medical projects are ranked based on the set evaluation criteria for the relevant stakeholders.

It is also proposed to ensure that priority projects are adapted to changes in the external project environment, such as new legislative initiatives, changes in funding or demographic changes. The use of dynamic modelling to predict possible scenarios for the development of healthcare facilities and adjust priorities based on new data is one of the advantages of the proposed approach. The advantages of using the proposed system-value approach to identifying priority projects for the creation and development of medical facilities in the hospital district are shown in Figure 2.

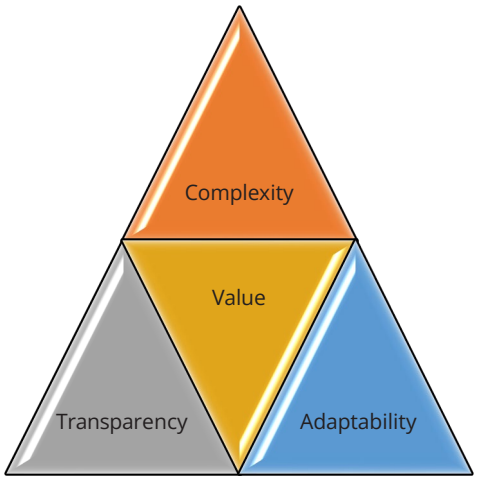

Figure 2. *The main advantages of using the proposed system-value approach to identifying priority projects for the creation and development of medical facilities in a hospital district*
Source: *developed by the authors*

The recommendations of W. Chen *et al.* (2023) regarding the use of a systematic approach that allows taking into account all the key factors that affect the effectiveness of healthcare projects and the healthcare system as a whole were taken into account. Transparency ensures clear definition of criteria and evaluation of healthcare projects, which avoids subjectivity in management decision-making. Adaptability allows for a quick response to changes in the external project environment and adjustments to the development plans of healthcare facilities. Value-based approach enables stakeholders

to receive benefits. It ensures the best use of available resources of hospital districts and ensures investment in the most valuable medical projects for society.

Thus, a systemic value-based approach to identifying priority projects for the creation and development of healthcare facilities in a hospital district makes it possible to make informed management decisions aimed at ensuring the sustainable development of the healthcare system and maximising value for stakeholders.

The formulated set of *i*-th projects $\{P_{ri}\}$ for the creation and development of healthcare facilities in the region requires further assessment of their value for stakeholders. Forecasting the value of these projects is carried out in the following sequence. First of all, the value of the formulated set of *i*-th projects $\{P_{ri}\}$ for the development of medical institutions in the region is quantified. For this purpose, computer modelling methods are used to forecast intermediate value indicators. The criteria for the value of the *k*-th projects for the creation and development of medical institutions in the region are the ratio of benefits (B_{sti}^{mk}) for stakeholders from the individual *m*-th medical systems to the costs (C_{pi}^{mk}) incurred to create these benefits:

$$V_{pi}^{mk} = \frac{B_{sti}^{mk}}{C_{pi}^{mk}}, \quad (3)$$

where V_{pi}^{mk} – value to *i*-th stakeholders from individual *m*-th healthcare systems due to implementation of *k*-th healthcare projects; B_{sti}^{mk} – benefits to *i*-th stakeholders from individual *m*-th healthcare systems due to implementation of *k*-th healthcare projects; C_{pi}^{mk} – costs incurred to create benefits from *m*-th healthcare systems due to implementation of *k*-th healthcare projects.

The basic value V_{pb}^{mk} from implementation for *i*-th stakeholders from individual *m*-th healthcare systems through the implementation of *k*-th healthcare projects:

$$V_{pb}^{mk} = \frac{1}{n}\sum_{i=1}^{n} V_{pi}^{mk}, \quad (4)$$

where V_{pb}^{mk} – is the basic value from the implementation of *k*-th medical projects; *n* – is the number of stakeholders who receive benefits; V_{pi}^{mk} – is the benefits from individual *m*-th medical systems due to the implementation of k-th medical projects.

The greatest basic value V_{pb}^{mk} for stakeholders from individual *m*-th healthcare systems through the implementation of *k*-th healthcare projects is provided by those projects that allow for maximum benefits $B_{sti}^{mk} \rightarrow max$ for *i*-th stakeholders at the minimum cost incurred $C_{pi}^{mk} \rightarrow min$ to create these benefits:

$$V_{pb}^{mk} = f(\{B_{sti}^{mk}\}, \{C_{pi}^{mk}\}) \rightarrow max. \quad (5)$$

On the basis of the identified basic value V_{pb}^{mk} for stakeholders from individual *t*-th medical systems through the implementation of *k*-th medical projects, priority projects are selected for a given hospital district.

Subsequently, priority projects for the creation and development of medical institutions in the region are identified. To determine the priority *k*-th projects, they are ranked in descending order by their basic value V_{pb}^{mk} for stakeholders:

$$V_{pb}^{m2} \geq V_{pb}^{m4} \geq \ldots \geq V_{pb}^{mk}. \quad (6)$$

This ensures the creation of a vector of priority projects for the creation and development of healthcare facilities in the territory of hospital districts. It is worth describing in mathematical terms the identification of priority *k*-th projects, which are then ranked in descending order of basic value V_{pb}^{mk} for stakeholders. In this case, the set of projects is known $P = \{p_1, p_2, \ldots, p_n\}$, as well as the basic value V_{pb}^{mk} for different stakeholders for each of them. Then the vector of priority projects P_P can be defined as:

$$P_P = (p_{(1)}, p_{(2)}, \ldots, p_{(k)}), \quad (7)$$

where $p_{(z)}$ – is a medical project with the *z*-th basic value in terms of quantitative value; *k* – is the number of priority medical projects to be implemented, units.

To form a vector of priority projects, medical projects $p_{(z)}$ are ranked by their basic value V_{pb}^{mk} in descending order. That is, for *i* from 1 to *k*. Thus, the ranking formula is as follows:

$$V_{(i)} = max\{V_j \mid p_j \in P \setminus \{p_{(1)}, p_{(2)}, \ldots, p_{(i-1)}\}\}, \quad (8)$$

where $V_{(i)}$ – is the medical project with the highest base value.

Once found, this project is removed from the set P_P. The procedure is repeated until the priority medical projects are identified. This allows us to form a vector of priority projects P_P, which includes the *k*-th number of medical projects with the highest core values for stakeholders.

To match the amount and sources of investment with the budgets of priority projects for the creation and development of healthcare facilities in the region, the *k*-th number of healthcare projects, the budget B_i of each *i*-th healthcare project (where $i \in \{1, 2, \ldots, k\}$, is the amount of investment I_i for each *i*-th healthcare project and the amount of available investment S_i for each i-th healthcare project from all sources. The amount of investment I_i for each i-th medical project should not exceed its budget B_i:

$$I_i \leq B_i \text{ for all } i \in \{1, 2, \ldots, k\}. \quad (9)$$

The amount of investment I_i for each i-th medical project should be equal to the sum of available investments S_i from all sources:

$$I_i = S_i \text{ for all } i \in \{1, 2, \ldots, k\}. \quad (10)$$

If S_i it consists of several sources of investment (e.g., state budget (D_i), local budget (L_i), private investment (P_i), and other sources (O_i), then:

$$S_i = D_i + L_i + P_i + O_i \text{ for all } i \in \{1, 2, \ldots, k\}. \quad (11)$$

Thus, the following system of equations (9-11) is used to match the amount of investment I_i with the budgets B_i of the *i*-th medical projects. These equations ensure that each *i*-th healthcare project receives the required amount of investment I_i that does not exceed the approved budget. At the same time, investment sources should be properly distributed B_i among priority projects.

For each of the project environment factors, the variability index is calculated using the formula:

$$k_{Mi} = N_{3i} \cdot v_i, \quad (12)$$

where k_{Mi} – is the coefficient of variability of the project environment during a given period of medical project implementation; N_{3i} – is the number of changes in the *i*-th factor of the project environment during a given period of medical project implementation; v_i – is the importance of the *i*-th factor of the project environment for the implementation of the medical project. The total weighted number of changes in the project environment is determined by the formula:

$$W_{nc} = \frac{\sum_{i=1}^{n} k_{Mi}}{n}. \quad (13)$$

The described system-value approach to identifying priority projects for the creation and development of medical institutions in a hospital district is the basis for creating an appropriate decision support system. The proposed approach is based on comprehensiveness, transparency, value and adaptability, which ensure the evaluation of priority projects in the hospital district.

Results and Discussion

In order to speed up and improve the quality of the management process of identifying priority projects for the creation and development of medical institutions in the region, an algorithm has been developed. It is based on the proposed system-value approach, which takes into account the peculiarities of the project environment, budgeting of projects for the creation and development of medical institutions in the region, and the value of the given benefits. On the basis of the proposed algorithm, a decision support system is proposed, which makes it possible to identify and visualise trends in the indicators of priority projects for the creation and development of medical institutions in the region.

The flowchart of the algorithm of the management process for determining priority projects for the creation and development of medical institutions in the region includes 12 steps (Fig. 3).

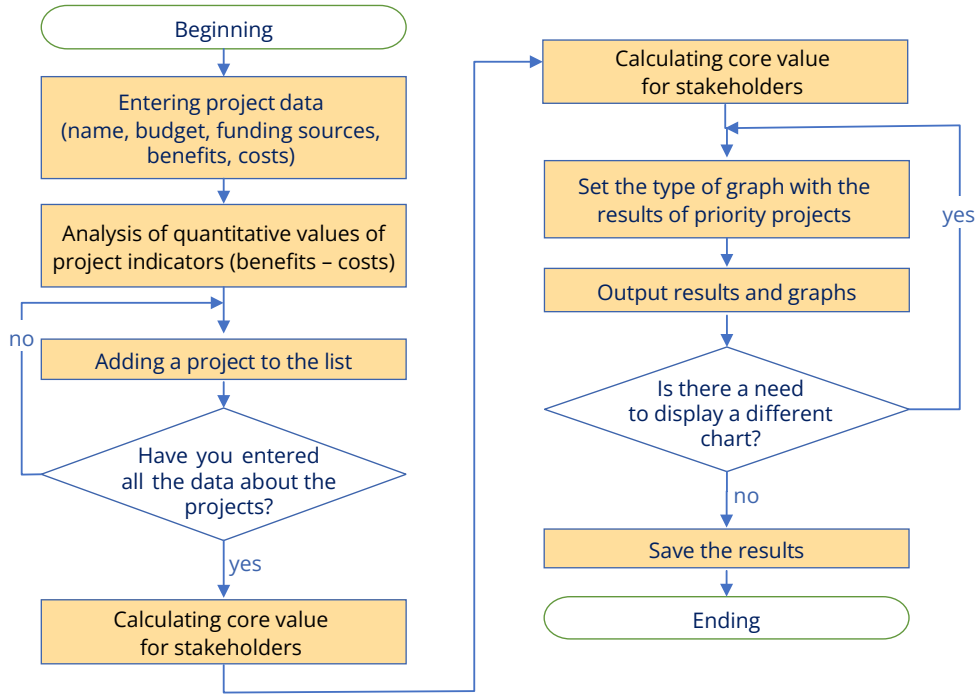

Figure 3. *Flowchart of the algorithm of the management process for identifying priority projects for the creation and development of healthcare facilities in the region*

Source: *developed by the authors*

The paper described the proposed algorithm of the decision support system for identifying priority projects for the creation and development of medical institutions in the region, which provides for:

1. Start. At the beginning of the DSS operation, the user opens the interface for entering data on projects that need to be prioritised. For this purpose, a webpage was developed that allows users to enter the necessary

information about each of the projects for the creation and development of healthcare facilities in the region.

2. Entering data on the project for the creation and development of healthcare facilities in the region. The user fills in the form provided to him/her, entering the following data about each project:

- project name – enter an identifier or name of the project that allows it to be easily recognised among others;
- project budget – the total amount of funds required for the project implementation;
- state budget – the amount of funds coming from the state budget is entered;
- city budget – the amount of funds to be received from the local budget;
- private investments – the amount of funds to be received from private investors;
- other sources – the amount of funds coming from other sources of financing;
- benefits from the project implementation – a quantitative assessment of the benefits that will be brought by the project implementation;
- costs of creating the benefits – enter the quantitative value of the costs required to achieve the benefits of the project.

3. Analysis of quantitative values of project indicators (budget – benefits – costs). After entering the project data, the system automatically analyses the values of the project indicators, which include the budget, benefits and costs of its implementation.

4. Adding a project for the creation or development of healthcare facilities in the region to the list. All analysed project values, together with other entered data, are added to the list of project characteristics. This list is saved in the PC memory for further processing and analysis.

5. Check whether the list contains all the necessary data on projects for the creation or development of healthcare facilities in the region. If some data is missing, the user is informed about this absence and should proceed to step 2. If all the data is available, proceed to step 6.

6. Calculation of the base value from the implementation of projects to create or develop healthcare facilities in the region. For this purpose, use the formulas (3-5) described in the Materials and Methods section.

7. Ranking of projects for the creation or development of healthcare facilities in the region in descending order of their basic value. This allows to identify which of the existing projects have the highest value and, accordingly, should be prioritised for funding and implementation.

8. Set the type of graph with the results of priority projects. To do this, use the drop-down menu to select the name of the desired graph to be displayed. In particular, these can be graphs with trends in the value, budget, benefits, and costs of project implementation.

9. Displaying results and graphs. The system displays the results of the analysis in the form of a list of projects for the creation or development of medical institutions in the region with the values of their indicators. Additionally, a graph is generated that visually displays the value (budget, benefits and implementation costs) of the projects, which facilitates decision-making. The graph is created using visualisation libraries.

10. A condition is checked to see if there is a need to display another graph. If there is, the user returns to step 8 and sets the desired type of graph. If there is no need to display graphs anymore, the system proceeds to step 11.

11. Save the results. This step saves the calculations and graphs to a file for further work by project managers.

12. Termination. After the results are displayed and saved, the algorithm completes its work. The user can view the saved results and perform further analysis based on comparison with other data on the implementation of projects for the creation or development of healthcare facilities in the region.

A number of tools have been selected to develop a decision support system for identifying priority projects for the creation and development of healthcare facilities in the region, which is a web application. In particular, HTML (HyperText Markup Language) and CSS (Cascading Style Sheets), are the main technologies for creating web pages. They are used for structuring content and designing web pages. In this case, HTML is used to structure the web page. CSS is used for styling and design, including the Bootstrap 4 library for creating responsive designs.

The JavaScript programming language was used to add dynamic behaviour and interactivity to the web page. This allows executing client-side logic, interact with the user, change page content without reloading, work with data, etc. In addition, jQuery is used to simplify DOM manipulation, and Chart.js to visualise data in the form of graphs. It also used the server-side scripting language PHP (Hypertext Preprocessor) to develop the web application. PHP runs on the server and generates HTML code that is sent to the user's browser. PHP interacts with databases, manages user sessions, processes forms, and performs other server-side tasks. To create a decision support system for identifying priority projects for the creation and development of medical institutions in the region as a web application, the Replit development environment (IDE) was integrated.

As for the architecture of the decision support system for identifying priority projects for the creation and development of healthcare facilities in the region, the client part (Frontend) involves the use of HTML and CSS for marking and styling the page, JavaScript for dynamically adding projects to the list, processing events, and sending requests to the server, jQuery for more convenient manipulation of DOM elements, Chart.js for building graphs and visualising the results of the analysis. At the same time, the server side (Backend) involves the use of PHP to process POST requests from the client side, process project data, and sort them based on the calculated value. The php://input file is supposed to be used to receive data from the POST request and temporarily store it in the PC memory.

The user interface (UI) of the decision support system provides for users to enter data on the characteristics of projects for the creation and development of healthcare facilities in the region through a form that includes fields with their name, budget and its sources of revenue (state budget, municipal budget, private investment, other sources), benefits and costs (Fig. 4). There is a button "Add project" that allows adding project characteristics to the list of projects on the client side. Data processing is performed after clicking the "Analyse projects" button. In this case, the data on the characteristics of individual projects for the creation and development of medical institutions in the region are sent to the server using an AJAX request. The PHP script on the server receives data on the characteristics of individual projects for the creation and development of medical institutions in the region, processes them, sorts them by the value of the specified projects, and returns the results back to the client side. On the client side, the results are displayed in the form of a list of priority projects for the creation and development of medical institutions in the region sorted by value (Fig. 5). At the same time, Chart.js is used to build a graph with priority projects.

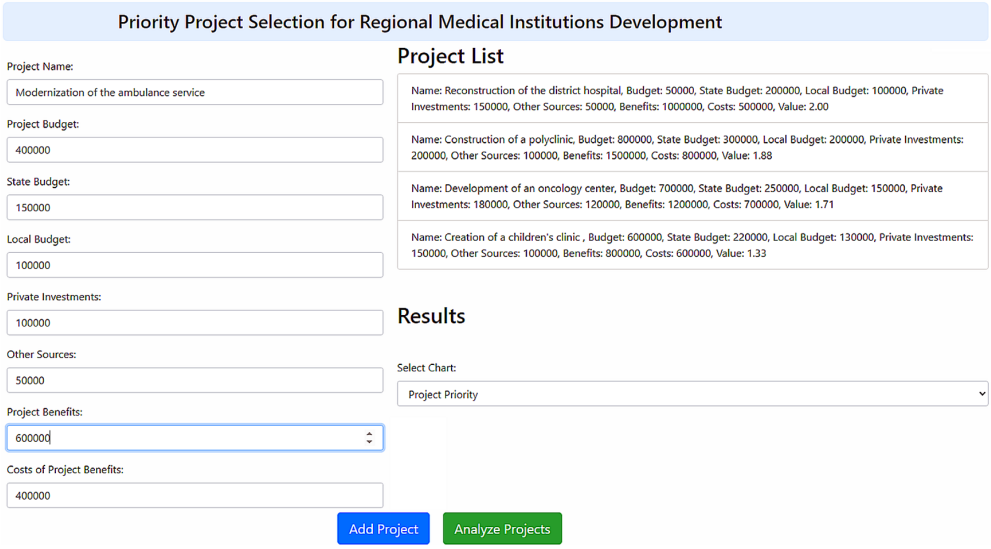

Figure 4. *The user window of the decision support system for identifying priority projects for the creation and development of healthcare facilities in the region*
Source: *developed by the authors*

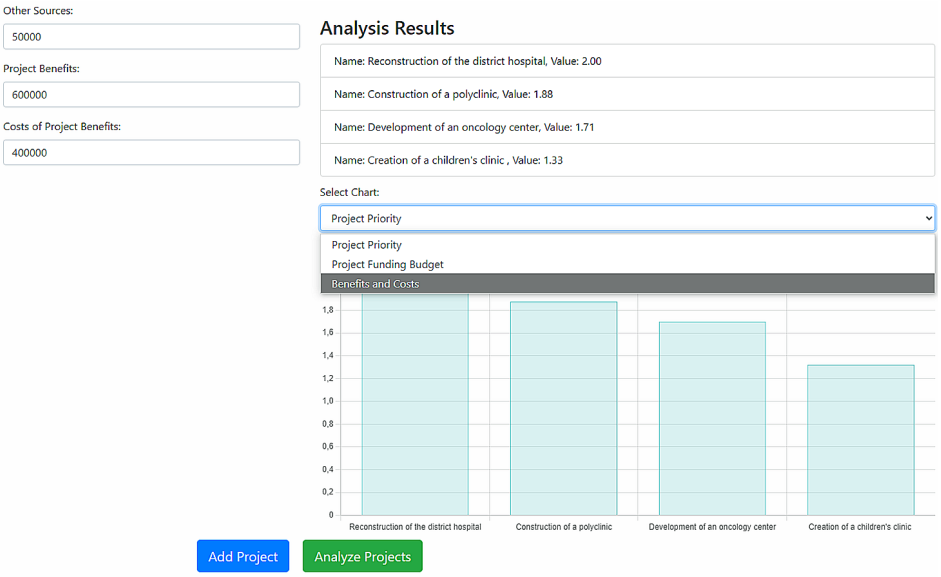

Figure 5. *The user window of the decision support system for identifying priority projects for the creation and development of healthcare facilities in the region with the results of the analysis and the graph of projects sorted by value*
Source: *developed by the authors*

The features of the decision support system for identifying priority projects for the creation and development of healthcare facilities in the region are that users can dynamically add new projects and see them in the list without reloading the page. The system automatically calculates the value of each project based on benefits and costs, sorts them and displays the results. The use of Chart.js for visual representation of priority projects helps users to better understand data and make management decisions. At the same time, the proposed decision support system has a simple and intuitive interface that allows project managers to quickly enter data and get results.

Based on the use of the proposed decision support system, priority projects for the creation and development of medical institutions in the region were identified. Initial data for this management process are presented in Table 1.

Table 1. *Initial data for identifying priority projects for the creation and development of medical institutions in the region, USD (as of 2023)*

Project name	State budget	Local budget	Private investments	Other sources	Benefits from project implementation	Variability of the project environment
Reconstruction of the district hospital	200000	100000	150000	50000	1000000	0.4
Construction of a polyclinic	300000	200000	200000	100000	1500000	0.21
Development of an oncology center	250000	150000	180000	120000	1200000	0.284
Creation of a children's clinic	220000	130000	150000	100000	800000	0.321
Modernisation of the ambulance service	150000	100000	100000	50000	600000	0.297

Source: *compiled by the authors*

Table 1 indicates that the costs of creating benefits are equal to the project budget, while the benefits of the project refer to what stakeholders receive from each project. In Table 1, the project budget is calculated as the sum of the state budget, local budget, private investment, and other sources of funding (Fig. 6).

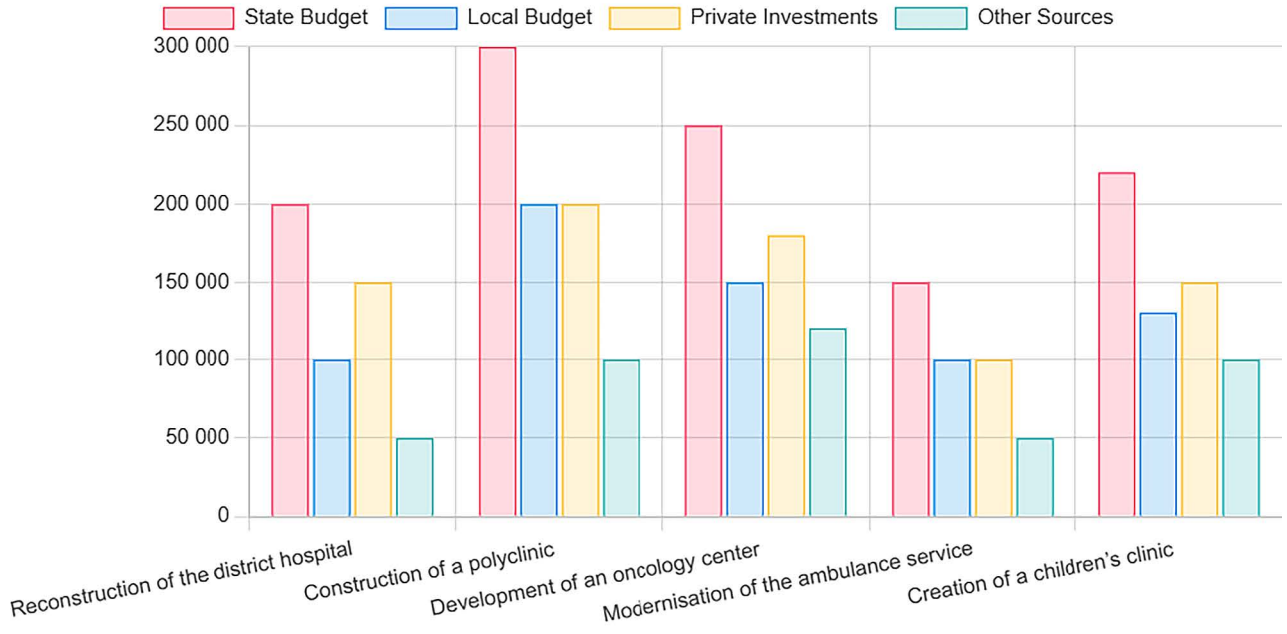

Figure 6. *Budget structures of projects for the creation and development of healthcare facilities in the region, USD (as of 2023)*

Source: *developed by the authors*

The variability of the project environment reflects the volatility of the conditions in which a healthcare project is implemented. Its quantitative value depends on various factors, such as changes in funding, availability of resources, legal regulation or technological innovations. For example, the project environment variability for the

reconstruction of a district hospital is 0.362, which indicates a relatively high rate of change in this project, while for the construction of a polyclinic, the value is 0.21, which means a more stable project environment. The variability of the project environment is used to assess risks and adapt the project management strategy.

The variability of the project environment was determined as follows. The frequency of changes in the main components of the project environment for individual healthcare projects during the six months of their implementation was taken into account. This included changes in funding, availability of resources, technological changes, changes in legislation, and changes in the project team. The results obtained from the example of the district hospital reconstruction project are presented in Table 2.

Table 2. *Results of the assessment of the components of the changing project environment of the district hospital reconstruction project (as of 2023)*

Month	Financing	Availability of resources	Technologies	Legislation	Project team
1st month	Change	No changes	No changes	No changes	Change
2nd month	No changes	Change	Change	No changes	No changes
3rd month	Change	No changes	No changes	Change	Change
4th month	No changes	Change	No changes	No changes	No changes
5th month	No changes	No changes	Change	No changes	No changes
6th month	Change	No changes	No changes	Change	No changes

Source: *compiled by the authors*

Based on the data in Table 2, the number of changes in each of the factors of the project environment under consideration was calculated. It is established that during the period under consideration there were 3 changes in financing, availability of resources – 2 changes, technology – 2 changes, legislation – 2 changes, and project team – 2 changes. Depending on the specifics of each medical project, the weight of the influence of each of the factors of the project environment under consideration is taken into account. In particular, funding – 0.4, availability of resources – 0.2, technology – 0.15, legislation – 0.15, and project team – 0.1.

Substituting the corresponding values into formula (12), the quantitative values of the coefficients of variability of the project environment during a given period of implementation of a medical project are obtained. The total weighted number of changes in the project environment for the project of reconstruction of the district hospital is:

$$W_{nc} = \frac{2.4}{6} = 0.4.$$

It has been established that taking into account the weight of each factor of the project environment, the weighted frequency of changes in the main factors of the project environment is 0.4 (changes per unit of time, i.e. per month). Similarly, calculations were made to determine the variability of the project environment for other medical projects under consideration.

As a result of using the proposed decision support system, priority projects for the creation and development of medical institutions in the region were identified using the initial data presented in Table 1, and the graphs presented in Figures 6-8 were obtained.

The obtained graph of the budget structure of projects for the creation and development of medical institutions in the region (Fig. 6) makes it possible to analyse the share of funding received from different sources. It has been established that all the projects under consideration are largely dependent on public funding. In addition, the second most important source is the local budget, which provides funds to finance projects for the creation and development of healthcare facilities in the region. Project managers should look for additional sources of funding if the state budget is limited. In addition, strategies should be developed to attract the private sector to participate in project financing. The costs of creating benefits are equal to the project budget, and the benefits of the project reflect the value that stakeholders receive from each project (Fig. 7). The presented schedule of benefits and costs of implementing projects for the creation and development of healthcare facilities in the region provides for the identification of projects with the highest benefit-to-cost ratio. This helps to identify the most effective projects, such as the reconstruction of the district hospital and the construction of a polyclinic. At the same time, the analysis of project implementation costs will help determine their feasibility. In particular, it was found that the polyclinic construction project requires significantly more costs compared to the project reconstruction of the rayon hospital at a lower cost. Therefore, if the budget is limited, the project to reconstruct the Rayon Hospital should be preferred (Fig. 8).

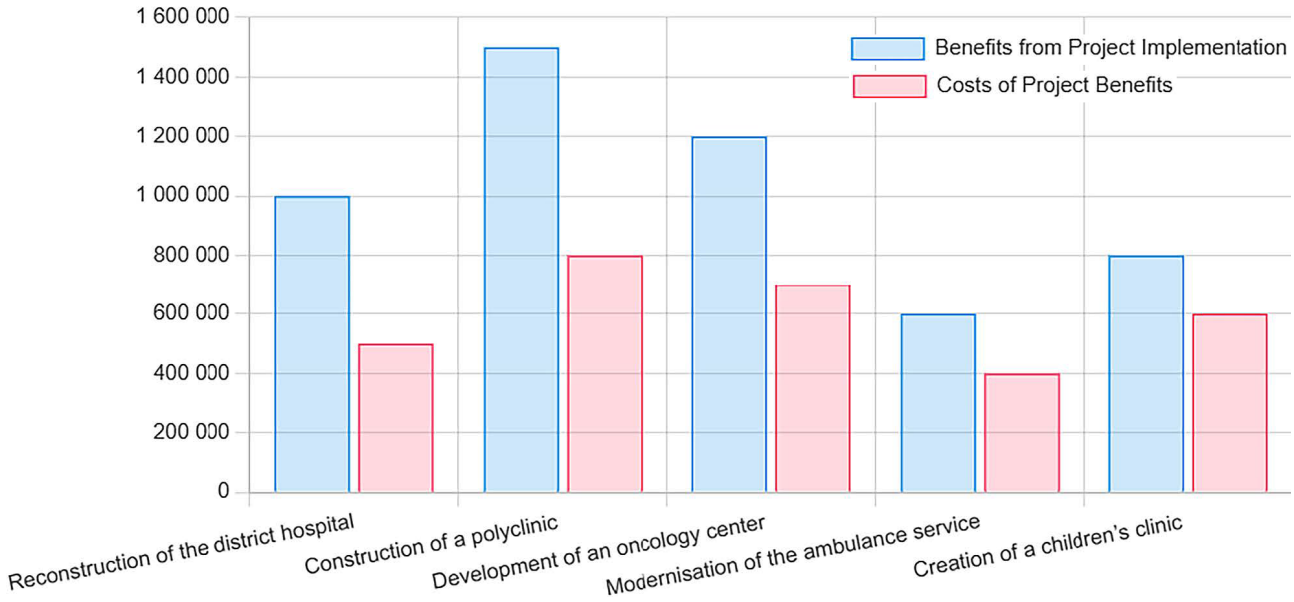

Figure 7. *Budget structures of projects for the creation and development of healthcare facilities in the region, USD (as of 2023)*

Source: *developed by the authors*

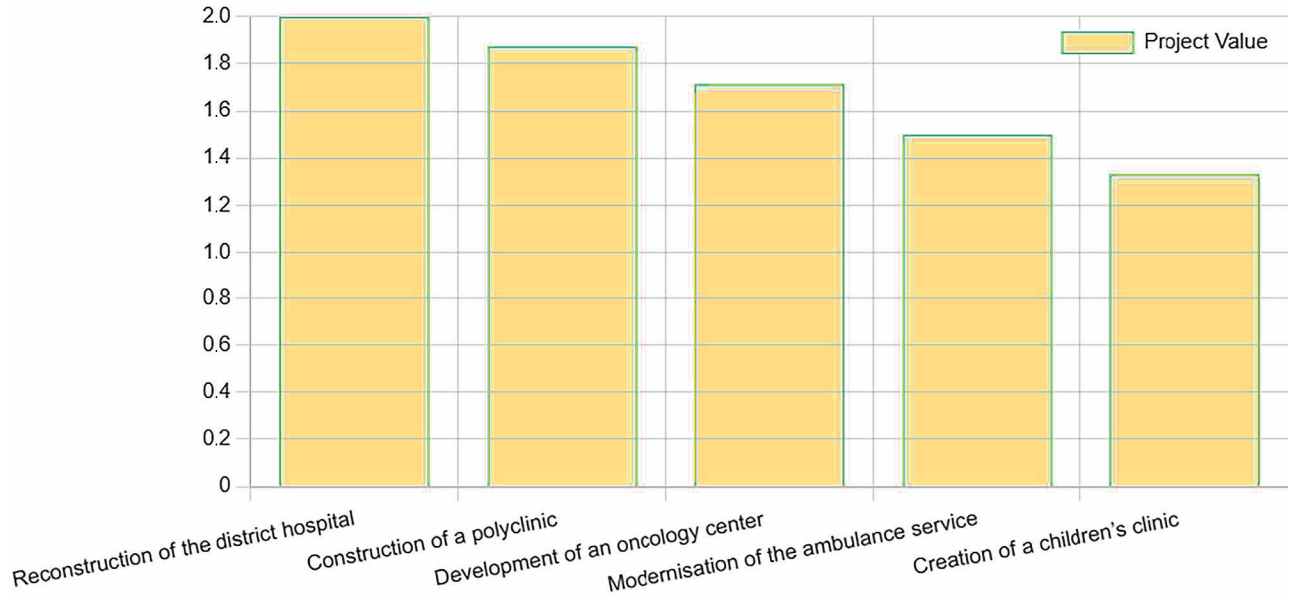

Figure 8. *Histogram of priority projects for the creation and development of medical institutions in the region sorted by their value (as of 2023)*

Source: *developed by the authors*

As a result, a schedule of priority projects for the creation and development of medical facilities in the region was obtained, sorted by their value. It was determined that the reconstruction of the district hospital has the highest value (2.0). The benefits of this project are twice as high as the costs of its implementation. The projects to build a polyclinic and develop an oncology center have high values close to 2.0, which also indicates high efficiency. Establishing a children's clinic has the lowest value (1.333), but is still profitable to implement. The results indicate that the highest value projects are the reconstruction of the rayon hospital and the construction of a polyclinic, which are prioritised for priority funding and implementation. They will bring the greatest benefits to the stakeholders at the optimal cost of their implementation. Project managers should prioritise and give preference to projects with the highest value, maximising stakeholder benefits at the lowest cost.

In general, the identification of priority projects for the creation and development of healthcare facilities in the region using the proposed decision support system enables project managers to obtain information about

them, which allows them to focus on higher-priority projects to quickly obtain benefits for stakeholders. Based on the analysis, project managers make decisions about the need to find and attract additional sources of funding to ensure the stability of project budgets. Conducting a cost-benefit analysis for stakeholders is the basis for improving the efficiency of using available resources. These recommendations will help project managers to effectively manage healthcare facility creation and development projects, ensuring maximum benefit for the region's stakeholders at the optimal cost of resources.

The study developed a decision support system (DSS) to identify priority projects for the development of medical facilities in a hospital district. This system is designed to improve the accuracy and quality of management decision-making by project managers in a resource-limited environment. H. Hu *et al.* (2016) argued that one of the tools to improve the accuracy and quality of management decisions is DSS. They are important tools for improving management decision-making processes, including in the healthcare sector. DSSs provide the ability to comprehensively analyse a large amount of data, model possible development scenarios, and assess the impact of various factors in the project environment. Implementation of the DSS allows taking into account financial constraints, population needs, infrastructure capacities, and other aspects that are crucial for successful planning of healthcare facilities development. Analysing scientific papers, it have identified both common features and differences with the results of other studies in this area. For example, H.C. Lin *et al.* (2021) discussed the implementation of a patient management system in the clinical practice of Chinese medicine, focusing on the digitalisation of healthcare services. Although, this study aimed to create tools for prioritising projects, both papers emphasised the importance of technological solutions for improving healthcare services. However, in contrast to the approach taken in this paper, H.C. Lin *et al.* (2021) focused on aspects of patient management rather than systematic project analysis.

The work of B.F.F. Rodrigues *et al.* (2020) focused on risk assessment of investments in biofuel projects, reflecting the importance of risk management. D. Benavides *et al.* (2024) also analysed approaches and platforms for analysing and presenting data that facilitate effective energy management and decision-making. The DDS also takes into account risks, but this study focused on healthcare projects, which requires a more comprehensive approach to analysing the project environment.

The author K. Burdyka (2023) examined models for creating community fire suppression projects, focusing on the practical aspects of project implementation. Although, the paper illustrated the importance of a systematic approach to project management, this article suggests other mechanisms for setting priorities in healthcare facilities, which underlines the uniqueness of the study.

Researchers Y. Zheng *et al.* (2023) studied eight OHMC hospitals planned for construction based on the conditions and potential of several districts in terms of economies of scale. The authors concluded that hospital expansion can contribute to the group's development, but it can also create problems, such as rising costs, increased management and operating costs, inefficient allocation of medical resources, and unbalanced development. A. Vallee & M. Arutkin (2024) noted that virtual hospitals offer an effective solution to many systemic problems, including rising costs and increased workload for healthcare professionals.

Researchers Y. Wang *et al.* (2024) presented a neural network-based model for predicting and estimating head injury parameters in children. Although the main focus of their study is on risk assessment, the use of neural networks for prediction is a common approach in this study. This work also used prediction models, but unlike the study by Y. Wang *et al.* (2024), the presented system is aimed at identifying priority projects of hospital districts rather than individual risks.

The systematic review by D. Johnson *et al.* (2024) examined clinical decisions that promote genetically targeted medicine. This study demonstrated how new technologies can improve treatment outcomes, but they do not focus on management decisions in the direction of health facility development projects. In contrast, the DSS, as outlined in this paper, focuses on project environment factors that influence project prioritisation.

The study by M. Gholamzadeh *et al.* (2023) emphasised the importance of knowledge in supporting clinical decision-making to improve adherence to evidence-based medicine in the treatment of chronic diseases. The authors focused on improving medical practice through the use of knowledge, which partially coincides with results of this research. However, this work is more focused on managerial aspects and identifying priority projects in the healthcare sector.

Thus, the study adds to the existing knowledge in the field of project management by creating a decision-support system for healthcare. The authors focused on identifying priority projects for the development of medical institutions in the hospital district, which makes the results an important contribution to project management.

Conclusions

The proposed system-value approach to the multifactorial evaluation of medical projects, their integration with strategic goals, and taking into account the adaptive project environment allows to comprehensively identify priority projects for the development of medical institutions in a hospital district. This approach was based on the principles of comprehensiveness, transparency, value and adaptability, which allow for effective evaluation of priority projects in the hospital district. This approach makes management decision-making on priority projects more informed and

focused on the real needs of the population, which contributes to improving the quality of healthcare services. This approach significantly reduced the risks of inefficient use of resources and ensures the sustainable development of medical institutions.

The substantiated algorithm of the management process of identifying priority projects for the creation and development of medical institutions in the region involved 12 steps that allow project managers to systematically select priority projects. The algorithm included the stages of data collection and analysis, assessment of benefits and costs, and identification of risks associated with each healthcare project. With this clear structure, project managers can make management decisions based on objective data and quantitative indicators, which ensures transparency and clarity of the process. This is especially important in a resource-constrained environment where every decision needs to be as well-founded as possible.

Based on the proposed system-value approach and algorithm, a decision support system was created. The architecture of this system includes a client-side (Frontend) developed using HTML and CSS for markup and styling of pages, as well as JavaScript for the dynamic addition of medical projects to the list, event processing, and sending requests to the server. To make it easier to work with DOM elements, jQuery was used, and Chart.js was used to build graphs and visualise the results of identifying priority projects for the creation and development of medical facilities in the region. The proposed decision support system facilitates the identification of priority projects in the hospital district. Further research should be carried out using the developed decision support system to assess the relationships between the components of the project environment and determine their impact on the priority projects for the creation and development of medical institutions in the hospital district.

Acknowledgements

None.

Conflict of Interest

None.

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Система підтримки прийняття рішень для визначення пріоритетних проєктів розвитку медичних закладів госпітального округу

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Анотація. Актуальність дослідження полягає у вирішенні науково-прикладної задачі створення інструментарію для визначення пріоритетних проєктів розвитку медичних закладів госпітального округу. Метою статті було обґрунтування системно-ціннісного підходу та розробка на його основі системи підтримки прийняття рішень для визначення пріоритетних проєктів створення та розвитку медичних закладів. У роботі було використано методи системно-ціннісного аналізу, багатофакторної оцінки медичних проєктів, комп'ютерного моделювання. Аналіз наукових праць показав, що розробка системи підтримки рішень для пріоритетних проєктів медичних закладів госпітального округу є важливим завданням, яке потребує системно-ціннісного підходу для комплексного управління. Обґрунтовано доцільність та особливості системно-ціннісного підходу, який дозволяє комплексно визначати пріоритетні проєкти для розвитку медичних закладів у госпітальному окрузі. Розроблений алгоритм управлінського процесу визначення пріоритетних проєктів створення та розвитку медичних закладів регіону базується на запропонованому системно-ціннісному підході і передбачає виконання 12 кроків. Він дозволяє проєктним менеджерам пришвидшити процес вибору пріоритетних медичних проєктів. На основі запропонованого системно-ціннісного підходу та алгоритму розроблено систему підтримки прийняття рішень. Архітектура цієї системи підтримки прийняття рішень передбачає клієнтську частину (Frontend). Вона розроблена із використанням HTML та CSS для розмітки і стилізації сторінки, а також JavaScript для динамічного додавання медичних проєктів до списку, обробки подій, а також надсилання запитів на сервер. Використано jQuery для зручнішого маніпулювання елементами DOM та Chart.js для побудови графіків і візуалізації результатів визначення пріоритетних проєктів створення та розвитку медичних закладів регіону. Використання запропонованої системи підтримки прийняття рішень для заданого проєктного середовища забезпечило визначення пріоритетних проєктів створення та розвитку медичних закладів регіону. Практична цінність дослідження полягає у впровадженні системи підтримки прийняття рішень, яка дозволяє проєктним менеджерам визначати пріоритетні проєкти створення та розвитку медичних закладів, що підвищує ефективність управлінських рішень та оптимізує використання ресурсів у сфері охорони здоров'я

Ключові слова: управління проєктами; стратегічне планування; системно-ціннісний підхід; першочергові медичні проєкти; проєктне середовище

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Overview of global challenges and survival strategies for export companies

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Abstract. Global challenges have created problems for export companies due to the growing threats of the market environment, which requires such companies to adopt a survival strategy and apply appropriate strategic methods to successfully counteract emerging global challenges. The purpose of the article was to update knowledge on how global challenges affect the sustainability of export companies and how strategies adopted by companies counteract the negative impact of global challenges. The methodological basis for obtaining the results of the study was factual analysis, logical and structural analysis, strategic analysis, analysis of cause and effect, and generalisation. The article critically analysed the existing theoretical concepts for explaining the impact of modern global challenges on export companies in order to reveal strategies for their survival in the face of uncertainty in the current market environment. Their further review revealed critical global challenges for export companies, which were classified according to the signs of their typification. Namely basic elements, sources of formation, thematic areas of influence, duration of influence, degree of implementation and nature of influence. The application of a strategic analysis of global challenges of export companies by thematic areas revealed possible causes of their emergence and consequences of their impact on the activities of export companies. In particular, it was found that export companies have the potential for negative impact of political and economic challenges, positive impact of technological and socio-cultural

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challenges, as well as neutral potential for legal and environmental challenges. It was proposed strategies for the survival of export companies under the influence of modern challenges, which should be focused on to obtain results that will ensure the sustainability of such companies in the future. The practical significance of the results lies in the fact that the main scientific provisions have been brought to the level of recommendations that can be used by managers of export companies to clarify the problems and promising areas of development of export activities

Keywords: global issues; market environment; innovations; strategic analysis; company survival strategies; exporting companies

Introduction

Export companies play a significant role in economic development around the world. Their activity has a favourable impact on the dynamics of the export balance of countries, creates additional jobs, improves living standards, promotes socio-economic development and stimulates economic growth in the global community. Despite their significant contribution to economic development, it is worth noting that the positive effect could have been much higher, as export companies are affected by numerous global challenges that may have different origins.

S.K.N. Gamage *et al.* (2020) found that the critical global challenges for companies of an economic nature are global market competition, international finance, economic crises, digital technologies, the activities of multinational companies, changes in consumer tastes and preferences, dumping in trade in goods, and trade wars. They are caused by the growing uncertainty of the market environment and intensified competition, which cause financial destabilisation and crises, negatively affecting the export opportunities of companies. A.R. Syahputra & S. Hamid (2024) emphasised the importance of global political challenges, such as international terrorism and religious wars, which often have a major impact on the economy and society, causing a decrease in the export activity of companies in the regions of the world to which they apply. This calls for a stronger cross-border response and proper coordination policies to identify such threats. S. Tong *et al.* (2022), in their study of global environmental change, noted the growing negative impact of global environmental challenges that cause ecosystem degradation and threats to life safety. This impact is exacerbated by the industrial growth of economies, requiring export companies to incur additional costs to create environmentally friendly products. There are also significant technological and social challenges that increase the imbalance between the world's economies, especially in the context of the growing need for business digitalisation, macroeconomic and microeconomic polarisation, and blocked access to income.

In the context of the growing negative impact of global challenges, strategic orientation and the ability to carry out strategic renewal are of great importance for the survival and further growth of export companies (Ahmed *et al.*, 2023), which requires a strategic vision of the prospects for their development in an uncertain market environment. As pointed out by R. Ballance & S. Sinclair (2021), a detailed study of the experience of companies in the automotive, steel, electronics, and oil refining industries suggests that the study of the business environment is the future basis for developing strategies available to such companies. Business diagnostic methods, symptomatic diagnostics of export-import activities, or strategic analysis tools can help determine their current state (Smerichevskyi *et al.*, 2021; Kryvovyazyuk *et al.,* 2021). As noted by D. Rakshit & A. Paul (2020), the results of using these methods serve as a further basis for strategy development, with differentiation strategies playing a dominant role in contributing to the efficiency of export companies and survival strategies in the export market.

The number of global challenges affecting the operations of export companies requires the development of survival strategies due to their annual growth in pressure on economic performance. This requires the use of both traditional and new strategic methods to successfully counteract emerging global challenges. However, this may not be enough. For companies entering export markets, it is crucial to identify the full range of factors that could negatively affect their international operations (Haddoud *et al.,* 2021). The authors Q. Liu *et al.* (2022) noted that in order to successfully export, when entering the international market, managers of companies without experience and resources should make targeted efforts to develop and use innovations, rely on an entrepreneurial orientation, or skilfully combine them. That is, the development of survival strategies for export companies should include the implementation of innovative processes, the introduction of innovative products into production, and the use of advanced management methods and tools.

The purpose of this study was to update the knowledge on how global challenges affect the activities of export companies in order to more clearly identify the consequences of such impact and to identify survival strategies that will ensure their sustainability in the face of increasing market uncertainty.

The scientific novelty of the work is to improve the integrated approach to explaining the impact of modern global challenges on the activities of export companies in the context of the Keynesian concept of industrial development, as well as the concepts of globalisation, digitalisation and business transformation by further

justifying the implementation of relevant strategies of export companies based on the provisions of the concepts of survival, strategic analysis and innovation.

The methodology for disclosing the results of the study included four stages. The first stage involved the selection of scientific sources for a systematic review through a general web search using key phrases related to the problem under study: *global challenges and export companies, global challenges and strategic analysis, and global challenges and survival strategies of companies.* A total of 64 documents published by Tayler and Francis, Emerald, Elsevier, MDPI, Springer were selected in accordance with the research topic. At the second stage, using an integrated approach, the theoretical concepts of explaining the impact of modern global challenges on export companies and the feasibility of applying strategies that ensure their survival were revealed. At the third stage of the study, a review of global challenges for export companies was carried out based on research materials from pre-selected publications by applying content analysis methods to selected scientific sources. By applying logical-structural and strategic analysis, the global challenges were classified by the method of generalisation and the causes and consequences of their impact on the activities of export companies were identified. At stage 4, the scientific support for the choice of survival strategies for export companies was improved. This was achieved by developing a concept of solving global problems of export companies and determining the place of development of their survival strategies in it. Taking into account the system of interrelations between the concepts of solving global problems of export companies, a set of specific strategies for their survival was determined on the principles that reflect the trends and nature of the development of the modern market environment and the behaviour of export companies in it.

Theoretical concepts for explaining the impact of modern global challenges on export companies and the feasibility of applying survival strategies

The complexity of survival for companies in the global market environment is related to the existence of three major challenges of the 21st century: sustainability challenges, technological challenges and global challenges. Global challenges relate to the ability of companies to protect their internal markets and enter new global markets (Noe *et al.*, 2017).

The current economic literature offers few explanations of how global challenges affect the performance of exporting companies. This is because such companies are relatively more powerful, resilient and competitive than those operating on national markets. Therefore, they have a more balanced management system and a stronger potential for survival and growth. The increasing number of internal and external challenges that arise on their way to the global market, the growing strength of their influence on the activities of export companies, increasingly necessitates explaining the causes and consequences of such influence in the context of related theoretical concepts (Fig. 1).

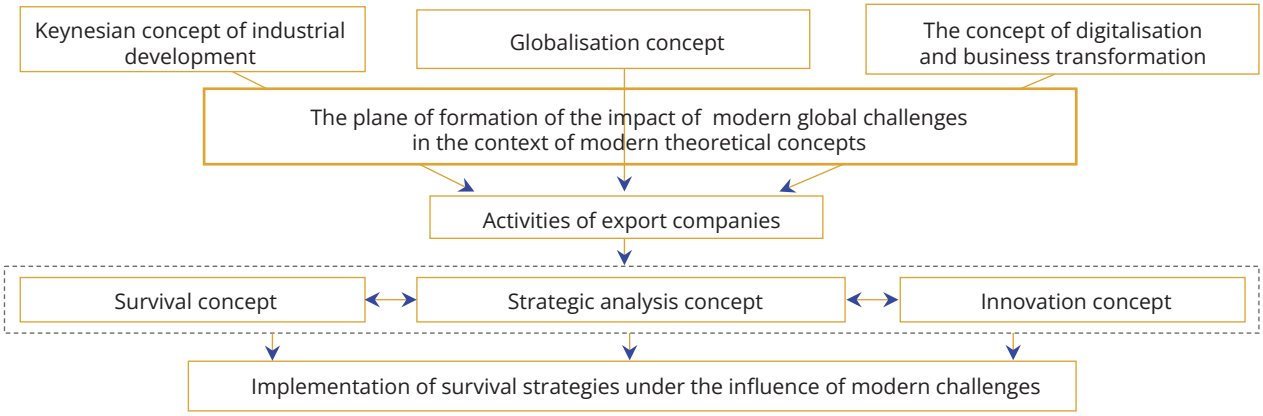

Figure 1. *Modern theoretical concepts, global challenges and survival strategies for export companies*
Source*: compiled by the author*

Governments around the world use industrial strategy to promote innovation and economic growth (Mazzucato, 2022). In scientific publications, there is a gradual return to the principles of the Keynesian concept of industrial development, given the possibilities of integrating the principles of Keynesian and structural economics with a focus on production development in relation to companies, opportunities and innovation (Chang & Andreoni, 2021), and the formation of an environment of global changes in economic development of both economies and individual companies. The emphasis on technological and production capabilities of companies is appropriate and justified, as they are important factors in the efficiency and competitiveness of firms and have a positive impact on export performance. However, in the context of complex systemic challenges,

a clear separation of production, consumption, and innovation, including opportunities for each of them, can be abandoned (Anzolin & Lebdioui, 2021). In determining the plane of influence of modern global challenges, the study of the impact of globalisation and digitalisation is becoming increasingly important.

Most often, the impact of external challenges for export companies is associated with globalisation, which affects the structural characteristics of national economies and is determined by global sustainable development goals. O.A. Aluko *et al.* (2021) and R. Wu *et al.* (2024) noted that the concept of globalisation directly or indirectly affects political systems and economic cultures, social and scientific and technological exchange, exchange of goods, and the environment. It has also shaped the modern competitive environment and the emergence of competitive challenges in the global marketplace. The ability of export companies to survive in a competitive environment and the ability to globalise business activities is a distinctive feature of multinational and transnational corporations compared to small and medium-sized companies positioned in international markets (Ren *et al.*, 2015). Researchers J. Kyove *et al.* (2021) noted that such companies are more likely to suffer from globalisation because they must quickly adapt to possible market fluctuations, reducing their innovation activity, given the relationship between globalisation factors and company performance, combined with potential consequences.

The ability of export companies to adapt to the challenges of the external environment is closely linked to the concept of digitalisation and transformation of modern business and their ability to meet the challenges of the internal environment. The introduction of advanced digital technologies into the management system, as noted by I. Kryvovyazyuk *et al.* (2023), helps to accelerate the introduction of innovations and end-to-end organisational changes, determines the future prospects of market, customer and business relationships, and points to the importance of studying the factors that ensure their success. B. Dethine *et al.* (2020) revealed the greatest impact of digital facilitators on the following export management practices of companies: relationships with value chain stakeholders (suppliers, distributors, partners), adaptation of the offer (including products, communications, business model), preparation of business intelligence, formation of a strategic vision, operational adaptation, as well as knowledge management and capitalisation. Digitalisation has the greatest global impact on e-business facilitators.

Thus, the plane of formation of the impact of global challenges in the context of modern theoretical concepts does not have a clear centre of gravity, as it depends on a set of external and internal factors. It can be argued that the scope and strength of their influence will increase from year to year, as evidenced by the negative impact of the Covid-19 pandemic on the reduction in company exports (Waldkirch, 2021; Borino *et al.*, 2024), the Russian-Ukrainian war on the global economy in general and exports in particular (Orhan, 2022). Scientists are already conducting research in this area and focusing on studying the possibilities of companies' survival in the face of global challenges.

The concept of survival is not a new one in economic theory. However, in most publications of contemporary authors, it is seen as rejecting innovation, as it is based on the need to optimise the use of resources (Paul, 2020; Ballance & Sinclair, 2021). In addition, as noted by P. Dec & P. Masiukiewicz (2021), the concept of survival can be seen as a counterweight to the concept of sustainable development of companies, as managers often prioritise survival over sustainable development. Instead, T.T. Eapen & D.J. Finkenstadt (2024) drew parallels between nature and survival strategies in different systems and consider the concept of survival as an organisational goal to ensure long-term success. In this context, achieving efficiency, sustainability and general recognition are key to the survival of companies in the face of global challenges, offering a framework for managing resources, adapting to external forces and balancing the appearance of prosperity amidst challenges.

The expediency of interpreting the survival of companies in relation to innovations is also confirmed by the scientific approach of J. Bessant (2019). The author considered the long-term survival of a company solely through innovation. He proposed to base such survival on five goals of innovation management: formation of a system of new knowledge, development of innovative capabilities, building a network of innovation ecosystems, strategic direction and advancement, and dynamic possibilities of modifying innovations. Focusing on determining the impact of innovation on the survival of companies in export markets, the authors prove the positive role of technological innovation in the survival of direct exporters and their insignificant role in the survival of indirect exporters in the presence of reasonable government support for an innovative development strategy (Dai *et al.*, 2020). Other studies have noted that organisational innovation has a direct and indirect impact on firms' export performance through the support of technological innovation. This impact may increase with the increasing radicality and intensity of technological innovation (Azar & Ciabuschi, 2017).

Strategic analysis tools are widely used to find and further solve the problems of export companies. In order to explain the impact of global challenges in the context of developing survival strategies for export companies, SWOT analysis, which interconnects internal and external environment factors (Gamage *et al.*, 2020), SPACE and LOTS methods (Pakhucha *et al*, 2021), and less often PESTEL analysis. This analysis is a more accurate method for justifying the choice of strategies in terms of clarifying the target audience and the impact of risks (Çitilci & Akbalık, 2020), forming a reliable basis for making

management decisions in the face of global challenges. The use of PESTEL analysis also allows a business to more accurately identify the environment in which it operates and provides data and information that serve as the basis for the company's ability to predict future situations. It is quite difficult to determine which strategic analysis tools to use, as in each situation it will depend on the number of factors that globally affect an export company, the strength of their impact, the company's ability to counteract such impact, etc.

Scientists are increasingly raising the issue of the need to reconsider strategy development and implementation, in particular from the perspective of the importance of developing strong dynamic capabilities to create viable strategies to generate value in potentially unfavourable and unstable conditions, as well as to shape the business environment in a more favourable way (Teece, 2020). Therefore, the results of the strategic analysis to determine the impact of global challenges, a system of innovative approaches and solutions regarding the survival behaviour of companies in the market will serve as a necessary platform for further justification of the choice of a survival strategy. Scientists F. Liñán *et al.* (2020) studied the activities of export companies and recognised the need to postulate such strategies for them to withstand competition and succeed in the global market, given the constantly emerging internal and external global challenges.

There are still significant gaps in the theoretical framework in terms of the content of global challenges, as well as in the choice of strategies that export companies should rely on in the face of growing global threats. Thus, in the broadest sense, the theories reviewed point to the importance of a deeper study of the impact of global risks and the survival strategies of export companies.

Global challenges for export companies and their classification

Modern scholars have studied various types of challenges faced by companies around the world. Among them, the most commonly mentioned are economic, often caused by market dynamics and competition (Gamage *et al.*, 2020), political (Al-Saadi, 2023), and environmental (Prăvălie, 2021). The authors I. de Soysa & K.C. Vadlamannati (2023) pointed out the societal problems, G. Azar & F. Ciabuschi (2017) on technological ones. According to R.A. Noe *et al.* (2017), it is important to distinguish between sustainability challenges, technological challenges, and global challenges from the perspective of business management. Since this study focused on global challenges for export companies, a classification of global challenges has been developed based on the following features of their typification: basic elements of influence, sources of influence, thematic areas of influence, frequency of influence, degree of influence implementation and nature of influence of global challenges.

Depending on the origin of the impact on the formation of companies' export opportunities, global challenges are proposed to be divided into resource, competence and natural. This is due to the fact that in the global economic environment, access to resources is limited due to the need to protect the environment, the importance of preserving natural resources, protecting industries, or as a response to imperfect market regulation, energy depletion, and human development (Kim & Korinek, 2011; Xu & Zhao, 2023). Therefore, managers of exporting companies should be careful not to spread the marginal resources too thinly. Researchers M.-T. Bui & H.-L. Le (2023) noted that in order to effectively overcome external challenges, in particular those related to limited access to resources, companies should develop internal skills. The need for skilled personnel for export companies is constantly growing, driven by the increasing number of export companies, their scale of operations, the need to ensure international digital competence, which should include intercultural programming skills, global virtual networks, adaptability of cross-border digital monetisation, and the reconfiguration of the international business model, which has already become global (Cahen & Borini, 2020). According to B.J. Clarke *et al.* (2021) and M. Qin *et al.* (2023), exports are restricted in the event of global natural disasters. A weak response to such challenges on the part of managers negatively affects the export capabilities of companies.

V. Akimana (2017) and J.N. Edeh *et al.* (2020), who studied the scope of influence of global challenges on the activities of export companies, agreed that, depending on the degree of dependence on the spread of the impact of global challenges on the formation of export opportunities of companies, they should be divided into internal and external. Among the main internal factors that impede exports in the global market environment, the authors noted the impact of such factors as the lack of investment funds for which there is fierce competition, lack of knowledge about foreign markets, as well as meeting the requirements for the quality and quantity of goods supplied to international markets, production development, opportunities and implementation of innovations (Chang & Andreoni, 2021), digitalisation and business transformation (Kryvovyazyuk *et al.*, 2023). External factors include competition in the global market, development of own infrastructure, the ability to globalise business activities (Ren *et al.*, 2015), and globalisation processes in general (Aluko *et al.*, 2021; Wu *et al*., 2024). Taking into account such challenges is important for determining the company's strategy.

The period of 2022-2024 has become a real global challenge for the countries of the world in the context of rising geopolitical tensions. Terrorist threats, the war in Ukraine, presidential coups on the African continent, and the deterioration of the situation in the Middle East have global implications for the global economy and significantly hinder international economic cooperation.

The current geopolitical tensions have a negative impact on the export-import operations of companies from underdeveloped countries (Pyo, 2020; Akter *et al.*, 2024) and a relatively positive impact on the export activities of companies from highly developed countries (Wang & Hannan, 2023), but may not meet expectations.

As noted by S.K.N. Gamage *et al.* (2020), the processes of globalisation and internationalisation in the world economy have led to the emergence of such a challenge as global economic competition, while promoting trade liberalisation, rapid technological change, and growing demand for high-quality and differentiated intermediate and final goods and services. However, in such an environment, small and medium-sized export companies are less resilient than large and multinational ones due to productivity problems, labour-intensive production systems, insufficient management skills to operate in international markets, and low levels of technology adaptation. Economic competition requires export companies to be extremely vigilant in developing business strategies that will ensure their survival in the face of such a global challenge. The market always generates new challenges, regardless of whether an export company is ready to overcome them or not. It is important to be able to adapt to such challenges and try to effectively mitigate their negative impact on export activities.

G. Halkos & S. Nomikos (2021) believed that corporate social responsibility related to environmental, social and economic factors plays an important role in the promotion of companies in foreign markets. Although it does not have a direct impact on export performance, as determined by A. Martos-Pedrero *et al.* (2023), it has an indirect impact due to its close relationship with management processes and innovation. And such components of dynamic managerial capabilities as social capital and managerial skills, complementing these factors, improve the performance of export companies (Mostafiz *et al.*, 2021). It is also worth noting the impact of social media on export companies' relations with foreign markets. M. Hultman *et al.* (2023) found that the mechanisms by which social media tactics affect customer performance and the benefits of a two-way social media strategy contribute to adaptation to foreign markets and international exports.

The technological development of companies around the world is gaining global significance and is influenced by the trends of digitalisation and business transformation, the spread of innovations, and the greening of developments. C. Narvaez Rojas *et al.* (2021) emphasised that the impact of Society 5.0 is so significant that it is shaping a market environment where there is movement between industries and small and medium-sized enterprises, covering 90% of all companies globally, with the aim of creating a sustainable world with improved quality of life and social well-being. To ensure high export intensity, companies should comprehensively promote the combination of foreign licensed technologies, internal and external R&D, as well as product and process innovation, as the experience of Moroccan companies proves. Open innovation practices, as emphasised by M.Y. Haddoud *et al.* (2023), allow to overcome institutional gaps and successfully develop innovations, which increases their entry into export markets. Export competitiveness is enhanced by the development of the digital economy, but as F. Wang *et al.* (2023) emphasised, only for high-tech companies, provided that the government promotes international cooperation on digital innovation, international standardisation and coordination of digital economy standards.

Globalisation processes in 2010-2024 had a significant impact on economic development, resulting in the emergence of a significant number of environmental challenges: total environmental pollution, global warming, climate change, etc. These challenges have led to the destruction of infrastructure (Clarke *et al.*, 2021), negatively affected production (Yadav *et al.*, 2021), and disrupted global supply chains (Qin *et al.*, 2023). U. Shahzad *et al.* (2020) noted that export diversification policies can be harmful to the environment, as export development can contradict sustainable development goals and environmental goals, as it is associated with increased emissions. When individual companies take care of the environment, they incur significant hidden costs in global value chains, which makes addressing environmental issues a rather difficult task. Despite the challenges, it is worth noting the progress in this direction (Ponte, 2020).

Legal challenges for export companies are largely related to legal restrictions imposed on the export of goods in accordance with the foreign economic policy chosen by a particular country to protect national interests, as well as in accordance with the requirements of international law. They acquire a global character if such products are exported to many countries of the world (e.g., the sale of Russian oil during the occupation of the territory of Ukraine). A. Catanzaro & C. Teyssier (2021) noted the positive impact on the export volumes of companies of existing state export promotion programmes, which, according to the experience of 147 internationalised French companies, stimulate them in the implementation of foreign direct investment strategies and improve the export capabilities of companies. Customs restrictions, which occur in certain legal cases under the World Trade Organisation, are also regulated by international law. On the other hand, as S.K.N. Gamage *et al.* (2020) pointed out, levelling the trading conditions for companies has a significant effect on the competitiveness of their products on the global market. In addition, global companies may face problems with the implementation of customs control rules, which may differ both within individual countries and their economic unions. The comprehensive attention of export companies to legal challenges will contribute to their sustainability in international markets.

It is worth noting, that global challenges can be both temporary and permanent. Temporary challenges include extreme weather conditions (hurricanes, floods, droughts), financial and other crises, geopolitical conflicts and wars, the spread of pandemics, product embargoes, and others. Their duration and effect depend on the nature of the spread of natural disasters, as well as on the foreign economic policy of countries, the number of countries affected by a financial or other crisis, trade dependence on supplies of certain strategically important products, etc. If companies are unable to fulfil their export obligations under the pressure of force majeure within 60 days, they are exempt from fulfilling them without being subject to any sanctions. Global challenges of a permanent nature include the greenhouse effect, environmental pollution, global competition, deepening international division of labour. It should also be noted, that some global challenges may turn from temporary to permanent. For example, the ongoing digitalisation of business is gradually becoming global and it is not certain that it will not become a mandatory requirement for the distribution of products in international markets.

Global challenges should also be divided according to the degree of their impact: realised (those that have affected the export company's performance or the degree of realisation of its capabilities); unrealised (those that could have affected the export company's performance or the degree of realisation of its capabilities, but did not due to changes in the situation) and potential (those that may affect the export company's performance or the degree of realisation of its capabilities).

It is also worth highlighting the feature of dividing global challenges by the nature of their impact on the performance of an export company or the degree of realisation of its capabilities, given its prevalence among scientific sources that study the issues of strategic management. Accordingly, it is proposed to distinguish the following types of global challenges: challenges with the potential for positive impact; challenges with the potential for neutral impact; challenges with the potential for negative impact.

The results of the study of the types of global challenges of export companies by a set of classification criteria are summarised in Table 1.

Table 1. *Classification of global challenges for export companies*

Classification feature	Criterion of differentiation	Types of global challenges
1. By basic elements of influence	Origin of the impact on export opportunities	▣ resource-based; ▣ competence-based; ▣ natural
2. By sources of influence formation	Degree of dependence on the spread of the impact of global challenges on export opportunities	▣ internal; ▣ external
3. By thematic areas of influence	Ability to influence different areas of export opportunities development	▣ political; ▣ economic; ▣ socio-cultural; ▣ technological; ▣ environmental; ▣ legal
4. By the frequency of influence	Duration of the impact on export opportunities	▣ temporary; ▣ permanent
5. By the degree of impact realisation	Practicality and prospects for implementing the impact	▣ implemented; ▣ unrealised; ▣ potential
6. By the nature of the impact	Ability of individual factors to influence the formation of export opportunities	▣ that have the potential for positive impact; ▣ with the potential for negative impact; ▣ with neutral impact potential

Source*: compiled by the authors*

An in-depth strategic analysis of global challenges by thematic areas serves as the basis for determining the causes and consequences of their impact on the activities of export companies. Table 2 differentiates the types of global challenges by thematic areas of influence and identifies the sub-factors that shape them, which are typical for export companies. For each sub-factor, the possible causes of its emergence and the consequences of its impact on the activities of export companies are described.

Table 2. *Global challenges: causes and consequences of their impact on export companies*

Global challenges	Sub-factors	Causes of occurrence	Consequences of impact
Political	Global political instability	Deterioration of relations between countries	Reduction or loss of export markets
	Terrorist threats and wars	Ethnic and religious conflicts	Increased risks of export activities
	Trade conflicts between the US and China	Struggle for global market dominance	Disruption of export supply chains
Economic	Economic and financial crises	Cyclicality of economic development in the world	Reduction of export sales volumes
	Global energy crisis	Transformation of the energy market	Increase in energy costs
	Increasing fiscal failures	Impact on the interests of national producers	Increase in duties and customs fees
	Export restrictions	Threat to the national interests of the importing country	Reduction in the number of export goods
	Growth of the shadow economy	Lack of incentives and control by states	Loss of profit
	Global competition	Intensification of the international division of labour	Loss of positions and export market share
Social and cultural	Corporate social responsibility	Changing values and priorities in the activities of companies	Indirect impact on export efficiency
	Social media	The need to improve customer service	Facilitating the adaptation of export companies to foreign markets
	Social capital	Growing need for qualified personnel	Improved performance of export companies
Technological	Open innovation practices	The need to overcome institutional gaps	Capture of new export markets
	Digitalisation of business	Formation of the information society	Increased exports of high-tech companies
	Technology and development transfer	Search for ways to increase competitiveness	Increase in export intensity
	Poor protection of commercial information	Insufficient level of cybersecurity	Loss of competitive advantages of the company
Environmental	Weather events and disasters	Anthropogenic impact	Disruption of global supply chains
	Green economy	Growing environmental responsibility	Growth of reputational gains
	Circular economy	Growth of environmental responsibility	Growth in reputational damage
	Increase in emissions	Export diversification	Increase in fines for environmental pollution
Legal	Non-compliance with international law	Poor knowledge of international regulations and laws	Fines, criminal liability
	Antitrust restrictions	Monopoly position of the company	Restrictions on market share growth
	Export promotion programmes	Favourable state policy	Growth in exports of companies
	Levelling the playing field	Favourable foreign trade policy of countries	Increased competitiveness of export products

Source*: compiled by the authors based on research of S.K.N. Gamage et al. (2020), M.Y. Haddoud et al. (2023), M. Wang & S.A. Hannan (2023)*

The application of the strategic analysis of global challenges of export companies by thematic areas demonstrates the negative nature of the impact of political and economic challenges (as evidenced by the trends in the economic development of countries, as well as frequent terrorist threats and wars, trade and political conflicts between countries), the favourable impact of technological and socio-cultural challenges (due to the needs of time, society, business), as well as the uncertain neutral impact of legal and environmental challenges (the presence of equivalent positive and negative impacts).

Thus, the proposed scientific approach to determining the signs of typification of global challenges allows to define more clearly their types in relation to the established classification features, the causes of global challenges by thematic areas, as well as the existing potential for impact on the activities of export companies.

Survival strategies for export companies in the face of global challenges

Given the total impact of numerous global challenges, it is difficult for export companies to ensure the sustainability of their operations. For this purpose, it is

important to create the necessary conditions for stabilising the business environment, in which case export companies can only influence internal factors, while external factors need to be adapted as soon as possible. Current circumstances suggest that export companies can be protected only within the framework of integration associations of countries or other types of economic unions. Companies will remain resilient if they can overcome global challenges, ensuring their chances of survival by responding to internal and external factors of influence (Ifekwem & Adedamola, 2016).

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Companies' survival strategies, as opposed to global challenges, are based on the theoretical foundations of the survival concept. However, in the context of the growing impact of global challenges, there is a need to develop a concept of solving global problems and in the context of the goal of its direction, there are results oriented towards stability. Modern authors have different approaches to the choice of survival strategies. I. Kulkov *et al.* (2024) argued that in order to achieve the global goals of export companies, it is important to take into account the study of organisational, technical and process aspects in the context of digitalisation to ensure the relevance and effectiveness of solutions.

S.K.N. Gamage *et al.* (2020) believed that when making such a choice, one should take into account the requirements for the development of export companies, and strategies should be based on infrastructure development, supply chains, market knowledge, branding, reputation enhancement, as well as management and digital capabilities of companies. The importance of taking into account the type of organisational culture of the company when choosing survival strategies is emphasised in O.P. Krupskyi & Y. Kuzmytska (2020). The authors Q. Liu *et al.* (2022) emphasised that business survival is largely ensured by innovation and entrepreneurial orientation. However, it is worth noting that the choice of strategy can lead to different financial results and survival ability.

The existing interrelationships between the components of the concept of solving global problems of export companies reveal the essence of this concept and the place of developing their survival strategies in it, as shown in Figure 2.

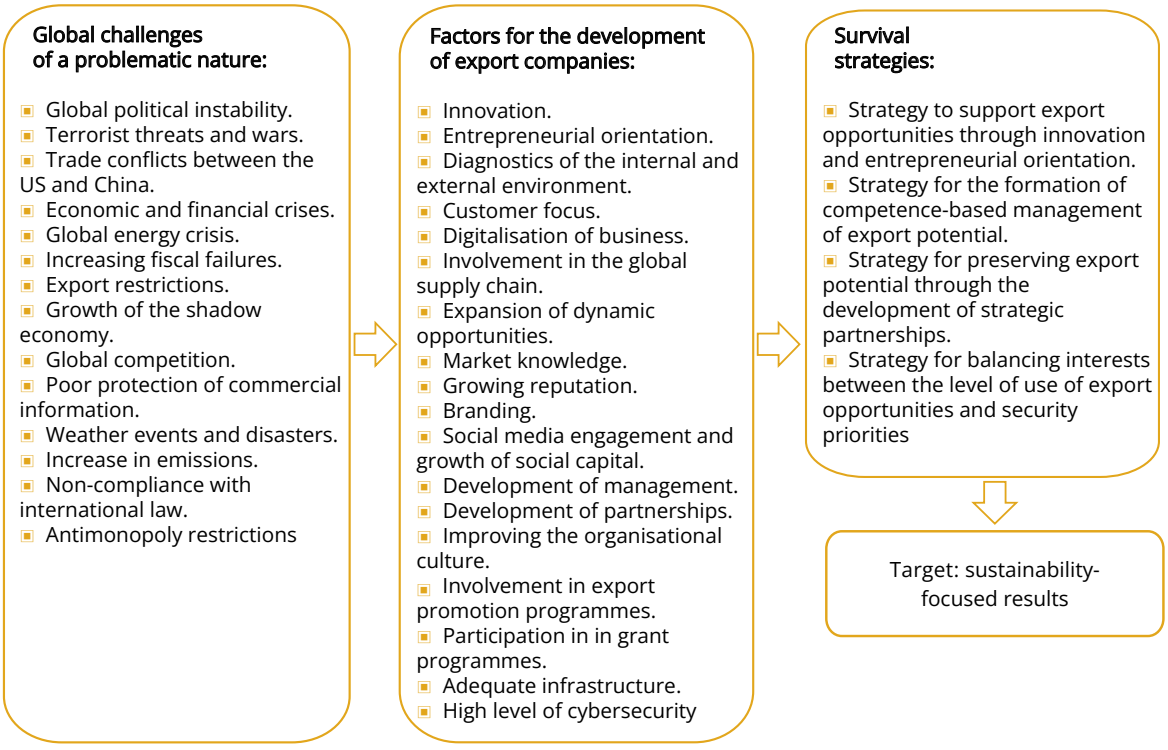

Figure 2. *The concept of solving global problems of export companies*

Source*: developed by the authors based on the research of S.K.N. Gamage et al. (2020), H.H. Nguyen et al. (2021), I. Kulkov et al. (2024)*

The recommended survival strategies are aimed at reducing the negative impact of global challenges, which is achieved by increasing the resilience of export companies in the market environment. To reduce the negative impact of global challenges, it is necessary to ensure the implementation of a strategy to support export opportunities through the introduction of innovations, including technological and organisational ones, contributing to their radicality and intensity (Azar & Ciabuschi, 2017; Dai *et al*., 2020). The feasibility of such a strategy is due to the significant innovation and entrepreneurial potential of export companies. To support the sustainability of export companies, I. Kryvovyazyuk *et al.* (2021) suggested using the results of business diagnostics of the company's internal and external market environment, and E. Pakhucha *et al.* (2021) – a strategic analysis tool, Q. Liu *et al*. (2022) proposed to ensure their effective orientation in the market environment. In the context of measures to improve entrepreneurial orientation, it is also worth noting the importance of applying a customer-centric approach and further support for digitalisation and business transformation. Integration into the system of global supply chains is also becoming a priority (Krupskyi & Kuzmytska, 2020).

Implementation of the strategy of competence-based management of export potential should ensure the reduction of the impact of global challenges, in particular global competition and market risks. Expanding the dynamic capabilities of export companies should be based on knowledge competencies in relation to changes in their business environment. Export companies should perform a SWOT analysis to face the challenges of global competition (Gamage *et al.*, 2020) or a PESTEL analysis to justify the choice of strategies in terms of clarifying the target audience and the impact of risks (Çitilci & Akbalık, 2020). The effectiveness of implementing such a strategy is enhanced by improving the reputation of the export company, active branding, and the use of social media. In order to increase the sustainability of export companies, it is important to conduct reputational monitoring of business processes, make decisions on assessing the level of business reputation, increase the effectiveness of brand policy, improve the company's reputation management.

Among the survival strategies of export companies, it is worth highlighting the strategy of preserving export potential through the development of strategic partnerships. This strategy should be applied when information exchange and building long-term relationships with business partners are crucial in international markets (Keskin *et al.*, 2021), contributing to the sustainability of export companies. Such a strategic partnership ensures the simultaneous achievement of a system of goals: increasing the level of external relevance, ensuring the integration of business sectors, improving the organisation of partnerships and organisational culture, achieving compatibility of management goals, and the possibility of achieving synergies (Kryvovyazyuk *et al.*, 2023), while its flexibility increases export efficiency through the development of marketing capabilities and the introduction of digital technologies (Zahoor & Lew, 2023). This strategy aims to reduce the adverse impact of global challenges through an integrated approach to achieving its goals.

For modern export companies, the issues of protecting commercial data from intruders have become relevant. These circumstances underscore the need to implement a strategy to balance interests between the level of use of export opportunities and the security priorities of export companies, which is designed to ensure rapid adaptation to such challenges and find ways to reduce their negative impact. This strategy takes into account all types of business activities, is based on the results of analysis and effectiveness of measures, assesses possible losses in the absence of such measures, aims to ensure long-term sustainability, provides for control at each stage of its implementation, and is focused on solving the main problem that is balancing interests between the level of use of export opportunities and security priorities of export companies.

Conclusions

Modern global economy is significantly affected by global challenges, and it is difficult to find an export company that would ignore the existing threats of the internal and external environment. Economic reviews do not analyse this topic extensively enough, although export companies make a significant contribution to the economic development of countries and economies. The paper depended the knowledge of how global challenges can change the environment of export companies and affect their sustainability, and companies can adopt strategies to counteract their negative impact.

The study applied an integrated approach that helped to determine the scope of the impact of current global challenges in the context of the Keynesian concept of industrial development, the concept of globalisation, and the concept of digitalisation and business transformation, and the feasibility of applying survival strategies by export companies based on the provisions of the concepts of survival, strategic analysis, and innovation. The study has contributed to the methodology for reviewing global challenges and survival strategies of export companies. It was proposed to implement it in three stages: systematic selection of scientific sources for the review and analysis of global challenges for export companies based on materials from pre-selected studies, scientific support for the selection of survival strategies for export companies in the face of global challenges, which is a development of the process approach. In addition, based on the results of a critical analysis of scientific sources, the article analysed the types of global challenges in terms of their impact on export companies, classifies them by basic elements, sources of formation, thematic areas of influence,

duration of influence, degree of implementation, nature of influence. It is a further development of the theory of globalisation in terms of its impact on the activities of individual companies. The study clarified the causes and consequences of the impact of global challenges by thematic areas on the activities of export companies, which mediates the link between political, economic, socio-cultural, technological, environmental and legal challenges and the existing potentials for their impact on export companies. The results enrich the literature on strategic management by exploring the peculiarities of formation and types of survival strategies of export companies in the context of the relationship between the impact of global challenges and the factors of development of export companies. This approach creates additional opportunities for identifying and substantiating the system of strategic measures necessary to ensure the sustainability of export companies to counteract the negative impact of global challenges.

For future research, it is proposed to investigate in more detail the internal global challenges of a problematic nature for export companies, as well as possible short- and medium-term actions to overcome the negative impact of such challenges. It is also worth developing a model for choosing a survival strategy for export companies.

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Conflict of Interest

None.

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Огляд глобальних викликів і стратегій виживання експортних компаній

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Анотація. Глобальні виклики створили проблеми для експортних компаній через зростання загроз ринкового середовища, що вимагає від таких компаній прийняття стратегії виживання та застосовування відповідних стратегічних методів, щоб успішно протидіяти виникаючим глобальним викликам. Метою статті було оновлення знань щодо того, як глобальні виклики впливають на стійкість експортних компаній, та як стратегії, прийняті компаніями, протидіють негативному впливу глобальних викликів. Методологічною основою отримання результатів дослідження виступали фактографічний аналіз, логіко-структурний, стратегічний аналіз, аналіз причинно-наслідкових зв'язків, узагальнення. У статті здійснено критичний аналіз наявних теоретичних концепцій пояснення впливу сучасних глобальних викликів для експортних компаній, щоб розкрити стратегії їх виживання в умовах невизначеності сучасного ринкового середовища. Подальший їх огляд виявив критичні глобальні виклики для експортних компаній, які було класифіковано за ознаками їх типізації – базовими елементами, джерелами формування, тематичними сферами впливу, тривалістю впливу, ступенем реалізації та характером впливу. Застосування стратегічного аналізу глобальних викликів експортних компаній за тематичними сферами розкривало можливі причини їх виникнення та наслідки впливу на діяльність експортних компаній. Зокрема, встановлено, що для експортних компаній мають місце наявні потенціали негативного впливу політичних та економічних викликів, позитивного впливу технологічних і соціально-культурних викликів, а також нейтральний потенціал впливу правових і екологічних викликів. Запропоновані стратегії виживання експортних компаній під впливом сучасних викликів, на які варто зосередити увагу для отримання результатів, що забезпечать стійкість таких компаній в майбутньому. Практичне значення результатів полягає в тому, що основні наукові положення доведено до рівня рекомендацій, які можуть бути використані керівниками експортних компаній для уточнення проблем і перспективних напрямків розвитку експортної діяльності

Ключові слова: глобальні проблеми; ринкове середовище; інновації; стратегічний аналіз; стратегії, що спрямовано на виживання компанії; компанії-експортери

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Modernisation of the simplified accounting system for small businesses in Ukraine: Theoretical concepts and practical needs

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Abstract. Accounting science is increasingly focused on large businesses that have the resources to innovate and implement, while small businesses need support, understanding and clear rules. It should be borne in mind that the accounting system for small businesses should be simplified and the budget for its implementation should be minimal. The aim of the study was to improve the simplified accounting system for small businesses by using mandatory standard accounting methods with a limited number of them, rather than developing separate accounting rules. The study was based on a survey of 200 small businesses and entrepreneurs, a comparative analysis of the accounting system of 60 small businesses, and the use of a systematic research method. The structure and components of the accounting system are analysed, and the components that need to be simplified for small businesses are identified. The accounting system at an enterprise is considered as an information system. Using the methodology for assessing the effectiveness of an information system, the quality of the simplified accounting system provided for by the current legislation was assessed. According to the results of the survey, it was found that in Ukraine simplified accounting is used only by entrepreneurs in their activities, but the level of satisfaction with it is low. Legal entities that practically do not use simplified accounting as defined by Ukrainian legislation are twice as satisfied with the accounting system. The study identified the stages of development of the simplified accounting system in Ukraine, highlighted the existing options for simplification and outlines the directions of development. A vision of simplification of the accounting system at small enterprises in terms of the technical component is proposed, which involves setting limits on the scope of use of existing elements of the accounting method: limiting the requirements for valuation, variability of documents. The practical significance of the results lies in the fact that the main scientific provisions can be used by: government agencies in developing a regulatory framework for improving the simplified accounting system, improving digital tools to simplify the administration of small businesses; business entities in organising the accounting process

Keywords: entrepreneur; assessment of the accounting system; basic accounting; reporting; stages of basic accounting

Introduction

Any science should serve the needs of society and respond to its demands. Accounting science, being socially significant, plays an important role in meeting information needs in different economic epochs and periods of development. The emergence of modern economic theories (sustainable development, institutionalism) leads to the emergence of new indicators, reports, and calculations to explain them, which makes the accounting system overloaded, levelling an important rule that the costs of preparing information should not exceed the benefits of obtaining it. The cost factor is one of the most important when implementing in small businesses. This

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rule is formulated in the 1989 Framework for the Preparation and Presentation of Financial Statements, the so-called "Balance between Benefit and Cost" (Framework for the Preparation..., 1989). These benefits should not be hypothetical or probable in the future, but should be an actual result that can be measured and evaluated. With this approach, the implementation of accounting science will find its application in practice and the accounting system will not be overloaded with unnecessary information. The development of accounting rules for small businesses, standardisation and digitalisation of their requirements requires theoretical and methodological justification, which makes this study relevant.

As of 2024, there is a lack of research based on the study of practice at the level of small businesses, without which methodological generalisations are impossible. I. Zhurakovska *et al.* (2022), studying the topics of accounting articles, found that less than 1% of publications are devoted to small business. V. Onyshchenko *et al.* (2023) concluded that for future developments it is important to monitor changes in the accounting system from the point of view of practitioners, whose opinion is crucial at the micro level. D.R. Fordham & C.W. Hamilton (2019) proposed to take into account the level of automation of the accounting process as one of the factors of its organisation. F. Ibrahim *et al.* (2020) studied the level of automation of accounting in small enterprises and concluded that automation affects the methodology and organisation of accounting in small enterprises. The concept of a 'simplified accounting system' is widely used in practice to describe accounting processes in small enterprises, but no methodological justification for its use has yet been found. The systematic nature of accounting is indicated by studies by D. Nirosha (2020), who analysed accounting systems in terms of the financial reporting practices used by a company to prepare its annual report, understanding the accounting system as the practices used by a company to prepare its annual financial statements. It is this practice that should form the basis of further developments for small businesses. The peculiarities of accounting in small business were emphasised by V. Novikov (2024), who proposed a simplified structure of the accounting system in small business: accounting policy, accounting form and methods of accounting. A.V. Dovbush & H.I. Davydovska (2020) linked simplified accounting to the peculiarities of taxation of a certain category of small businesses in Ukraine. Y. Trush & N. Kudrenko (2021), analysing simplified accounting, noted that it is related only to income accounting.

According to the Official website of the State Statistics Service of Ukraine (2024), the share of small businesses in the total production in Ukraine in 2012-2021 ranged from 19 to 30% (excluding individual entrepreneurs), the share of taxes paid by small businesses was over 25% and continues to grow (Tax map of Ukraine, 2024). At the same time, accounting science is increasingly focused on large businesses that have sufficient resources to innovate, while small businesses need support, clear regulation, and clear rules.

A step towards meeting the demands of small businesses was the signing of Order of the Cabinet of Ministers of Ukraine No. 821-p (2024). The first strategic goal of this document was to restore and facilitate the process of doing business, which includes the creation of a favourable regulatory environment and deregulation. This operational goal is to simplify the administration of the tax burden and related reporting, in particular in terms of reducing differences in tax administration under different taxation systems; to regulate the activities (de-shadowing) of self-employed persons in terms of simplifying and automating accounting, and to introduce a favourable tax regime. The strategy for sustainable development of small businesses envisages addressing the challenges of standardising and digitalising accounting documents and conducting annual studies of time spent on accounting and reporting. Standardisation of small business accounting requirements should be accompanied by simplification, which in turn will have a positive impact on the index of economic freedom and the average time spent on bureaucratic procedures, as defined by the strategy's implementation indicators. So far, small businesses have been subjected to accounting rules that are impractical or that were developed for large businesses, without a "golden mean".

The purpose of the study was to substantiate a new approach to the simplified accounting system for small businesses, which does not provide for separate accounting rules, but rather the use of mandatory standard accounting methods with a limit on their number and variability. An example of this approach is the mandatory preparation of not all 200 types of primary documents, the form of which is approved by regulations, but 20, which are typical for most accounting systems.

Materials and Methods

The study was based on a survey of small businesses and entrepreneurs located in Volyn (108), Lviv (18), Zhytomyr (35) and Rivne (39) oblasts of Ukraine. The survey was conducted by questioning participants directly during trainings and seminars and by sending them questionnaires via e-mail. The survey group was selected by type of activity and number of employees, taking into account the structure of entrepreneurs by type of activity in Ukraine as a whole. This grouping allowed to cover all sectors of the economy and take into account the interests of small businesses.

The questionnaire contained 10 questions to assess the quality of the accounting system in accordance with the DeLone & McLean success model. This model was chosen because its empirical verification and validation was the basis of the studies by P.B. Seddon & M.-Y. Kiew (1994) and A. Rai *et al.* (2002) on assessing the quality of an accounting system. For example, P.B. Seddon & M.-Y. Kiew (1994) surveyed 104 users of an im-

plemented university accounting system and found significant correlations between 'system quality', 'user satisfaction', and 'information quality'. Scientists A. Rai *et al.* (2002) conducted a test of the suitability of the entire D&M IS success model based on the responses of 274 users to the information system. The research of W.H. Delone & E.R. Mclean (2003) confirmed that this model does not lose its relevance and is used as the basis for many studies. The survey on which the study is based was conducted in 2023-2024. A questionnaire with 10 short-answer questions was used. The following questions were offered for evaluation: 1) main type of activity; 2) number of employees; 3) whether you use a simplified accounting system; 4) quality of information provided by the accounting system; 5) whether the accounting system is technically supported (software) (quality of the system at the technical level); 6) whether the data in the accounting system is understandable (quality of the system at the semantic level); 7) whether the quality of public services in establishing accounting requirements is satisfactory; 8) whether you want to change the accounting system; 9) how satisfied you are with the accounting system; 10) whether the accounting system provides you with quality additional business benefits (Table 1).

Table 1. *Small business survey questionnaire to assess the accounting system*

Indicator	Type of response	Number of responses received
Main type of activity	Text field	228
Number of employees employed	Number	228
Whether you use a simplified accounting system	short answer 'yes' or 'no'	228
Quality of information provided by the accounting system	rating from 0 to 5, where 0 is very bad, 5 is very good	228
Whether the accounting system is technically supported (software)	rating from 0 to 5, where 0 is very bad, 5 is very good	228
Whether the data in the accounting system is clear	rating from 0 to 5, where 0 is very bad, 5 is very good	228
Whether the quality of public services in terms of accounting requirements is satisfactory	rating from 0 to 5, where 0 is very bad, 5 is very good	228
Do you want to change the accounting system	rating from 0 to 5, where 0 is I want to change, 5 is I do not want to change	135
How satisfied are you with the accounting system	rating from 0 to 5, where 0 is very bad, 5 is very good	228
Does the accounting system provide you with any additional business benefits	rating from 0 to 5, where 0 is very bad, 5 is very good	228

Source: *developed by the author*

The results of the questionnaire were grouped and used to identify the key areas of accounting reform and to develop a model of its modernisation for small businesses. The method of analysis was used to assess the accounting system used by 60 small businesses, which were selected at random. The structure of the accounting system and its automation were studied, which allowed using these results to form a picture of the general practice of the accounting system used in small businesses.

The study used a systematic method to study the accounting system in small enterprises with a focus on eight aspects of its application. The system-element and system-structural aspects were used to identify the components of the accounting system. In addition, the method of systematisation and analogy was used in forming the structure of the accounting system based on the results of the analysis of the works of scientists. This made it possible to identify the components of the accounting system that need to be simplified for small enterprises. The system-functional and system-target aspects allowed to check the functions and tasks of the simplified accounting system. The system-resource aspect was used to identify the resources required for the functioning of the accounting system. The system-communication aspect was used to identify external relations of the accounting system with the environment. The system-historical aspect was used to substantiate the period of emergence of simplified accounting in Ukraine, which allowed to compare it with historical events and substantiate possible development prospects. The system-integration aspect of the system method was used to determine the set of qualitative properties of the system. The accounting system at an enterprise is considered as an information system. According to the research of Z.-M.V. Zadorozhnyi *et al.* (2020), it includes all the main components of the information system: information (accounting); organisational units (accounting structure and personnel performing accounting procedures); functional components (accounting procedures). The DeLone & McLean success model was used to distinguish the qualitative characteristics of the information system of accounting from the existing methods of efficiency assessment. Using the methodology for assessing the effectiveness of an information system based on the "success model", the quality of the simplified accounting system provided for by the current legislation was assessed.

The study was conducted in compliance with the ethical standards specified in The Declaration of Helsinki (2013).

Results and Discussion

Each business entity is required to keep records of its activities, which allowed for a sufficient level of sampling of the survey by type of activity. During the study, more than 220 questionnaires were distributed, and 200 were used to ensure that the structure of the respondents corresponded to the structure of enterprises by type of activity in Ukraine in 2023. However, due to the peculiarities of obtaining information during the organisation of training for small businesses, the majority of respondents were representatives of microbusinesses with up to 5 employees. This also suggests that there is an increased demand for training events for small businesses in this segment. The structure of the surveyed small business representatives is shown in Table 2.

Table 2. *Structure of surveyed Ukrainian entrepreneurs in terms of the accounting system used*

Section classification of economic activities	Name	Structure of entrepreneurs by type of activity, %		Number of respondents to the survey by number of employees, people		
		In Ukraine in 2023, according to the State Statistics Committee	Respondents to the survey	1-5	5-10	More than 10
A	Agriculture, forestry and fisheries	1.39	3.81	4		
B	Mining and quarrying	0.00		-	-	-
C	Processing industry	4.35		-		9
D	Supply of electricity, gas, steam and air conditioning	0.01				
E	Water supply; sewerage, waste management	0.13		-		
F	Construction	1.57	2.86	3		
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	40.38	35.24	37	27	44
H	Transport, warehousing, postal and courier activities	5.10	0.00		3	12
I	Temporary accommodation and catering	3.60	9.52	10		
J	Information and telecommunications	19.32	18.10	19		
K	Financial and insurance activities	0.41	0.95	1		
L	Real estate transactions	3.58	3.81	4		
M	Professional, scientific and technical activities	8.00	10.48	11		
N	Activities in the field of administrative and support services	2.23	0.95	1		
O	Public administration and defence; compulsory social insurance	1.06		-		
P	Education	1.78	2.86	3		
Q	Health care and social assistance	0.82	2.86	3		
R	Arts, sports, entertainment and recreation	6.27	5.71	6		
S	Provision of other services	1.39	2.86	3		
T	Activities of households	0.00	0.00			
U	Activities of extraterritorial organisations and bodies	4.35	0.00			
	Total			105	30	65

Source: *prepared by the author, taking into account the structure of small businesses by type of activity in 2023 according to the Official website of State Statistics Service of Ukraine (2024)*

The concept of 'system' best explains the presence of a large number of components and links between them, when analysing the organisation of accounting at enterprises. The systematic nature of accounting is indicated by the studies of I. Jindrichovska & D. Kubickova (2013) and J. Beke (2013), who considered different classifications of accounting systems. The use of a systematic approach to the study of accounting involved the application of eight aspects of the method. The system-element aspect implied the allocation of its key elements in the accounting system, input (resources), output (goal), and the links between them and the external environment. The 'classical' structure of the accounting system included three levels: methodological or basic, where the methodology and accounting rules are formed; technical is a direct recording of business facts using a special methodology; organisational level is an interaction of users in decision-making. Ukrainian scientists standardise the structure, which is also reflected in the legislation, and they have supplemented

the understanding of the structure of the accounting system, and the authors have also proposed an institutional approach. In her article, V.M. Metelytsia (2012) confirmed the scientific nature of the institutional theory of accounting. The researcher also noted that the clarification of the subject of accounting allowed to focus on the importance of professional judgement for the improvement of the accounting profession. The studies of H.H. Kireitsev (2007) and V.M. Zhuk (2015) confirmed that accounting is one of the social institutions according to the institutional theory. Accounting is influenced by both formal and informal institutions, changing the vector of research to different objects of accounting, for example, intellectual, human, social, and natural capital. However, in the practice of small business accounting, which forms its own informal rules of documentation, valuation, and delegation of accounting functions, accounting innovations are practically absent.

The research results show that such a structure reflects the constant variability of its components within each business entity and can be used as a basis for analysis (Fig. 1). The structure is supplemented by a certain circulation of requests and information, which emphasises the ability of the system to improve itself, provided that such interrelationships are in place in practice.

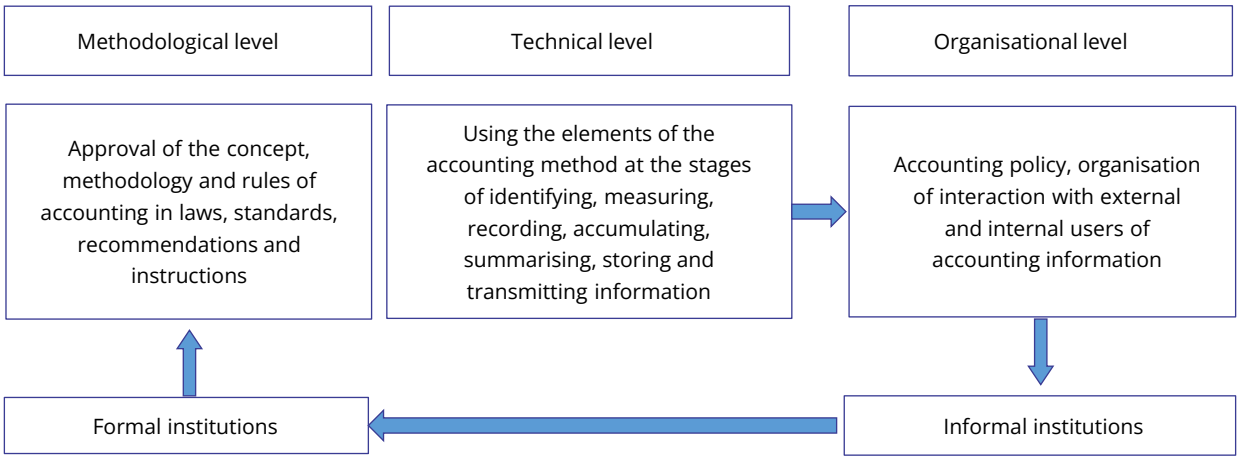

Figure 1. *Structure of the accounting system*
Source: *developed by the author based on V.M. Zhuk (2015), I.M. Burdenko & A.S. Korol (2021)*

The systemic and structural aspect involved establishing internal links between the components of the dependencies that determine the internal organisation. Figure 1 showed the information flow, which begins with the initiation of changes in the accounting system at the request of informal institutions, which are implemented in changes in legislation (formal institutions). To implement the innovations, changes are made to the technical level (accounts, documents, valuation and disclosure of reporting items), and then this information is provided to all users, not just those, whose requests for changes to the formal component were made.

The modern accounting system imposes rules for generating information at the request of more influential informal institutions, which in the 21st century represent global capital markets. Most of this information may not be relevant to users at the local level. This is one of the explanations for the predominant role of management accounting in responding to the needs of small business owners.

The system-functional and system-objective aspects of the method highlight the functions and objectives of the system. Therefore, the main goal is and remains to meet the information needs of users, i.e. to generate information necessary for making management decisions. This goal has led to the formation of a number of accounting system tasks, the number of which is only increasing. This is confirmed by the emergence of new accounting objects (intellectual capital, natural capital, social capital in all their diversities). For small businesses, the main task assigned to the accounting system is to prepare information for government agencies. Information requests of owners are often not fully satisfied, as the accounting system is set up for another user, the regulatory authorities.

The analysis of the accounting system according to the system-resource aspect most of all indicates the reasons for its constant change and variability in practice in small business. After all, virtually the only resource required for the system to function, apart from its methodological level, is the financing of business entities. The organisation and maintenance of the accounting system is one of the cost items that is a key factor in choosing the option of its organisation.

Based on the results of the direct analysis of the accounting system at the studied small enterprises, a typical accounting system for small businesses that are not participants in the global capital market and whose information is generated exclusively for regulatory authorities and owners has been modelled (Fig. 2).

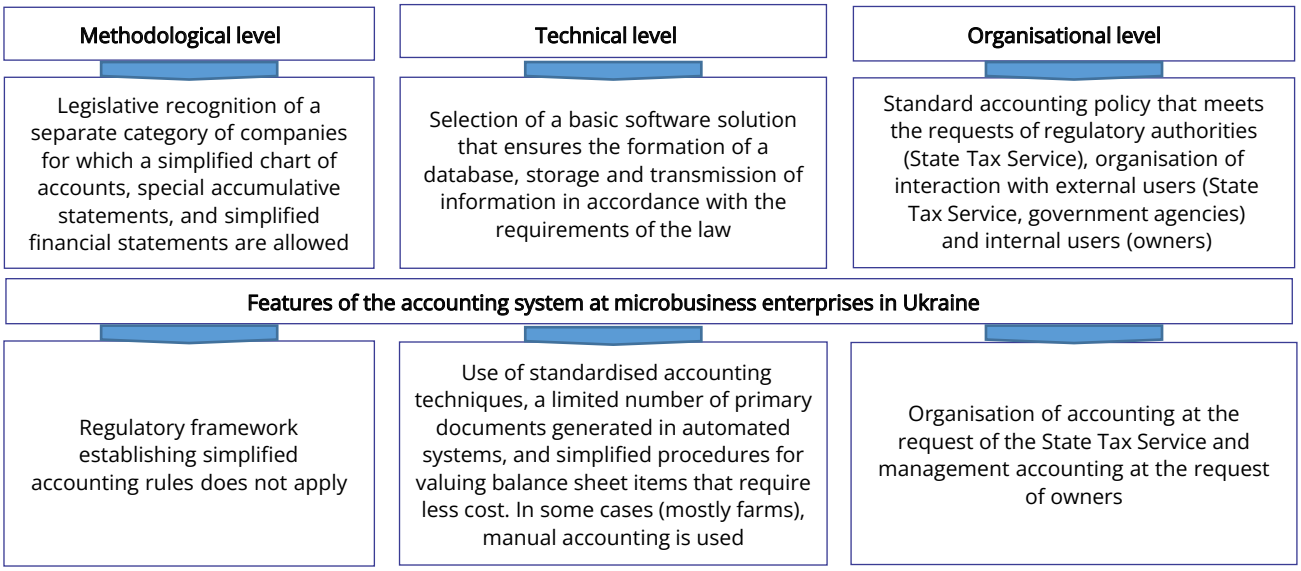

Figure 2. *Accounting system for micro business enterprises*
Source: *developed by the author*

The key factor influencing the formation of an accounting system is the budget for its organisation and information requests of users. The system-integration aspect of the accounting system analysis from the perspective of the system approach involves identifying its qualitative properties that determine its integrity. An accounting system has all the qualitative properties of a system, such as the system's usability, functionality, reliability, flexibility, and data quality. The information summarised in accounting must be clear and understandable, relevant, timely, reliable, and comparable in accordance with the Framework for the Preparation and Presentation of Financial Statements (1989) and Order of the Ministry of Finance of Ukraine No. 73 (2013). An accounting system is primarily an information system, so the DeLone & McLean success model was used to identify its quality characteristics. It provides for measuring the quality of the system by 'technical success' and 'semantic success'. The technical level of communication is the accuracy and efficiency of the communication system that produces information. The semantic level is the success of the information in conveying the intended meaning. The effectiveness level is the impact of information on the recipient. To assess the quality of the accounting system, the survey data were used (Table 3). The survey showed that simplified accounting is used only by entrepreneurs in their business activities, but the level of satisfaction with it is extremely low, as regulatory authorities request data that is not supposed to be summarised in such accounting, and the owners do not demand such accounting data. Thus, time spent on its maintenance is considered unproductive. Legal entities that practically do not use simplified accounting as defined by Ukrainian law are twice as satisfied with the accounting system, but the level of availability of specialised software is also higher.

Table 3. *Results of assessing the quality of the accounting system at small businesses*

Indicator	Answers	
	Legal entities	Sole tradership
Number of respondents	**68**	**132**
Number of employees hired	Number	
Whether you use a simplified accounting system	Yes is 4, no is 64	Yes is 129, no is 0
Quality of information provided by the accounting system, average value	2.8	1.3
Whether the accounting system is technically supported (software)	4.7	1.9
Is the data in the accounting system clear, average value	2.4	0.5
Whether the quality of public services in terms of establishing accounting requirements is satisfactory, average	1.8	0.9
Would you like to change the metering system, average	0.5	0.8
How satisfied are you with the accounting system, average	2.5	1.1
Does the accounting system provide you with any additional business benefits, average	0.1	0.5

Source: *developed by the author*

The empirical studies conducted to analyse the quality of the simplified accounting system using the DeLone & McLean success model indicators showed that the existing simplified system for small businesses is ineffective. The resources spent on its development and implementation have not yielded results. In the 21st century, there have been significant changes in society and the business environment, in the pressure on business entities and in the requirements of owners, managers, banks and other stakeholders to provide adequate information. O.J. Kolawole *et al.* (2024) argued that there is a large superiority complex between academic accountants and practitioners. Practicing accountants are believed to be more familiar with accounting practice than academic accountants. According to A.O. Unegbu (2014), this led to the fact that the two groups, which should work together to develop best accounting practices, do not have common goals and a common focus. Good accounting is an important element of building trust in companies and their business reputation. For small businesses, which are obliged to generate the same amount of information (except for reporting) as large businesses. This information is not systematised in reporting and is not needed by the owners, but is required by numerous regulations that large, medium and small businesses are obliged to comply with.

The analysis of the accounting system from the point of view of the system-communication aspect allows to identify its interconnection with formal and informal institutions and communication between them. The basis of formal institutions is regulatory and legal support. Research suggests that communication links between business and government agencies are being established. This is confirmed by the fact that the state strategy includes provisions on reorganising accounting for small businesses with a focus on standardising accounting documents. However, it should be emphasised that the interconnections of the simplified accounting system are smaller compared to large enterprises: fewer requests from owners, simpler reporting. Accordingly, studying these requests and taking them into account allows implementing the directions of simplifying the accounting system in terms of communications. For large enterprises, the simplification of communications, in particular during audits, is achieved through the introduction of a standard audit file (SAF-T UA). Accordingly, it is expected that this information should satisfy all requests from regulatory authorities. Moreover, this file should be generated automatically. For small businesses, such a system is burdensome in terms of resources, but the establishment of certain rules for information exchange is important for small businesses as well.

From the perspective of the systemic-historical aspect of the systemic method, the study shows that the simplified accounting system is closely linked to changes in legislation that provided for special simplified accounting rules for small businesses. The impetus for such changes was the recognition of the role of small business in Ukraine's economic development at the legislative level. Law of Ukraine No. 4618-VI (2012) can be considered the decisive one. The stages of development of the simplified accounting system for small businesses in Ukraine are shown in Figure 3.

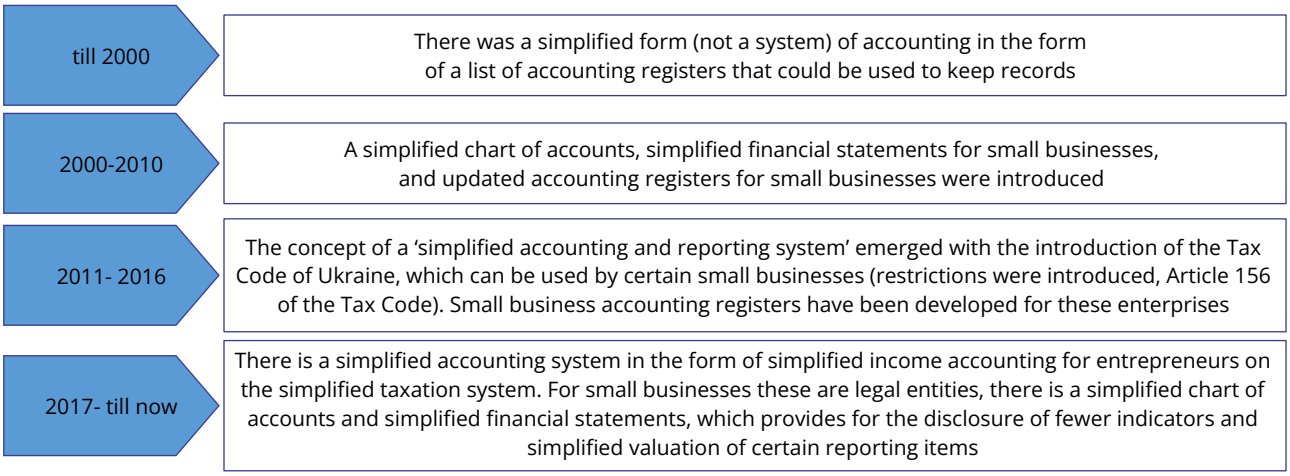

Figure 3. *Stages of development of the simplified accounting system for small businesses in Ukraine*
Source: *developed by the author*

An analysis of the stages of development of a simplified accounting system for small businesses showed that until 2010, it was believed that small businesses did not use accounting automation. No accounting automation solution was based on registers designed for small businesses, as they duplicated the usual information on accounts.

With the adoption of the Tax Code of Ukraine No. 2755-VI (2010), the concept of a simplified accounting system was introduced at the legislative level, but

its application is possible only for a certain category of small businesses with reference to preferential taxation, which ended in 2016. As of 2024, there are no simplified accounting rules for small businesses that are legal entities, except for a simplified chart of accounts and simplified financial statements. The "simplified accounting system" declared at the legislative level applies only to entrepreneurs.

The way out of this situation may be to simplify the accounting requirements for small businesses, which all enterprises with limited accounting staff will be able to meet. However, it is important to define what exactly this simplification means. There are at least three options for such 'simplification': 1) simplification in terms of application of method elements (e.g., no double entry); 2) simplification in terms of limiting the application of certain provisions or parts of regulations (e.g., NUAS 25); 3) simplification by developing a separate methodology. The most optimal way is the second option, which is partially implemented in the simplified financial statements. The simplification of the technical component of the accounting system is shown in Table 4.

Table 4. *Areas of the simplified accounting system for legal entities (at the technical level)*

Elements of an accounting method	Simplified accounting and reporting system for legal entities, as provided by the current legislation as of 2024	Proposals for a simplified accounting system for legal entities (at the technical level)
Documentation	Documentation without features	Establishment of a list of mandatory documents
Evaluation	Simplified valuation of non-current assets, receivables and liabilities in terms of collateral	Simplified valuation of non-current assets, inventories, receivables and liabilities, including discounting (except for financial institutions)
Double entry	Ability to apply double entry using special cumulative registers	Double-entry accounting without peculiarities due to the prevalence of automated accounting
Accounting accounts	Simplified chart of accounts	Standard chart of accounts due to the prevalence of automated accounting
Calculation	Calculation without features	Costing without specifics
Balance sheet and reporting	Simplified financial statements	Simplified financial statements
Inventory	Inventory without features	Simplified requirements for the formation of inventory commissions

Source: *developed by the author*

The approach to simplifying accounting by limiting the scope of transactions is a common practice and does not require the development of a separate methodology. The experience of restricting certain volumes of work for small businesses is widespread in European countries. For example, simplified accounting for car expenses (Poland) and delivery costs (Italy). Most of the simplifications involve alignment with tax legislation. As L.M. Kindratska (2017) noted, "such an accounting orientation should lead to a "cessation" of the process of putting forward unsystematic ideas for radical accounting updates. It is important to prevent a kind of crisis in the transformation of accounting due to the incompetence of transformers".

The peculiarity of the simplified accounting system is that the only users of information are owners and regulatory authorities. The end product of the accounting system is the information provided for these users. The systematic approach to the study of accounting in small enterprises has confirmed that standard accounting methods are used in practice. Therefore, the proposed approach, using limitations in the scope of work, taking into account the limited range of communication links, will allow the use of standard software solutions, the introduction of digitalisation of accounting, without the development of separate accounting rules. A high-quality accounting system under the conditions of simplification must meet all the requirements for information systems. In particular, it should meet the system's qualitative indicators (adaptability, accessibility), information quality indicators (completeness, ease of understanding, relevance) and should provide benefits from its implementation (cost savings, time savings).

Conclusions

As a result of the study, the properties and components of the accounting system were identified, which were simplified in practice due to various circumstances. Accordingly, this study has begun the process of analysing the current accounting system and the possibilities of simplifying it without losing quality indicators.

The study identified the peculiarities of the account ing system for small businesses. These features relate not to the structure but to the size of the components and the number of communication links between them. The components of the accounting system change over time and their interaction depends on the size of the business entity.

The survey conducted in the study found that the existing simplified accounting system does not satisfy the main users, who are entrepreneurs, in terms of information. The vast majority of respondents wanted changes in the accounting system, clearer rules, taking into account the minimum costs of their implementation in practice. It has been established that as of 2024, at

the legislative level, simplified accounting is provided for entrepreneurs in the form of simplified income accounting. For legal entities, the simplification applies only to the use of accounts and simplified financial statements with certain valuation restrictions. Therefore, the current legislation allows regulatory authorities to demand the same amount of information from small businesses as from large enterprises.

Also were identified four historical stages of accounting simplification for small businesses in Ukraine. The simplified form of accounting in the form of accounting registers existed from 1996 to 2010, which was replaced by a simplified accounting system for a certain category of small businesses. For legal entities, the simplified accounting system was temporary.

The study suggested simplifying one of the components of the accounting system (technical). A similar analysis for simplification will be conducted for the methodological and organisational components in the future. In terms of simplifying accounting, the European experience is important, but not advanced. In Ukraine, there is excessive over-regulation of documents, but also a higher speed of innovation through digitalisation. Ukraine is ahead of European countries in the digitalisation of services for small businesses, which can be used as one of the ways to implement the developed concept of a simplified accounting system in symbiosis with tax legislation.

In addition to the technical component, the methodological level (in terms of regulatory and legal support) and the organisational level (allocation of information requests) should also be simplified, which will allow future research to present a comprehensive model of a simplified accounting system for small businesses.

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Conflict of Interest

None.

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Модернізація спрощеної системи обліку для малого бізнесу в Україні: теоретичні концепції та практичні запити

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Анотація. Облікова наука все більше орієнтується на великий бізнес, який має ресурси для нововведень і впроваджень, тоді як малий бізнес потребує підтримки, розуміння і встановлення чітких правил. Варто враховувати, що система обліку на малих підприємствах має бути спрощеною, а бюджет витрат на її впровадження мінімальним. Метою дослідження було вдосконалення спрощеної системи обліку для малого бізнесу шляхом використання обов'язкових стандартних методик обліку з обмеженням їх кількості, а не розробки окремих правил обліку. Дослідження ґрунтувалося на матеріалах опитування 200 підприємств та підприємців, які належать до малого бізнесу, порівняльного аналізу системи обліку 60 підприємств малого бізнесу, використанні системного методу дослідження. Проаналізовано структуру та складові системи обліку, виділено складові, які потребують спрощення для малих підприємств. Систему бухгалтерського обліку на підприємстві розглянуто як інформаційну систему. Використовуючи методику оцінки ефективності інформаційної системи, проведено оцінку якості спрощеної системи обліку, яка передбачена чинним законодавством. За результатами опитування встановлено, що в Україні спрощений облік використовується тільки підприємцями у своїй діяльності, але рівень задоволеності ним низький. У юридичних осіб, які практично не використовують спрощений облік в розумінні законодавства України, задоволеність системою обліку більша в два рази. В дослідженні виділено етапи розвитку спрощеної системи обліку в Україні, виділено наявні варіанти спрощення та окреслено напрямки розвитку. Запропоновано бачення щодо спрощення системи обліку на малих підприємствах в частині технічної складової, що передбачає встановлення обмежень щодо обсягів використання наявних елементів методу бухгалтерського обліку: обмеження вимог до оцінки, варіативності документів. Практичне значення результатів полягає в тому, що основні наукові положення можуть бути використані: державними органами – під час розробки нормативної бази щодо вдосконалення спрощеної системи бухгалтерського обліку, вдосконалення цифрових інструментів для спрощення адміністрування малого бізнесу; суб'єктами господарювання – під час організації облікового процесу

Ключові слова: підприємець; оцінка системи обліку; спрощений бухгалтерський облік; звітність; етапи спрощеного обліку

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Customs taxation in Ukraine: Efficiency of administration and directions for improvement

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Abstract. Ukraine's current state of customs payments administration is undergoing transformations influenced by internal and external factors. However, customs taxation remains a significant fiscal tool that contributes to the accumulation of funds in national and local budgets. This study aimed to substantiate theoretical and practical recommendations for improving the mechanism of taxing goods crossing the national customs border. This was achieved through the analysis and evaluation of collected customs payments, the share of customs payments in budget structures, and their dynamics during the period of 2017-2022. The article examined the theoretical foundations of customs payments administration for goods crossing the national customs border. It explored the procedures, conditions, characteristics, methods, and types of border crossings, and presented a procedural framework for customs clearance of goods at the national customs border. An analysis of the share of customs payments in the State Budget of Ukraine from 2019 to 2022 revealed that the highest accumulation was observed in 2019. The structure and dynamics of import and export duties were identified, with the volume of import duties amounting to 36854.9 million UAH and export duties to 1322.3 million UAH in 2021. The contribution of value-added tax and excise fees to the State Budget of Ukraine was assessed. Between 2017 and 2022, the share of value-added

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tax in the State Budget fluctuated between 26.3% and 41.7%. The share of excise tax in Ukraine's revenues ranged from 13.85% to 15.42% during 2017-2021. However, in 2022, a record low of -5.3% was recorded for excise tax contributions to state revenue. This decline resulted from the temporary suspension of customs and tax payments on imported vehicles, implemented from April to June 2022. Typical violations of the rules for crossing goods through the national customs border were outlined, and priority areas for improving the taxation mechanism for goods crossing the customs border were identified

Keywords: customs payments; customs border crossing; tax administration; value-added tax; excise tax; customs clearance; export and import

Introduction

One of the primary financial levers influencing foreign economic activity and a key source of revenue for the State Budget of Ukraine (SBU) is customs payments made during the crossing of goods through the national customs border. However, due to constant geo-economic changes, efforts to combat smuggling, income concealment, and corruption, new taxation rules are regularly introduced. These measures aim to identify alternative methods and approaches to replenishing the budget. Consequently, Ukraine's tax and customs legislation undergoes continuous amendments. The taxation mechanism for goods at the national customs border is complex and lengthy, as it involves the procedural activities of customs and tax authorities in at least two countries.

For goods to enter the global market and circulate internationally, they must be physically transported beyond the borders of their country of origin. Such transportation can be conducted by businesses engaged in international trade, exporters, state enterprises, or individuals. The movement of goods across the national customs border constitutes export, if the crossing occurs out of the country and import, if the crossing occurs into the country. These processes of border crossing and clearance (export and import) are accompanied by customs relationships. At the core of these relationships lies an economically calculated principle – calculation and payment of customs payments.

The study of the taxation mechanism for goods at Ukraine's customs border is essential for identifying and addressing challenges and opportunities that arise during the crossing and clearance of goods. This includes the evaluation and analysis of levying of duties, value-added tax (VAT), excise taxes, and other related charges. Such a focus highlights the need to refine the taxation mechanism for goods crossing the national customs border and sets new objectives for this domain.

Worthy of note is the publication by A.V. Mazur & Y.D. Kunev (2023) on methods of nontariff regulation, when moving goods across the state customs border, where the authors classified non-tariff methods that directly affect the quantitative and value parameters of foreign economic activity. Yu.V. Onishchyk (2022) investigated the essence of the category of "customs payments" in the legislation of Ukraine and the European Union, in particular, the author proposed to include in customs all payments levied, when moving goods and vehicles across the customs border, and not just some of them. M.-M.P. Matviyishyn & O.V. Mykulyak (2022) explored customs procedures for ensuring foreign economic activity in wartime. The authors presented irrefutable arguments that the main advantage of the customs warehouse regime is the creation of conditions for preparing goods for their use on the territory of the state, thus, business entities receive a deferral of costs associated with the movement of goods. N. Reznik & A. Boshtan (2022) dedicated their research to identifying the main directions for simplifying customs control in Ukraine, which was carried out after the Russian military invasion and the introduction of martial law in the country. The authors proposed adopting the Convention "On a Common Transit Procedure" No. 994_001-87 (2022) and the Convention "On the Simplification of Formalities in Trade in Goods" No. 987_012 (2022), which would allow Ukraine to simplify the customs clearance of goods to EU countries and increase Ukraine's trade, accelerating European integration into the EU's trade networks.

The efficiency of customs payments administration has undergone changes caused by various external objective circumstances. Ukrainian researcher L.R. Prus (2020) investigated the transformation of state customs activities in the context of the anti-crisis response to the COVID-19 pandemic. The author identified key areas of reengineering customs authorities' activities, which must function continuously and under time constraints. These areas include developing organisational measures, ensuring epidemiological protection for officials, digitising customs procedures and regulations, and implementing measures to facilitate trade.

Since 24 February 2022, customs payment administration has changed, and these processes have also been reflected in scientific publications. Researcher O. Fedotov & A. Nazarko (2023) dedicated their research to studying the impact of Russia's invasion of Ukraine on the activities of the State Customs Service of Ukraine and its territorial bodies (customs offices). Their study assessed the advantages and shortcomings of the crisis measures introduced by the Customs Service to mitigate the adverse effects of the ongoing armed aggression. Authors S.G. Saydam & M.E. Civelek (2022) directed their research towards identifying the problems faced by cross-border

e-commerce companies and developing a scale for the effectiveness of cross-border e-commerce.

The issue of interpreting the essence and content of the definitions of the terms "movement/crossing of goods across the state customs border" and "customs payments", as well as the procedural issues arising from them, remains insufficiently studied due to the complexity of the processes. The study aimed to examine the procedure for administering customs payments, assess and analyse the levying of duties, VAT and excise tax, and identify trends in changes in the size of taxation of goods at the customs border of Ukraine. It also sought to develop recommendations for improving the taxation mechanism for goods crossing the customs border, thereby enhancing Ukraine's competitiveness in international trade policy.

Materials and Methods

A range of general and specialised scientific methods were employed in the study, enabling the formulation of well-founded conclusions and the identification of relevant trends in the taxation system for goods crossing the state customs border. The application of logical analysis to scientific research on the taxation of goods at the state customs border allowed for the systematisation of existing studies and a deeper analysis of their theoretical and substantive content. Additionally, through analysis, researchers were grouped, who identified key points regarding the nature and content of the process of moving/crossing goods across the state customs border; the formation, collection and accumulation of customs payments into the State Budget of Ukraine; and the study of instruments for regulating the state's foreign trade and customs policy. Methods of analysis and synthesis enabled the study of the dynamics of customs payments: VAT, excise tax, import and export duties into the State Budget of Ukraine, and their share. Grouping and generalising data, systematising it from the standpoint of assessing the state of customs payments administration in terms of the State and local budgets, made it possible to determine that the largest share in the structure of forming the revenue side of the State Budget of Ukraine is formed by VAT (from 30% to 45%), while at the local budget level, a significant share is accounted for by excise tax (from 10% to 11%). To identify ways to improve the mechanism for administering taxes on goods moving across the state customs border, a sampling survey and grouping method were used. Tabular and graphical methods made it possible to visually display the research results, compare existing mechanisms for taxing goods, when crossing the state customs border and the possibility of implementing existing experience in Ukrainian tax and customs legislation, which will contribute to increased revenue to the State Budget of Ukraine, ensure economic security of society and protect the national interests of the state.

The research drew upon a range of theoretical and analytical publications by Ukrainian and international scholars. The foundation for the analytical calculations was publicly available statistical data from government institutions in the fields of customs and tax policy. Specifically: the Official Website of the State Statistics Service of Ukraine (2024) was utilised to examine the dynamics of changes in the share of VAT and excise tax within the State Budget of Ukraine; the Official Website of the Ministry of Economy of Ukraine (2024) provided data for analysing customs payment inflows to the State Budget; the Official Website of the State Customs Service of Ukraine (2024) was used to investigate the structure of duties in the state and local budgets; the Official Website of the State Tax Service of Ukraine (2024) served as a source for studying the types of taxes administered for goods crossing the national customs border; the Official Website of the Ministry of Finance of Ukraine (2024) supported the analysis of the share of the structure of duties in tax payments. The publication of the Institute of Economic Research and Policy Consulting "Ukrainian and Foreign Experience in Building Customs Bodies" (2024) was referenced for examining tax rates in European countries. However, the evaluation was constrained by the availability of data up to 2022 due to the full-scale invasion of Ukraine by the RF, which imposed restrictions on the publication of information in open sources.

Results and Discussion

The procedure for goods to cross a state customs border is accompanied by customs control and customs clearance operations. These operations are standardised, meaning they are generally the same for most goods, except transport vehicles used to move goods. Additionally, customs control and clearance operations are identical in terms of content in different countries and do not depend on the exporting or importing country. The procedure and conditions for goods to cross a state customs border involve a specific sequence of actions that must be performed by individuals and legal entities. Such actions can be defined by the following characteristics and procedures:

- the presence of intentional actions by individuals and legal entities;
- the execution of intentional actions aimed at achieving a specific outcome;
- adherence to legislative requirements regarding the procedures and conditions for goods crossing a national customs border;
- the implementation of intentional actions regarding the procedure and conditions for goods to cross the state customs border following the established legal methods;
- conducting intentional actions by the legislatively approved procedures and conditions for goods that are permitted by law;
- the actual crossing of the state customs border by goods (Pavlovych-Seneta, 2019).

All procedures, terms and concepts related to the crossing, movement and passage of goods across the state customs border are regulated by Ukrainian legislation. The Customs Code of Ukraine No. 4495-VI (2024) (Clause 4, Part 1, Article 4) stipulates that "the importation of goods, vehicles into the customs territory of Ukraine, and the exportation of goods and vehicles beyond the customs territory of Ukraine, constitute a set of actions associated with the movement of goods and vehicles across the customs border of Ukraine in any manner and direction". The process of crossing, transporting and passing goods across the state customs border is carried out by various modes of transport. The main types of goods crossing include air, water, road, rail, pipeline, power grid, and combined methods. To cross the state customs border with goods, the presence of at least three parties is necessary: the sender, the recipient, and the carrier, who act based on agreements. There are also several ways to cross the state customs border with goods: cargo shipments, accompanying baggage, unaccompanied baggage, hand luggage, international postal consignments, and international express shipments (The Customs Code of Ukraine No. 4495-VI, 2024).

The procedures for the crossing, movement, and clearance of goods (both exports and imports) across a state customs border give rise to customs legal relations, which are based on the economic principle of calculating and paying customs payments. Accordingly, all customs clearance procedures and operations can be systematised in the following steps (Fig. 1):

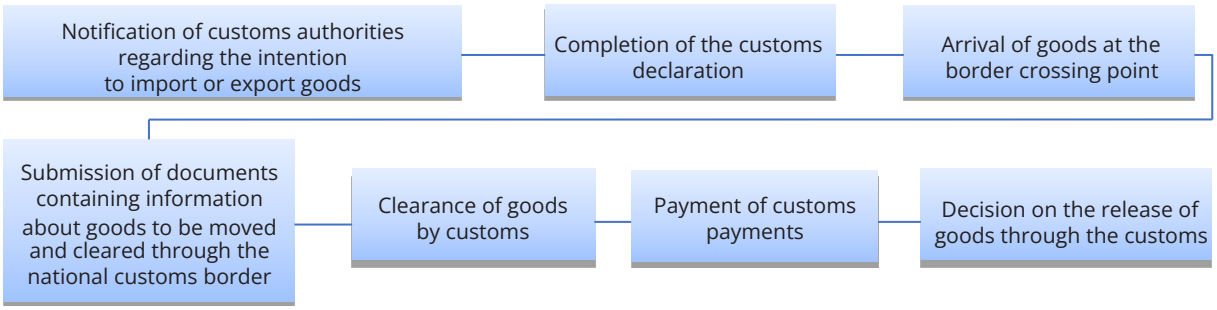

Figure 1. *Customs clearance procedure for goods crossing the national customs border*
Source*: compiled by the authors based on the Customs Code of Ukraine No. 4495-VI (2024)*

It is worth characterising the most significant stage for the Ukrainian economy, and in particular for its budget – the payment of customs payments. Customs payments are the basis of economic methods of regulating customs policy. They also play a key role in regulating the country's foreign economic activity. The entire system of payments, particularly those related to customs operations and foreign trade activities, is included in the list of indirect taxes. Indirect taxes are added to the price of goods and services as a surcharge. The amount of indirect taxes does not depend directly on the income of an individual taxpayer. In Ukraine, indirect taxes include VAT, excise tax, and duty.

The essence and scope of customs payments are most effectively revealed through an examination of their functions, which are derivative of tax functions. The fiscal, distributive, regulatory, and control functions carry a similar burden. Customs payments and fees are used to fill the State Budget of Ukraine. The revenue from customs payments to the State Budget of Ukraine is determined by the accuracy of their calculation and assessment, which is ensured by the state customs authorities. When goods cross the state customs border, the functions of customs authorities are performed by the Official website of the State Customs Service of Ukraine (2024).

When customs payments are viewed as an instrument of state customs policy, their role in implementing tax system provisions becomes evident, as reflected in the following functions:

- ensuring the accumulation of payments from customs operations;
- resolving organisational issues to improve the efficiency of customs authorities;
- establishing the powers of government bodies at various levels;
- regulating relations arising from customs payments.

When considered as an instrument of the state's foreign trade policy, customs payments support the implementation of external economic activity provisions. This is manifested in the following functions:

- determining the rights and obligations of entities engaged in foreign economic activity;
- determining the rights and obligations of customs authorities;
- organising customs clearance of goods;
- organising customs control of goods;
- determining the procedure for appealing decisions of customs authorities.

The fiscal mechanism of the state determines the planned volumes and size of revenues to the State Budget of Ukraine. The fulfilment of planned indicators is ensured through constant monitoring and control carried out by customs and tax authorities. Also, thanks to

the fiscal mechanism, customs control over payments made is carried out, acting as a tool for regulating trade and conducting the state's foreign economic policy. An analysis of the revenues and expenditures of the State Budget of Ukraine for 2019-2022 provides data on the volume of accumulated customs payments and the share of import and export duties in the structure of the revenues of the State Budget of Ukraine (Table 1).

Table 1. *Accumulation of customs payments to the State Budget of Ukraine and their share in 2019-2022, million UAH*

No.	Indicator	Year			
		2019	2020	2021	2022
1	Total state budget revenue excluding inter-budgetary transfers	989619.9	1065368.9	1284320.3	1778245.4
2	Tax revenue:	1070321.8	1136687.2	1453804.1	1343225.0
2.1.	Customs payments	319849. 4	304574.0	301233.0	300800.0
	Share of customs payments in tax revenue, %	29.9	29.8	20.7	22.4
2.2.	Import duty	29855.4	30203.2	36854.9	20200.0
	Share of import duty in tax revenue, %	2.8	2.7	12.2	1.5
2.3.	Export duty	230.6	257.3	1322.3	800.0
	Share of export duty in tax revenue, %	0.02	0.02	0.09	0.06
2.4.	Excise tax on imported excisable goods	53460.8	57846.8	79592.8	78900.0
	Share of excise tax in tax revenue, %	5.0	5.1	5.5	5.9
2.5.	VAT on imported into the territory of Ukraine excisable goods	289760.4	274113.5	380714.4	204000.0
	Share of VAT on imported excisable goods in tax revenue, %	27.1	24.1	26.2	15.2

Source: *calculated by the authors based on data from the Statistical collection: "Budget of Ukraine 2021" (2022), Official website of the State Statistics Service of Ukraine (2024)*

An analysis of the accumulation of customs payments to the State Budget of Ukraine for 2019-2022 has provided data on their significance in the structure of tax revenues to the State Budget of Ukraine. The share of customs payments in tax revenues to the State Budget of Ukraine in 2019 was set at a record level of 29.9%, and in 2021 it decreased to an abysmal record of 20.7%, in 2022 the situation improved and amounted to 22.4%. Analysing the accumulation of customs payments over 2019-2022, it is worth noting a decrease in their share in the overall budget structure by 7.5%. An assessment of the administration of customs payments in monetary terms shows that revenues decreased from 319849.4 million UAH in 2019 to 300800.0 million UAH in 2022.

Beyond the statistical data presented in Table 1, it is important to evaluate the structure of levying duties to the State Budget of Ukraine during 2019-2021 (Table 2).

Table 2. *Structure and dynamics of duties for 2019-2021, million UAH*

Indicator	2019	Change from 2018	2020	Change from 2019	2021	Change from 2020
Import duty	29855.4	+12.4	30203.2	+1.2	36854.9	+22.0
to state budget	29855.4	+12.4	30203.2	+1.2	36854.9	+22.0
to local budgets	-		-		-	
Export duty	230.6	+44.7	257.3	+11.6	1322.3	+514.5
to state budget	230.6	+44.7	257.3	+11.6	1322.3	+514.5
to local budgets	-		-		-	

Source: *calculated by the authors based on data from the Official website of the State Customs Service of Ukraine (2022), Statistical collection: "Budget of Ukraine 2021" (2022)*

It should be noted that during the period under review, there was an increase in the volume of customs payments to the State Budget of Ukraine. Between 2019 and 2021, import duty increased by 9.6%. Assessing the levying of import duty in monetary terms, it is necessary to note an increase of 6999.5 million UAH (from 29855.4 million UAH in 2019 to 36854.9 million UAH in 2021). Over the period 2019-2021, export duty increased by more than 2.5 times, in percentage terms – by 257.2%. Assessing the levying of export duty in monetary terms, it is necessary to note an increase over the period under review of 1091.7 million UAH, that is, from 230.6 million UAH in 2019 to 1322.3 million UAH in 2021. It should also be noted that all revenues from import and export duties are fully directed to the State Budget of Ukraine.

Since duties are administered in the course of international trade and foreign operations, it is necessary to examine the share of tax revenues from import and export duties for 2019-2021 (Table 3).

Table 3. *Share of the structure of duties in tax payments and its dynamics for 2019-2021*

Indicator	million UAH			% to 2019			% to 2020	
	2019	2020	2021	2019	2020	2021	2020	2021
Taxes on international trade and external operations, including:	30086.00	30460.50	38177.20	100	101.3	126.9	100	125.3
Import duty	29855.40	30203.20	36854.90	100	101.2	123.4	100	122.0
Export duty	30.6	257.3	1322.30	100	840.9	513.9	100	513.9

Source: *calculated by the authors based on data from the Official website of the Ministry of Finance of Ukraine (2022), Statistical collection: "Budget of Ukraine 2021" (2022)*

An analysis of the dynamics of import and export duties between 2019 and 2021 reveals an increase in their share in the structure of administered taxes. In 2020, the share of import duty increased by 1.2% compared to the base year of 2019 and by 23.4% in 2021. The share of export duty in 2020 increased almost 8.5 times, i.e., by 840.9% compared to 2019, and almost 5.1 times in 2021, thus shifting by 513.9%. The growth is due to Ukraine's active foreign trade policy. Among the goods that Ukrainian enterprises exported and on which duties are paid are: petroleum products, gas-oil derivatives, coal, nitrogen fertilisers, coke, and steel-rolled products.

Ukraine's active trade policy in foreign markets has contributed to filling the State Budget of Ukraine. Ukraine faces the urgent and complex task of modernising and improving the tools and mechanisms for administering not only customs payments, but also VAT and excise tax. The effective functioning of the national economy, the development of foreign economic relations and the acceleration of Ukraine's integration into the European space largely depend on the improvement of VAT and excise tax administration, the optimisation of calculations and procedures, and the achievement of a balance of interests of all stakeholders. The taxation of operations involving the crossing, movement, and clearance of goods through the state customs border is regulated by the Tax Code of Ukraine No. 2755-VI (2024). Article 1, Clause 1.2 of the Tax Code of Ukraine No. 2755-VI (2024) establishes the procedure and mechanism for administering taxes on goods or services, and Article 180 of the Tax Code of Ukraine No. 2755-VI (2024) defines taxpayers and other persons who pay customs payments, when carrying out export and import operations.

The primary indirect tax contributing to the state budget is VAT. For example, in 2015, according to K. Bezverkhyi (2015), VAT accounted for approximately 50% of the State Budget of Ukraine. The data in Table 4 confirms a rather significant share of VAT in filling the State Budget of Ukraine, although not 50%. In particular, during 2017-2022, the share of VAT in the State Budget of Ukraine fluctuated between 26.3% and 41.7%. The amounts and volumes of VAT payments from foreign economic activity are quite significant; they provide financial support for the national interests of the state (Table 4).

Table 4. *Share of VAT in the State Budget of Ukraine in 2017-2022*

No.	Indicator	Share, %					
		2017	2018	2019	2020	2021	2022
1	Revenue to the State Budget, million UAH	787474.1	920808.7	989619.9	1065368.9	1284320.3	1778245.4
2	VAT, million UAH	313980.6	374508.2	378690.2	400600.1	536489.1	467000.9
3	Share of VAT, %	39.87	40.67	38.26	37.6	41.7	26.3

Source: *calculated by the authors based on data from the Official website of the Ministry of Finance of Ukraine (2022), Statistical collection: "Budget of Ukraine 2021" (2022)*

One source of revenue for the State Budget of Ukraine is the customs payments in the form of excise tax on excisable goods. This tax is levied on goods subject to excise taxation that are imported into the territory of Ukraine. In general, the excise tax is an indirect tax on the consumption of certain types of goods, defined as excisable goods by the Tax Code of Ukraine No. 2755-VI (2024), and is added to the price of the goods. Goods imported into Ukraine are subject to excise tax in accordance with the rules established by Articles 212-230 of the Tax Code of Ukraine No. 2755-VI (2024). Excise tax is paid to the State Budget of Ukraine in connection with the crossing of goods across the state customs border. According to Ukrainian law, excise tax rates are uniform throughout Ukraine, and administration is carried out by customs authorities. Under Ukrainian law, excise taxation occurs, when the following operations are carried out:

- import of excisable goods;
- sale of confiscated excisable goods;
- sale of ownerless excisable goods;
- sale of excisable goods for which the owner has not claimed possession by the end of the storage period;
- sale of excisable goods that pass into state ownership by inheritance;

▣ sale of excisable goods that come into state ownership on other grounds;

▣ sale or transfer of excisable goods that have been imported with tax exemption, as regulated by Clause 213.3 of Article 213 of Section VI of the Tax Code of Ukraine No. 2755-VI (2024).

Goods subject to excise tax include: ethyl alcohol; alcohol distillates; alcoholic beverages; beer; tobacco and tobacco-containing products; industrial substitutes for tobacco; petroleum products; liquefied gas; passenger cars and car bodies; trailers for motor vehicles; semi-trailers for motor vehicles; motorcycles (Tax Code of Ukraine, 2024). An analysis of excise tax administration reveals the distribution of excise tax revenues between different levels of budgets in 2017-2022. It is worth noting that the funds received from excise taxes were directed both to the State Budget of Ukraine and to local budgets (Table 5).

Table 5. *Distribution of revenues and excise tax by budget levels in 2017-2022*

No.	Indicator	Total, million UAH					
		2017	2018	2019	2020	2021	2022
1	Revenues	1016969.5	1184290.8	1289849.2	1376673.8	1662333.6	2196634.6
1.1.	to the state budget	787474.1	920808.7	989619.9	1065368.9	1284320.3	1778245.4
1.2.	to local budgets	229495.4	263482.1	300229.3	311304.8	378013.3	418389.2
2	Excise tax	121449.4	132649.8	137076.4	153850.3	180300.4	115434.4
2.1.	to the state budget	108293.5	118852.4	123357.9	138296.1	162451.2	102352.9
2.2.	to local budgets	13156.0	13797.4	13718.5	15554.2	17849.1	13081.5
3.	Share of excise tax in Ukraine's revenues, %	15.42	14.4	13.85	14.4	14.0	5.3

Source: *calculated by the authors based on data from the Official website of the Ministry of Finance of Ukraine (2022), Statistical collection: "Budget of Ukraine 2021" (2022)*

An analysis of the data in Table 5 reveals a relatively high share of excise tax in the revenue side of the State Budget of Ukraine. Excise tax contributed more than 10% of the total revenue to the State Budget of Ukraine. However, between 2017 and 2022, the share of excise tax decreased significantly from 15.42% in 2017 to 5.3% in 2022. Assessing the administration of excise tax over the period 2017-2022, it is worth noting that its share in the overall structure of budget revenues decreased to 5.3% in 2022. The highest indicator of excise tax administration was recorded in 2017 at 15.42%. The sharp decline is explained by the abolition of customs and tax payments on the import of vehicles, which was introduced during April-June 2022 (Law of Ukraine No. 2142, 2022). The introduction of preferential customs clearance led to an increase in the volume of vehicle imports by citizens to Ukraine. During April-June 2022, Ukrainian citizens imported 236800 vehicles, which represents a 44% increase in imports. In monetary terms, over the three experimental months of 2022, imported vehicles amounted to 1.117 billion USD, which could have brought 26.1 billion UAH to the State Budget of Ukraine, according to estimates (Customs clearance of cars during martial law: How many cars..., 2022). However, as soon as the preferential period ended, the volume of vehicle imports into Ukraine decreased tenfold. In July 2022, the number of vehicles imported into Ukraine amounted to only 13.6 units, which generated 1.7 billion UAH in budget revenue. In August-September, the number of vehicles imported into Ukraine amounted to 36.3 and 31.8 units, respectively, which generated 3.6 billion UAH in revenue for the State Budget of Ukraine each month.

The dynamics of changes in the share of VAT and excise tax in the State Budget of Ukraine for 2017-2022 are presented in Figure 2. An evaluation of the current state of excise tax administration necessitates an analysis of its distribution between state and local budgets during 2017-2022 (Table 6).

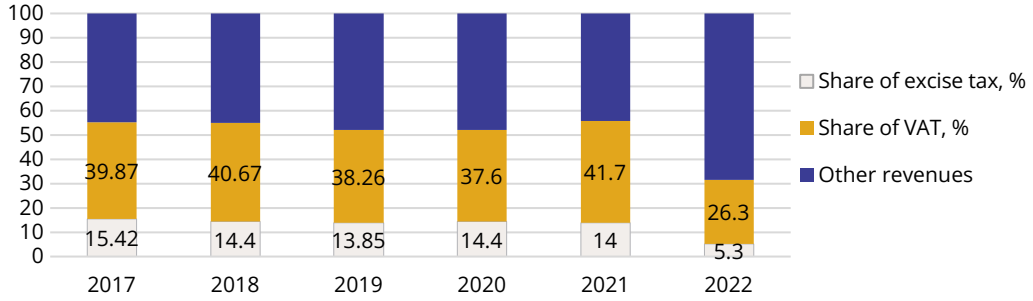

Figure 2. *Changes in the share of VAT and excise tax in the State Budget of Ukraine during 2017-2022*
Source: *compiled based on the Official website of the State Statistics Service of Ukraine (2024)*

Table 6. *Dynamics of the share of excise tax administered to the state and local budgets during 2017-2022, %*

No.	Year	Administration of excise tax	
		to State Budget of Ukraine, %	to local budgets, %
1	2017	89.2	10.8
2	2018	89.6	10.4
3	2019	96.0	10.0
4	2020	89.9	10.1
5	2021	90.1	9.9
6	2022	88.7	11.3

Source: *compiled based on the Official website of the State Statistics Service of Ukraine (2024)*

Table 6 shows that the administration of excise tax to the state and local budgets changed insignificantly during 2017-2022. Approximately 90% of payments are directed to the State Budget of Ukraine, while on average 10% go to local budgets. Characterising the structure of excise tax, it should be noted that the largest share is occupied by excise tax on goods manufactured in Ukraine. This type of tax leads to the structure of customs payments, as it accounts for 50% or more of deductions. In second place is the excise tax on goods imported into Ukraine. The share of this tax in the structure of excise payments is 40% or more. Completing the list of leaders is the excise tax on the retail sale of excisable goods. Its share in the structure of excise deductions is 4.5%.

However, due to the significant demand for excisable goods on the internal market, cases of deliberate violations of customs regulations, when goods cross the state border are quite common. Typical examples of violations include non-compliance with customs legislation in several ways:

- transporting goods outside customs checkpoints;
- concealing excisable goods from customs authorities;
- manufacturing counterfeit stamps for excisable goods (tobacco products and alcoholic beverages);
- carrying out "pseudo-export" operations with excisable goods (tobacco products and alcoholic beverages). This method is often employed to facilitate the "shadow" sale of goods manufactured in Ukraine, but marketed as excisable.

Customs authorities not only perform the functions of processing, calculating and collecting customs payments, but also carry out control over the crossing of goods across the state customs border and ensure the completeness and timeliness of the administration of customs payments on these goods. Ukraine's active position and recognition in the world require the protection of the rights and interests of producers, and the mechanisms for the movement of goods across borders between countries must also be regulated.

Ensuring the protection of Ukraine's economic interests is one of the main tasks implemented by the state fiscal service, therefore, when improving the mechanism for taxing goods, when crossing the state border, the following issues are checked:

- correctness of calculating customs payments;
- timeliness of customs payments administration;
- completeness of customs payments;
- legality of measures taken to enforce the administration and collection of payments on goods crossing the state border.

Among the list of key issues, a priority should be given to improving the procedures and mechanisms for taxing goods, when they cross the state customs border, as the Ukrainian system of customs payments administration differs from the European one. European legislation practices two opposing mechanisms for levying customs payments. These payments in foreign trade operations are based on two approaches: the destination principle and the origin principle. The destination principle means that goods crossing the border are taxed, where they will be consumed. That is, the customs payment rate in EU countries does not exceed the internal customs payment rate, when goods are sold. The origin principle means that goods are taxed at the place of their manufacture. Indeed, if a country exporting a good is its monopolist, then using the mechanism of calculating VAT based on the origin principle makes it possible to accumulate additional deductions to the budget from payments by consumers of the country that imported the goods (Law of Ukraine No. 2142, 2022).

Ukraine's integration into the European Union requires an urgent solution to the existing "gaps" in the mechanism for taxing goods, when they cross the state customs border. Key areas in this context are: the abolition of the possibility of deferring VAT, changing the amount of VAT charged, VAT refunds, the legitimacy of VAT administration for goods under temporary import regimes, and the procedure for calculating VAT rates. Table 7 proposes directions for improving the mechanism for taxing goods, when crossing the state customs border.

Table 7. *Directions for improving the mechanism of taxation of goods crossing the state customs border*

	Directions for improving				
	Cancellation of the possibility of deferring VAT	Change in the amount of VAT charged	VAT refund	Legitimacy of VAT administration for goods under temporary import regimes	Procedure for calculating VAT rates
Risks	Corruption risks – granting individual importers the right to defer the payment of VAT	Fraud – importing subsequent batches of similar goods under the guise of deferred VAT	Fraud – manipulation of the total tax amount payable to the state budget	Violation of international law, as such goods, do not create additional value; do not change ownership; the goods will be returned to the country of origin; VAT amounts on such goods are prohibited from being included in the tax credit	Deficit – a single tax rate for "luxury" goods and socially important and necessary goods leads to an increase in the cost of the latter
Solutions	The impossibility of accumulating unpaid VAT bills for transactions involving the crossing of goods across the state customs border	Regulation and strict control over the quantity, batches, and volumes of taxable goods	Adoption of a unified differentiated formula for calculating the amount of VAT refund	Refusal to charge and pay VAT if goods crossing the state border are under a temporary import regime	Introduction of differentiated VAT rates depending on the goods crossing Ukraine's customs border

Source: *compiled based on H.Yu. Razumey (2019), Customs regimes and their features (2021), Law of Ukraine No. 2142 (2022)*

Addressing some of these issues will help to avoid the shortcomings that exist in the taxation of goods, when they cross the state customs border. It should be noted that some of the proposed directions are actively used by European countries. For example, Belgium, Lithuania, Greece, Sweden, Slovakia, and other countries use, to varying degrees, a tool such as granting licenses for VAT deferral, which is a positive practice. In European Union countries, differentiated VAT rates apply depending on the goods crossing the state customs border. For example, the lowest VAT rate in Luxembourg is 15%, and a rate of 5% is applied to goods and services that have a social or cultural purpose. In Denmark and Sweden, the VAT rate is 25%, while a VAT rate of 5% is applied to food products, pharmaceuticals, hotel services ("Ukrainian and foreign experience..., 2024). The proposed directions for improving the mechanism for taxing goods, when crossing the state customs border will contribute to increasing revenues from customs payments to the State Budget of Ukraine, ensure the economic security of society and protect the national interests of the state.

A significant number of Ukrainian and foreign researchers have studied the content and essence of the taxation of goods at the state customs border. They can be conditionally divided into two groups: the first group includes researchers, who in their studies focused on studying the nature and content of the process of moving/crossing goods across the state customs border. O.S. Ivanchenko (2007) emphasised that the movement of goods across the customs border is the carrying out of actions to import or export goods to/from the customs territory of Ukraine by any means, including transit. Researcher S.Yu. Dyomina (2010) emphasised that the movement of goods across the customs border is the customs procedure to which goods and vehicles moving across the customs border of Ukraine are subject. V.V. Chentsov (2013) argued that the movement of goods across the customs border is a set of actions related to the import into the customs territory of Ukraine, export from this territory, or transit through the territory of Ukraine of goods, vehicles, and other items in any way, by any means and modes of transport. The second group of researchers focused on customs payments, which are one of the tools for regulating the foreign trade and customs policy of the state. Scientist N.P. Kucheryavenko (2014) defined customs payments as a type of fees, deductions, and payments in the case of crossing the customs border of Ukraine. A.I. Krysovaty & V.P. Martynyuk (2009) defined customs payments as a fee for the performance of customs responsibilities and services, which is used to develop the customs authorities system. S.V. Volosovych & T.D. Lipikhina (2009) characterised them as a system of taxes and fees levied on goods and other items crossing the customs border. Characterising the developments in this area, the research of O.P. Hrebelnyk (2003) should be highlighted, in which it was proved that, firstly, the object of taxation is not only goods, but also other items that are not goods. Secondly, some customs payments are not related to the crossing of goods across the state customs border, but are paid for the provision of certain services by customs authorities in the field of customs tariff relations.

Researcher A. Barbosa (2023) dedicated a significant portion of their publications to studying the issue of dematerialising cross-border goods transactions, particularly between economic operators in EU member states and third countries. The author emphasised the importance of transparency in the taxation of international

trade given the proportionally increasing complexities of the conditions under which cross-border trade in goods takes place. A. Fruscione (2022) examined the practice of the Court of Justice of the European Union regarding the relationship between the customs value and the cost of delivering goods. The author explored the determination of the customs value of imported goods and the costs actually incurred by the producer for their transportation to the place, where they were imported into the customs territory of the European Union and, relying on the decisions of the CJEU, argued that such costs are not added to the value of the goods deal, when, according to the agreed terms of delivery, the obligation to cover these costs lies with the producer, even if these costs exceed the price actually paid by the importer, provided that this price corresponds to the actual value of the goods.

The research of P. Saint-Amans (2024) deserves attention, as the author explored the EU's potential to create its own resources based on a common tax policy. According to the researcher, the EU suffers from a "tax leakage", where profits are shifted from EU countries with high tax rates to EU countries with low tax rates, and from there to jurisdictions outside the EU or with low taxes, often without the application of withholding taxes. To address this situation, the author proposes the introduction of a quasi-tax reflecting the rule of low-profit taxation, agreed upon within the framework of an international agreement on a corporate minimum tax.

Common to the first group of researchers, in the definitions given, were the emphasis on the complex process of movement, which included the import, export, and transit of goods across the state customs border, and includes regulation by customs procedures regardless of the mode of transport. For the second group of researchers, common aspects were the emphasis on payments as fees associated with crossing the state customs border, as well as the multifunctional role of customs payments in regulating customs processes and financing customs authorities. However, such several different interpretations of the same issue require a more detailed consideration.

Conclusions

Taxation of goods, when crossing the state customs border is a key mechanism that helps not only to ensure revenues for the State Budget of Ukraine, but also to support national interests, regulate competition, and protect the internal market. As a result of the research, a list of legal relations arising when crossing, movement, and clearance goods across the state customs border has been identified and structured.

An analysis of customs payments to the State Budget of Ukraine in 2019-2022 has established that their share in the overall budget structure has decreased by 7.5%. Assessing the levying of duties, it is necessary to emphasise the increase in import duties by 9.6% and the increase in export duties by 257.2%. Tracking the dynamics of import and export duties for 2019-2021, it is worth noting the increase in their share in the structure of taxes: import duties in 2021 grew by 23.4%, while export duties grew by 513.9%. It is proven that positive shifts are due to Ukraine's active foreign trade policy. As for the share of VAT in the State Budget of Ukraine, a downward trend was established in 2019-2022. In particular, over the past 5 years, the share of VAT in the State Budget of Ukraine has increased by 15.4%. Namely, 39.87% in 2017, 40.67% in 2018, 38.26% in 2019, 37.6% in 2020, 41.7% in 2021, and 26.3% in 2022. A decrease in the share of excise tax in the revenue part of the State Budget of Ukraine has also been observed over the period 2017-2022. In particular, over the period 2017-2022, the share of excise tax was 15.42% in 2017, 14.4% in 2018, 13.85% in 2019, 14.4% in 2020, 14% in 2021 and 5.3% in 2022.

It is crucial to understand the fundamentals of the current taxation mechanism at the Ukrainian customs border, its key elements, and its specific functioning. Adherence to the procedures and conditions for crossing goods across the state customs border allows for the control of revenues to the State Budget of Ukraine, as well as the order of actions that must be carried out by customs and tax authorities. The mechanism for taxing goods, when crossing the state customs border is a complex system that includes various types of taxes and methods of calculating them. The correct, uninterrupted, and well-established functioning of this system contributes to economic growth, a balanced state budget, the protection of the national market, and the stimulation of the development of Ukrainian production.

Further research into the mechanism for taxing goods, when crossing the state customs border should focus on unifying national legislation in the field of customs policy, procedures for crossing, moving, and passing goods, and the rates of customs payments with the European customs and tax systems. This will contribute to simplifying the trade process, increasing the competitiveness of Ukrainian goods on the European market, reducing costs for businesses, and increasing the country's investment attractiveness.

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Conflict of Interest

None.

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Митне оподаткування в Україні: ефективність адміністрування та напрямки удосконалення

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Анотація. Сучасний стан адміністрування митних платежів трансформується під впливом внутрішніх і зовнішніх екстерналій, проте митне оподаткування залишається важливим фіскальним інструментом, який сприяє акумулюванню коштів до державного та місцевих бюджетів. Метою статті було обґрунтування теоретико-практичних рекомендацій щодо удосконалення механізму оподаткування товарів при перетині державного митного кордону на основі аналізу та оцінювання здійснених митих платежів, питомої ваги митних платежів у структурі бюджетів та їх динаміки протягом 2017-2022 років. У статті досліджено теоретичні основи адміністрування митних платежів при перетині товарами державного митного кордону. Розглянуто порядок, умови, ознаки, способи та різновиди перетину товарів через державний митний кордон, побудовано схему процедур митного оформлення товарів при перетині ними державного митного кордону. На підставі аналізу питомої ваги митних платежів у Державному бюджеті України протягом 2019-2022 років встановлено, що найбільше значення акумулювання спостерігалось у 2019 році. Визначено структуру та динаміку ввізного та вивізного мита, зокрема у 2021 році обсяг ввізного мита становив 36854,9 млн.грн., а вивізного мита – 1322,3 млн.грн. Оцінено питому вагу податку на додану вартість та акцизного збору у наповненні Державного бюджету України. Визначено, що протягом 2017-2022 років питома вага податку на додану вартість у Державному бюджеті України коливалась від 26,3 % до 41,7 %. Питома вага акцизного податку у доходах України у 2017-2021 роках становила від 13,85 % до 15,42 %. У 2022 році зафіксовано «антирекорд» -5,3 % відрахувань акцизного податку у доходах держави, що спричинено відміною митних та податкових платежів на імпорт транспортних засобів, що був запроваджений протягом квітня-червня 2022 року. Представлено типові порушення правил перетину товарів через державний митний кордон та визначено першочергові питання щодо удосконалення механізму оподаткування товарів при перетині державного митного кордону

Ключові слова: митні платежі; перетин митного кордону; адміністрування податків; податок на додану вартість; акцизний податок; митне оформлення; експорт та імпорт

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Identification of the enterprise diversification stages

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Abstract. The purpose of this study was to identify strategic approaches to enterprise diversification in the context of global economic instability, including an assessment of the effectiveness of multiple types of diversification in enhancing the resilience of business models. For this, qualitative data collection methods were employed, including a case study of public reports of large Ukrainian enterprises such as "MHP", "Interpipe", and "SoftServe". The key findings of the study included the identification of the most effective diversification strategies, including vertical, horizontal, and conglomerate, which reduce risks and increase the competitiveness of companies. Furthermore, the study found that innovation and technological development are key factors in the success of these strategies. The study findings confirmed the significance of a combined approach to diversification depending on the industry and market conditions. It was found that enterprises that actively implement innovations have a better chance of successfully adapting to a changing market environment. It was discovered that vertical diversification allows companies to retain greater control over production processes, while horizontal diversification helps to expand sales markets. Conglomerate diversification is an effective strategy for companies seeking to reduce risks by entering new and unrelated markets. Furthermore, the study demonstrated that businesses that combine these strategies are better equipped to adapt to global economic changes and recover faster from crises. The findings of this study emphasised the need to adapt diversification strategies to the specific conditions of the enterprise and the market, which allows mitigating risks and creating sustainable business models

Keywords: strategies; technological development; business models; economic instability; integration

Introduction

In the modern conditions of fierce competition, unstable economic environment, and global transformations, businesses are forced to look for innovative approaches to ensure their sustainability and growth. Increasing market share, reducing risks, and creating more opportunities for development can be achieved through diversification. This process is vital for companies operating in unstable locations or in the face of rapid changes in internal and international markets. However, the successful implementation of diversification strategies requires a profound understanding of the various stages of this process, from the initial analysis to the implementation of new business models. The lack of systematic methods for determining the key stages of diversification creates a risk of failure in the development and implementation of such strategies, which emphasises the need for a detailed investigation of this issue. This study is also relevant in the context of finding effective management strategies that would address modern challenges: rapid technological development, changes in consumer behaviour, and tightening environmental requirements. Analysing the stages of diversification enables companies not only to adapt to these changes, but also to create added value, providing competitive advantages at all stages of their development.

Diversification is a valuable tool for increasing the resilience and adaptability of enterprises to current economic challenges. Retailers face the need to adapt to

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market changes by diversifying their activities, particularly by creating online stores, which contributes to their long-term sustainability. O.I. Shaleva & I.S. Sereda (2023) investigated the specific features of the transformation of business processes of retail enterprises, the algorithm of diversification through the creation of an online store, the advantages of online sales over offline trade, and the factors of effectiveness of this approach. However, the risks associated with the complexity of managing new areas and resource provision continue to be a pressing issue that requires further research.

Diversification of agricultural enterprises is a key factor in the economic development of the sector. M.V. Vovk & R.I. Stybel (2024) considered the areas of diversification aimed at increasing productivity and expanding revenues through the optimised allocation of resources. The investigate the subject, the researchers employed SWOT analysis. At the same time, the effect of diversification on non-economic aspects, such as environmental sustainability and social impact, is still understudied.

Another challenge in the industry is the need for retailers to adapt to the crisis. O. Hlushko (2024) analysed the effectiveness of online sales, courier delivery, duplication of export routes, and expansion of the range of private label goods, which contributed to business stability. However, the impact of corruption and shortcomings in the judicial and tax systems on these processes is still poorly understood.

Another problem in the field is the lack of attention to the impact of governance systems on diversification processes. K. Östlund & N. Akelmu (2023) examined, how management systems affect the stages of initiation, search, and implementation of diversification strategy in companies. The researchers found that "Boundary Controls" substantially affect all three stages, while other control systems showed mixed results. At the same time, the influence of these systems on various types of diversification strategies and in companies of varying sizes continues to be a relevant area of research.

In the field under study, there is a need for a detailed analysis of the impact of diversification on enterprise performance. H. Le (2019) investigated the relationship between diversification strategies, core competences of enterprises, and their performance. The researcher found that the success of diversification largely depends on the core competencies of the enterprise, which regulate the implementation of strategies. The influence of external factors and the mechanisms of interaction between diversification, competences, and efficiency stay open for further analysis.

There is also a need to reconcile international diversification with corporate environmental responsibility (CER). R.B. Sambharya & I. Goll (2024) investigated the effect of international diversification on CERD, considering cultural practices such as social support and productivity orientation. It was found that social support positively affects CER, while productivity orientation has an ambiguous effect. The impact of certain cultural aspects on non-market strategies is still understudied.

Innovative solutions are an essential tool for creating an effective organisational and economic structure of diversified enterprises. O. Zghurska *et al*. (2021) studied the mechanisms for implementing such solutions on the example of the agro-industrial enterprises "Ukrlandfarming" and "Astarta". The researchers found that diversification helps to increase competitiveness, optimise management processes, and expand markets. At the same time, the effect of globalisation and technological innovations on the long-term efficiency of such structures stays a pressing issue that requires further analysis.

The purpose of this study was to determine the key stages of the diversification process for enterprises to increase its adaptability and efficiency in a changing market environment. The objectives were to study theoretical approaches to determining the stages of the enterprises' diversification process; to analyse practical examples of the diversification process implemented by enterprises in various industries.

Materials and Methods

This study focused on strategic approaches to enterprise diversification in the context of global economic instability and a changing market environment. The study covered the period from 2020 to 2024, which allowed considering the latest trends in economic processes, changes in diversification strategies, and the effect of global crises (including the COVID-19 pandemic) on companies' business models. This timeframe helped to analyse in detail the adaptation of companies to various economic challenges, including changes in consumer patterns, technological innovations, and geopolitical factors. The study of such events helped to identify key trends and changes affecting diversification strategies in the context of global and local crises.

The study employed methods of data collection and analysis that enabled a detailed assessment of the enterprises' diversification strategies. The study used qualitative analysis to assess the diversification strategies of enterprises. The qualitative approach provided an understanding of how companies apply different diversification strategies (horizontal, vertical, conglomerate) to reduce risks and increase resilience to market changes. The qualitative analysis included public reports, company strategies, their adaptation to new market conditions, and the use of innovative business approaches. This approach provided a comprehensive understanding of the practical aspects of diversification, particularly in the context of economic and social instability. For a better grasp of the application of diversification strategies, the case study method was applied. This method helped to explore concrete examples of successful enterprises, such as "MHP", "Interpipe", and "SoftServe", and to compare the effectiveness of their diversification strategies.

The analysis of public reports of large Ukrainian enterprises enabled the assessment of strategic approaches to diversification and their effect on the overall performance of companies. Specifically, it was studied the reports of such companies as "Interpipe" (Herasymova, 2018), "MHP" (MHP announces strategic..., 2020), and "SoftServe" (Diversity, equity and..., 2024). These companies were selected for the study due to their successful diversification strategies aimed at reducing risks and increasing resilience in the face of economic instability. Each of these companies was selected because of their distinctive approaches to diversification. "MHP" pursued vertical diversification in the agri-food industry, "Interpipe" applied horizontal diversification in the steel and pipe industry, while "SoftServe" focused on technological diversification in the IT sector. The analysis of these examples helped to evaluate the effectiveness of various types of diversification in the face of economic instability and provide practical recommendations for other companies. The Porter's Five Forces Analysis and Ansoff Matrix models were also analysed to adapt them to modern strategic processes of enterprises, which help to optimise their operations. Furthermore, analytical tools such as PESTEL analysis, which helps to assess the influence of the external environment on enterprise strategies; Scrum and Agile methodologies, which illustrate the flexibility of management decisions; Gantt chart, which reflects the time aspects of strategy implementation; and Business Model Canvas were analysed. The review of these tools helped structure the data and assess their applicability to diversification strategies.

Results

Theoretical foundations of diversification of enterprise activities

Businesses often use diversification as a strategic approach to stay competitive and resilient in a dynamic market environment. It aims to expand the range of products, services, or markets to reduce dependence on a single source of income and mitigate risks. Diversification is typically used as a response to market challenges, such as increased competition, changes in consumer preferences, or economic instability. Many studies have focused on the classification, effects, and implementation stages of the diversification process during 2020-2024. This created a solid scientific basis for developing effective strategies.

Conglomerative, horizontal, and vertical diversification are the three principal types of diversification. Vertical, or concentric, diversification means expanding the range of existing activities by adding new ones to the existing ones along the technological cycle. This enables a company to use its potential to open new avenues. It is a logical extension of current operations. For example, flour production can be part of the vertical diversification of a wheat-growing company. In addition, according to D.A. Molodychenko (2020), this type of diversification contributes to the stability of supply, cost optimisation, and increased control over the technological process.

Horizontal diversification mewans the development of new services targeting the same customers, but not related to the existing ones in terms of the technological cycle. This type of diversification allows companies to leverage their reputation and market insight to expand their product range. For example, a clothing manufacturer can produce shoes for the same customers. Horizontal diversification has a great advantage, because it allows expanding the market without involving entirely new sectors. But if a company does not use enough innovation to create a unique product, this type of diversification may be limited (Skorobogatov & Kycherubova, 2011).

The most complex diversification type is conglomerative, which requires extensive resources. It involves the expansion of the existing product range with goods or services that are not related to the company's current activities. For instance, a pasta producer can offer transport services. Large companies with strong financial and organisational potential usually pursue this type of diversification. N.M. Skorobogatov & O.I. Kycherubova (2011) noted that conglomerate diversification opens new prospects for growth while reducing the risks associated with a single market or industry. However, it also comes with elevated costs and management challenges.

Table 1 summarises the key characteristics of the three types of diversification, as well as their advantages and disadvantages, allowing companies to choose the most effective approach to development.

Table 1. *Types of diversification: key characteristics, advantages and disadvantages*

Diversification type	Key characteristics	Advantages	Disadvantages
Vertical (concentric)	Expansion within the process cycle, integration of suppliers or distributors	Increased control, lower costs	Excessive cost, complexity of management
Horizontal	Launch of new products or services for the existing customer base	Market expansion, leveraging on reputation	Risk of not meeting customer needs
Conglomerate	Entering new industries not related to the core business	Reduced dependence on a single industry	Extensive investment, lack of experience

Source: *compiled by the author based on N.M. Skorobogatov & O.I. Kycherubova (2011), D.A. Molodychenko (2020)*

Thus, the type of diversification depends on the strategic goals of the company, its resources, and the specific features of the market environment. Vertical diversification is effective for optimising internal processes, horizontal diversification allows expanding the customer base, while conglomerate diversification

opens new opportunities for growth. Choosing the right strategy ensures a company's sustainable development and competitive advantage.

Diversification is a valuable strategic management tool that allows businesses not only to adapt to changes in the external environment, but also to ensure sustainable growth in an increasingly competitive environment. In the modern economic environment, where market dynamics are becoming increasingly unpredictable, diversification is of particular significance as a way to minimise risks, maintain financial stability, and strengthen competitiveness.

One of the key benefits of diversification is the reduction of risks associated with dependence on a single market or product. Businesses that focus exclusively on a single market segment are much more vulnerable to changes in consumer demand, price fluctuations, and economic or political crises. For example, a company that only produces seasonal products may face major losses during the "dead season". Diversification, in this case, helps the company to spread the risks by entering new markets or developing new products that can compensate for seasonal losses. This ensures financial stability and reduces the effects of adverse environmental factors (Williams, 2024).

Another valuable advantage of diversification is the increased competitiveness of the enterprise. The development of new markets, the introduction of innovative products or services enables businesses to increase their market share and strengthen their position among competitors. For instance, a company that expands its product range by introducing innovative products can offer consumers unique solutions that meet their needs and thus attract new customers. Furthermore, diversification allows businesses to leverage their existing expertise and reputation to succeed in new markets (Oladimeji & Udosen, 2019).

Diversification also contributes to a more efficient use of enterprise resources. Integrating new activities may allow for optimised use of equipment, technology, or human resources. For instance, a manufacturing company can use residual materials to make new products, which not only reduces costs, but also creates added sources of income. This approach increases profitability and ensures more efficient use of available resources.

Another prominent aspect is the long-term development of the company. Diversification creates new sources of income, which ensures stability in times of economic volatility. For example, a company that operates in several different industries at once is less vulnerable to negative changes in a particular industry, as other areas of activity can compensate for possible losses. This approach ensures long-term sustainability and creates conditions for continuous development.

Furthermore, according to D. Zevenko *et al*. (2024), diversification can help to strengthen the innovative potential of an enterprise. The development of new markets or products requires the development of advanced technologies, the implementation of modern management solutions, and adaptation to changing conditions. This encourages companies to continuously improve and develop, which contributes to their competitiveness. For example, companies that develop innovative technologies within the framework of diversification can leverage these innovations to improve the quality of their products or services, which allows them to attract new customers and strengthen their market positions.

However, it is essential to recognise that diversification also has its challenges. Specifically, businesses expanding into new areas may face the need for extensive investment and increased management complexity. For example, conglomerate diversification, which involves entering new industries, often requires major financial outlays for market research, product development, and the organisation of new business processes. Furthermore, the management of a diversified enterprise can be complicated by the need to control multiple activities that may have differing needs and specifics. Despite these challenges, diversification continues to be an indispensable tool for ensuring the development of enterprises. It not only minimises risks and increases financial stability, but also opens new opportunities for growth and innovation. Thus, diversification is one of the key factors for the success of enterprises in the current economic environment.

The diversification process involves many stages and requires careful planning and continuous execution of each stage to achieve the company's strategic goals. This process can be structured into several main stages, according to various theoretical approaches. All these approaches provide a comprehensive approach to implementing a diversification strategy.

The first step is to analyse the internal and external environment of the company. This stage involves an assessment of resources, financial capabilities, human resources, as well as market conditions, competitive environment, and economic trends. For example, SWOT analysis or PESTEL analysis methods help to identify the strengths and weaknesses of the company, as well as external factors that affect its operations. The next step is to select areas for diversification, which involves identifying potential areas for expansion. At this stage, companies determine which markets, products, or industries may be of interest for reasons of financial gain, synergies, or risk reduction. Particular attention is paid to determining whether the new areas are in line with the company's strategic goals.

The third stage involves developing a diversification strategy. This process entails creating a detailed action plan that considers the required investments, implementation timeframes, marketing strategy, logistics, and human resources. At this stage, financial calculations are particularly relevant to assess the feasibility of diversification and to forecast possible results. The fourth stage

is the implementation of the diversification strategy. This stage is the most resource-intensive, as it involves the practical implementation of all planned activities. This may include developing a new product, entering a new market, purchasing new equipment or investing in other businesses. Implementation is often accompanied by changes in the organisational structure, management processes, and communications (Zghurska, 2019). The final stage is monitoring and evaluating the effectiveness of diversification. At this stage, the company evaluates the achievement of its goals, analyses financial indicators, customer feedback, and market results. Monitoring allows identifying shortcomings in the implementation of the strategy and adjusting actions to achieve the best results (Oparina & Zavdoviev, 2018).

These stages are universal and can be adapted to the needs of a particular enterprise depending on its resources, industry, and strategic priorities. A clear understanding of each stage allows enterprises to successfully implement diversification strategies, minimise risks, and achieve sustainable growth.

Analysis of practical implementation and development of recommendations for identifying stages of the diversification process

One of the crucial strategies for modern Ukrainian businesses is to use the diversification process to ensure sustainability, competitiveness, and the ability to adapt to dynamic market conditions. This process not only minimises the risks associated with dependence on a specific product or market, but also creates new opportunities for growth.

Ukrainian businesses are increasingly adopting diversification strategies to adapt to market challenges. In the food industry, one of the leading examples is the "MHP" agricultural holding, known for its "Nasha Riaba" brand. The company started out as a chicken producer, but later expanded its business by investing in grain growing, meat production, and renewable energy. As a result, "MHP" has reduced its dependence on a single market segment, strengthened its position on the international market, and increased its financial stability (MHP announces strategic..., 2020).

In the steel industry, "Interpipe" is an example of successful diversification. The company, which historically specialised in the production of steel pipes, expanded its activities by launching the production of railway wheels. This enabled the company to diversify its revenues, reduce its dependence on fluctuations in steel demand, and take a leading position in the new market (Herasymova, 2018).

In the IT sector, the Ukrainian company "SoftServe" demonstrates the effectiveness of horizontal diversification. The company started out as a software developer, but later added consulting services, training programmes, and customer support to its portfolio. This helped to expand its customer base and strengthen its position in the international market. The company is also entering the Latin American market to continue its rapid growth and increase its global presence (Konopleva, 2022).

Each of the five stages of the diversification process is crucial for the success of the strategy. Examples of Ukrainian companies provide a detailed analysis of the specifics of these stages. The first stage is the analysis of the internal and external environment of the enterprise. "MHP" conducted a detailed analysis of market trends, identifying promising areas for expansion, including investments in meat production and renewable energy. The analysis identified opportunities to create synergies between existing and new business areas (MHP, 2018). This stage requires a clear understanding of the prospective areas of development that meet the strategic goals of the enterprise and its resource capabilities. "Interpipe" is a vivid example of a successful choice of diversification path. In response to fluctuations in demand for steel pipes, the company decided to focus on the production of railway wheels. The decision was made after a detailed market analysis, which revealed a stable demand for railway wheels even during periods of economic instability. Furthermore, this area is characterised by low dependence on international trade barriers, which made it particularly attractive to the company. Thanks to this choice, "Interpipe" managed to minimise the risks associated with a decline in orders in the metallurgical sector and ensure the stability of its business in the long term (Herasymova, 2024).

Strategy development is an essential stage that determines the sequence of actions to achieve the goals set. This process includes planning investments, logistics, marketing activities, and securing the necessary human resources. For example, "SoftServe", a software development company, has implemented innovative training programmes to train its employees as it diversified its business. The company developed a clear plan that included the creation of training courses aimed at developing key competencies such as project management, programming, and customer service. This enabled "SoftServe" to improve the quality of its services and secure competitive advantages. Furthermore, the strategy addressed the risks associated with the oversaturation of the IT services market and focused on entering international markets. Thanks to clearly defined priorities and realistic planning, the company successfully tackled the challenges of this stage (Diversity, equity and..., 2024).

Strategy implementation is the most critical and resource-intensive stage of the diversification process. It requires investment, teamwork, and effective project management. "Interpipe" managed to successfully reduce its dependence on the steel pipe market by investing in the production of railway wheels. The investments included the purchase of modern equipment, staff training, and optimisation of production processes. The introduction of modern technologies enabled the company to achieve high quality products that conformed

to international standards and to increase production volumes considerably. This approach not only strengthened "Interpipe's" position in the internal market, but also opened new opportunities for export. As a result, the company has become one of the leading players in its industry, demonstrating competitive advantages and long-term sustainability (Herasymova, 2024).

According to A.M. Tarasiuk (2023), monitoring allows enterprises to control the implementation of the strategy and respond promptly to deviations from the planned results. "MHP" uses developed monitoring systems that cover financial results, analysis of market indicators, and the effectiveness of management decisions. Such systems enable the company's management to quickly identify weaknesses and adapt the strategy in line with changes in the market environment. For instance, if a certain line of business proves to be less profitable, the company can reallocate resources to other areas with stronger growth potential. This ensures the flexibility of "MHP's" strategy, increases the effectiveness of the changes implemented and achieves stable financial growth.

Therefore, each of these stages is instrumental to the successful implementation of the diversification strategy. The use of modern analytical tools, clear planning, and performance monitoring allow companies to achieve their strategic goals and ensure long-term development. Table 2 provides an assessment of the key success factors and risks specific to each stage of the diversification process.

Table 2. *Assessment of key success factors and risks for the stages of diversification*

Diversification stage	Key success factors	Primary risks
Analysis of internal and external environment	1. Access to quality information. 2. Use of analytical tools. 3. Professional analysis of market trends	1. Incomplete or inaccurate data. 2. Incorrect forecasts. 3. Insufficient attention to the competitive environment
Selection of diversification areas	1. Compliance of the selected areas with the strategic goals. 2. Analysis of promising markets. 3. Potential for synergies	1. Selection of unprofitable areas. 2. Mismatch of new areas with existing resources. 3. Disregard for market risks
Strategy development	1. Realistic planning. 2. Clear estimate of costs and revenues. 3. Availability of financial resources. 4. Involvement of experts	1. Insufficient funding. 2. Errors in planning. 3. Failure to consider market or customer needs
Strategy implementation	1. Prompt implementation of measures. 2. Staff motivation. 3. Integration of new processes into the existing structure	1. Delays in implementation. 2. Resistance to change from staff. 3. Budget overruns
Monitoring and performance evaluation	1. Continuous monitoring of results. 2. Use of innovative monitoring tools. 3. Flexibility in decision-making	1. Insufficient monitoring. 2. Delayed corrective actions. 3. Untimely response to deviations from the plan

Source: *compiled by the author based on O.S. Borysenko et al. (2022)*

Table 2 showed that the diversification process is complex and multifaceted, requiring companies to analyse carefully, plan strategically, and execute accurately. The success of diversification depends on the company's ability to adapt to changes in the market environment, use resources efficiently, and manage the risks associated with each step of the process. Innovation, financial and human resources, and integration of the latest trends into the company's overall strategy are key components of success. At the same time, even the most promising projects can be lost due to risks, such as incorrect market assessment, budget overruns, or resistance to change.

Overall, Table 2 highlighted the significance of a comprehensive approach to diversification. Businesses need to address every aspect of the process, from market analysis to monitoring results. This helps not only to minimise risks, but also to increase flexibility and competitiveness in a dynamic economic environment. Considering these factors, diversification continues to be a powerful tool for achieving strategic goals and ensuring sustainable development of enterprises.

Implementing diversification requires careful planning, a systematic approach, and the use of modern management techniques. Businesses can reduce risks, increase profitability, and become more competitive in the long run by doing so. The primary purpose of diversification is to reduce dependence on a single market or product and to adapt to changing external conditions. To achieve this, it is necessary to develop a clear algorithm of actions, incorporate new management tools, and create a system for assessing the effectiveness of the strategy.

A preliminary audit of the company's internal resources and analysis of the external environment is the first step in implementing diversification. An internal audit includes an assessment of the company's financial capabilities, technical potential, available human resources, and the efficiency of existing processes. The analysis of internal resources, specifically, helps to identify the company's strengths, which can form the basis for opening new avenues. On the other hand, external analysis is aimed at studying economic, political, social, and environmental factors, as well as consumption trends and competitors' actions in the market. PESTEL

analysis is well suited for this purpose, as it provides a complete understanding of the impact of the macro environment on the company's operations.

The second step is to identify areas of strategic diversification. At this stage, companies should clearly define their goals. These goals can range from increasing profits to reducing dependence on a particular market or product. The Ansoff matrix is an effective tool for choosing strategic directions, as it allows to assess risks and development potential according to the degree of innovativeness of the product and market. Value chain analysis is also useful for businesses, as it helps to identify opportunities for creating synergies between existing and new activities. The development of a diversification strategy is the third stage, which includes the development of a detailed implementation plan. At this stage, it is key to define the timeline, required investments, resource allocation, and who is responsible for the implementation of the tasks. Establishing key performance indicators (KPIs) is an essential part of this stage, as it will allow measuring the progress and outcomes of the strategy. For example, revenue growth, market share, return on investment, and customer satisfaction can be part of the KPIs. The value proposition, customer segments, sales channels, revenue sources, and costs are the core elements of the business model, which can be structured using the Business Model Canvas tool, which can be used to visualise the strategy.

Strategy implementation is a critical stage that requires clear coordination between departments, adequate funding, the involvement of qualified specialists, and the use of innovative technologies. At this stage, businesses must execute their plans, such as creating new products, manufacturing them, opening new markets, or acquiring other companies. It is recommended to use Agile or Scrum methodologies to ensure flexibility during the project, as they can adapt to changes in the external environment. For example, a company can try out new products through pilot projects before expanding them to larger markets.

Completing the monitoring and evaluation of the effectiveness of the diversification strategy is the last step. At this stage, one can track the implementation of the plan, analyse the performance, and make necessary adjustments. Modern information systems, such as enterprise resource planning or customer relationship management, can be used to monitor performance as they automate data collection and analysis. Outcomes such as customer satisfaction, company reputation, and potential for innovation are critical, along with financial metrics such as revenue growth and profitability. For example, customer surveys provide feedback on new products, which allows for quick changes to the business plan.

It is essential to use the right management tools at each stage. At the stage of analysing the external environment, competitive analysis, PESTEL analysis, and market forecasting are effective tools. The Ansoff Matrix and Porter's Five Forces Analysis help in choosing the areas of diversification. Gantt charts and balance sheets should be used for planning and setting KPIs. Implementing the strategy requires the integration of Agile methods and enterprise resource planning systems to ensure flexibility and speed of task execution. To track results, it is advisable to use dashboards that show key performance indicators in real time.

Assessing the effectiveness of diversification depends on a thorough analysis of both financial and non-financial factors. Financial metrics include revenue growth, increased profitability, reduced costs, and increased market share. Meanwhile, the long-term impact of diversification on the development of an enterprise can be assessed using non-financial indicators, such as company reputation, innovation potential, customer satisfaction, and employee loyalty. To obtain an objective assessment, the indicators should be regularly monitored and compared with the established KPIs. Thus, successful implementation depends on the development of clearly defined algorithms, the use of modern management tools, and systematic evaluation of results.

Discussion

Diversification is a key strategy for businesses to reduce risks and increase their resilience to changes in the external environment. It provides an opportunity to adapt to economic, social, and technological changes, ensuring stability and growth. However, depending on the industry, market, and economic conditions, various forms of diversification may have different effects. Therefore, it is vital to consider the specifics of each enterprise and its strategic goals, when choosing which diversification strategy to pursue.

This study focused on the analysis of three types of diversification: vertical, horizontal, and conglomerate, which allow enterprises to reduce risks and increase competitiveness. It was found that vertical diversification optimises costs and increases control over processes, while horizontal diversification allows expanding the range of products, while maintaining a focus on existing customers. Conglomerate diversification, although it has significant costs, reduces the risks arising from dependence on a single market or product.

Comparing with the findings of S. Wang *et al*. (2024), it can be noted that the study of these researchers also highlighted the role of diversification, but with a greater focus on international aspects, particularly the impact of subsidiaries on parent companies' innovations. This study focused on local strategies and examples of how firms adapted to national conditions. The key difference lies in the context: S. Wang *et al*. (2024) examined international diversification strategies for global companies, while the present study addressed the adaptation of domestic enterprises to changes in the internal market. This contextual aspect is significant because it determines the choice of diversification strategy depending

on the specifics of the market and the size of the company. Thus, the findings confirmed that the diversification strategy has a variable impact on the efficiency of enterprises depending on market conditions and the scale of the company's activities. In the case of large international corporations, as shown by S. Wang *et al*. (2024), diversification through subsidiaries can promote innovation, while for local companies, as shown in this study, horizontal and vertical diversification strategies are more effective.

This study and W. Sels (2024) emphasised the significance of diversification for risk reduction but analysed it from different angles. W. Sels (2024) focused on portfolio investments, as location across classes (stocks, bonds, real estate, etc.), and geographic diversification to reduce volatility. In this study analysed diversification as a strategy for enterprises to adapt to market changes. The methodologies also differed, with W. Sels (2024) using statistical data from global markets, while the present study employed SWOT analysis, PESTEL analysis, and case studies. Both approaches agreed on the value of a balanced approach, although the author focused on financial aspects, while this study addressed the operational strategies of enterprises.

Studies by R. Kankaria & S. Pai (2023) and S. Mirković *et al*. (2024) analysed diversification strategies in various contexts. S. Mirković *et al*. (2024) focused on sectoral constraints, specifically in the Serbian defence industry, exploring linked and unlinked diversification. The researchers emphasised that linked diversification provides synergies and economies of scale, while unlinked diversification reduces risks but requires extensive resources. The researchers also noted that excessive diversification can lead to excessive costs and management challenges, which is consistent with the findings of this study on the need to balance the amount of diversification with the company's resources. As for the study by R. Kankaria & S. Pai (2023), their approach focused on the environmental aspects of diversification, specifically on achieving Net Zero goals for fossil fuel companies. The researchers examined, how diversification can contribute to the transition to a low-carbon economy through sustainability investments, government support, and the role of the board of directors. The cited study focused on environmental sustainability and governance aspects, while the present paper analysed business adaptation to a changing economic environment, with a greater focus on operational strategies. The findings of these studies demonstrated distinct aspects of diversification. S. Mirković *et al*. (2024) pointed out the significance of a reasonable balance between distinct diversification strategies, while R. Kankaria & S. Pai (2023) focused on environmental sustainability in the energy sector. This explored adaptive strategies to ensure business sustainability in the face of economic volatility.

M. Andreasson *et al*. (2024) analysed innovative diversification strategies, including the introduction of digital solutions into conventional industries. The focus was on horizontal diversification through investment in the latest technologies and expansion into digital markets. The researchers emphasised the role of innovation management and adaptation to technological trends to ensure competitive advantage. This study also explored adaptive diversification strategies, but focused on analysing resources and market opportunities to increase business resilience in the face of economic uncertainty. Both studies recognised the value of innovation and adaptation, but placed different emphases. M. Andreasson *et al*. (2024) focused on digital transformation and innovation in technology companies, while this study covered a wider range of industries and conventional business strategies. This approach allowed for a comprehensive analysis of the effects of diversification on the resilience of enterprises to market challenges.

Z. Qian *et al.* (2022) analysed the impact of diversification on inventory management efficiency, focusing on operational aspects and contract models in supply chains. This study investigated adaptive diversification strategies with a focus on strategic business management and its adaptation to market changes. While both studies emphasised the role of diversification for company performance, they differed in their approaches: Z. Qian *et al.* (2022) focused on the operational aspects, while this study covered the broader business context.

The authors K. Halttunen *et al*. (2023) focused on the transformation of energy companies to sustainable business models, emphasising the role of public policy and renewable energy sources. The researchers focused on the environmental aspects of diversification, emphasising the significance of transitioning to sustainable and environmentally friendly energy sources in the face of global challenges. This approach is specific to the energy sector, which is responding to climate change and societal demands. In contrast, the present study analysed the general diversification strategies used by businesses in various industries to ensure their resilience in the face of economic uncertainty. The key difference was in the focus of the studies: K. Halttunen *et al*. (2023) focused on environmental sustainability in the energy sector, while the current study had a universal approach to diversification, which helped to assess its effectiveness in distinct economic conditions and industries.

As for the study by E. Onali & D.V. Mascia (2021), it also highlighted the role of diversification, especially in the context of managing risks arising from external shocks such as the COVID-19 pandemic. Researchers focused on the impact of factors such as stock volatility and used financial indicators such as Tobin's q to analyse diversification strategies. Their study was more focused on the financial aspects of diversification and its effects on the resilience of companies to economic shocks, particularly in the face of financial volatility and market uncertainty. This study focused on the strategic aspects of diversification, namely on the types of

diversification, with a focus on the operational adaptation of enterprises to changing market conditions. The key difference between the study by E. Onali & D.V. Mascia (2021) and this study lied in the methods: E. Onali & D.V. Mascia (2021) used financial indicators to assess the effectiveness of diversification, while this study focused on the analysis of strategic approaches, such as SWOT and PESTEL analyses, which allow considering broader factors that affect the success of diversification. Another prominent difference is the focus on geographic diversification in the study by E. Onali & D.V. Mascia (2021). The researchers investigated geographic strategies, specifically diversification through international expansion, to reduce the risks associated with local economic shocks. At the same time, this focused on general diversification strategies without a clear focus on geographic aspects.

The study by L. Nguyen-Thi-Huong *et al*. (2023) and this study had a common focus on the significance of diversification for reducing risks and increasing the resilience of enterprises. Both studies emphasised that diversification helps to minimise risks, including financial and operational risks. They also employed resource theory to explain the mechanisms of diversification. The key difference was in the context: the authors focused on small and medium-sized enterprises in Vietnam and the impact of government support, while this study considered diversification in a more general context of large enterprises without focusing on government initiatives.

M. Chemirbayeva *et al*. (2020) analysed the economic strategy of diversification of light industry enterprises in the context of globalisation, emphasising the necessity of innovative management approaches to ensure competitiveness and reduce risks. This study employed cluster analysis methods to develop a strategy for the development of enterprises at the regional level in Kazakhstan. The researchers also explored the role of government support and the need to integrate industry into global economic processes. This study also considered diversification as a strategy to reduce risks and increase the stability of enterprises, but with a focus on more general aspects of business strategies, such as risk management, innovation strategies, and the role of the external environment for enterprise development. The difference was that the study by M. Chemirbayeva *et al*. (2020) focused on the analysis of specific features of the light industry in Kazakhstan, while this study covered diversification strategies in the context of global economic changes more generally.

Scientists O. Denysiuk *et al*. (2023) analysed the diversification of agricultural enterprises as a tool for sustainable development in rural areas. This study investigated the effects of general diversification strategies on increasing the resilience of enterprises in the face of economic instability. Both studies emphasised the role of diversification for reducing economic risks and adapting to changing conditions. The key difference was that O. Denysiuk *et al*. (2023) focused on the specifics of agricultural enterprises, applying a systematic approach to the analysis, while this study analysed general strategic approaches to diversification without focusing on a concrete industry or region. This universal approach allowed for a wider range of factors affecting diversification performance to be considered.

A.W. Stevens & J. Teal (2023) focused on the effects of diversification in the agri-food sector during the COVID-19 pandemic. The researchers analysed vertical and horizontal diversification as tools to increase the resilience of enterprises, using statistical methods to assess the effectiveness of these strategies. This study examined general diversification strategies in the context of global economic change, without reference to a concrete industry or crisis. The primary difference between the studies was that A.W. Stevens & J. Teal (2023) focused on a concrete sector and crisis period, while this study had a broader approach to analysing adaptation strategies.

The authors J. Foreman-Peck & P. Zhou (2023) focused on innovation in research and development (R&D), assessing the impact of internal and external R&D on company productivity. The researchers employed economic models to analyse the surplus from R&D investments, which allowed them to identify the link between innovation and economic performance of companies. This study examined diversification as a strategic tool to reduce risks and increase the resilience of enterprises to changes in market conditions. Both studies emphasised the key role of innovation and diversification in ensuring the competitiveness and efficiency of enterprises.

This study highlighted the significance of diversification for reducing risks and increasing the resilience of enterprises. Distinct approaches to diversification, such as vertical, horizontal, and conglomerate, were found to be effective depending on the context and specifics of the industry. While all studies emphasised the value of adapting to change, approaches vary, with some focusing on innovation, while others focus on financial aspects or operational strategies.

Conclusions

Diversification is one of the most effective tools for ensuring long-term sustainability and reducing risks in the face of economic instability and global change. According to the study, diversification enables companies to reduce their dependence on a specific product or market, making them more flexible and capable of adapting to changes in the external environment. The primary challenge for companies considering diversification is to choose the right strategy and implement it in great detail, which requires not only strategic thinking but also a clear analysis of all possible risks.

The study detailed the stages of diversification: from analysing market opportunities and assessing the external environment to choosing the best strategy and implementing it. The key stages included identifying internal and external factors affecting the company, as well

as assessing the company's resources and opportunities for expansion.

The study identified three major types of diversification: vertical, horizontal, and conglomerate. Each of these types has its specific features and applicability in certain situations. Vertical diversification ensures stable supply of resources and reduces costs. Horizontal diversification allows expanding the market and offering new products to existing customers. Conglomerate diversification, which involves entering new, unrelated markets, is riskier, but can bring considerable dividends if implemented successfully. Another aspect analysed was the role of innovation and technological development in the diversification process. Modern enterprises that actively use innovative technologies and strategies can greatly enhance their competitiveness. In this context, the significance of integrating the latest technologies into the strategic diversification process was emphasised. Innovations not only enable companies to expand their range of products and services, but also ensure their adaptation to a rapidly changing market environment.

The study also showed that successful diversification depends on many factors, such as strategic management, availability of financial resources, investment in research and development, and the ability of the enterprise to adapt to changes. The case studies showed that successful companies in Ukraine, such as "MHP", "Interpipe", and "SoftServe", employ different approaches to diversification to reduce risk and increase stability. Their successes demonstrate, how the right diversification strategy can lead to strong economic benefits.

One key aspect that requires further research is the adaptation of the diversification strategy to the specifics of the market and industry. It should be considered that approaches to diversification may differ substantially in different sectors of the economy, and therefore each company should develop an individual strategy that meets its goals and capabilities.

Businesses should develop diversification strategies based on a detailed analysis of market conditions, their resources, and growth potential, as well as consider the effects of technological innovation and external economic factors. This study was limited to the general aspects of diversification and did not address any specific industry conditions or characteristics of enterprises in different regions.

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Conflict of Interest

None.

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Ідентифікація етапів процесу диверсифікації діяльності підприємства

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Анотація. Метою цього дослідження було визначення стратегічних підходів до диверсифікації підприємств в умовах глобальної економічної нестабільності, зокрема оцінка ефективності різних видів диверсифікації для підвищення стійкості бізнес-моделей. Для цього було використано якісні методи збору даних, включаючи кейс-аналіз публічних звітів великих українських підприємств, таких як «МХП», «Інтерпайп» і «SoftServe». Основними результатами дослідження було визначення найбільш ефективних стратегій диверсифікації, зокрема вертикальної, горизонтальної та конгломеративної, що дозволяють знижувати ризики та підвищувати конкурентоспроможність компаній. Крім того, було виявлено, що інновації та технологічний розвиток є ключовими чинниками успіху цих стратегій. Результати дослідження підтвердили важливість комбінованого підходу до диверсифікації залежно від галузі та ринкових умов. Було з'ясовано, що підприємства, які активно впроваджують інновації, мають більші шанси на успішну адаптацію до змінюваного ринкового середовища. Виявлено, що вертикальна диверсифікація дозволяє компаніям зберігати більший контроль над виробничими процесами, в той час як горизонтальна диверсифікація сприяє розширенню ринків збуту. Конгломеративна диверсифікація є ефективною стратегією для підприємств, які прагнуть знизити ризики, виходячи на нові та непов'язані ринки. Крім того, дослідження показало, що підприємства, що комбінують ці стратегії, мають кращу здатність до адаптації до глобальних економічних змін і швидше відновлюються після криз. Результати дослідження підкреслюють необхідність адаптації стратегій диверсифікації до специфічних умов підприємства та ринку, що дозволяє знижувати ризики та створювати стійкі бізнес-моделі

Ключові слова: стратегії; технологічний розвиток; бізнес-моделі; економічна нестабільність; інтеграція

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Impact of financial management practices on the performance of small enterprises (SEs): A study based on the perceptions of entrepreneurs in Southern Assam, India

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Abstract. Financial management practices play a crucial role in shaping the performance and growth of enterprises. Financial management involves arranging both short-term and long-term funding needs, ensuring the smooth functioning of enterprises. This research aimed to examine the relationship between financial management practices and the performance of small enterprises, as well as the impact of these practices on enterprise performance. Recognising the importance of financial management in enterprises, this study focused on small enterprises, which was key contributors to the growth of Northeast India. The research investigated entrepreneurs' perceptions of financial management practices and their relationship to the performance of small enterprises in Northeast India. The study based on primary data collected from a sample of 50 registered small enterprises under the District Industries Centre, Silchar. The data were analysed using descriptive statistics and Spearman's rank correlation. The results indicate that financial management practices – namely Capital Budgeting, Cash Management, Stock Management, Receivable Management, Capital Structuring, and the Use of Information Technology for maintaining financial records – are significantly correlated with enterprise performance. Furthermore, statistical tests using multiple regression analysis demonstrated that these practices positively and significantly impact the performance of small enterprises. The findings of this study will assist entrepreneurs in identifying the financial management practices that play a crucial role in improving the performance of small enterprises

Keywords: Capital Structuring; Capital Budgeting; control; profit; cash; receivables

Introduction

Small enterprises (SEs) are vital for economic development, but their financial management practices differ significantly from those of large organisations, and poor financial decisions can lead to business failure. Despite their importance, many SEs lack strategic financial planning skills. Effective financial management practices are crucial for the success and sustainability of SEs. These practices encompass key areas such as working capital management, Capital Structuring, and the use of accounting information systems, all of which significantly influence enterprise performance. This study explored how entrepreneurs perceive the impact of these financial management practices on their business outcomes. By examining various research findings, the analysis aimed to illuminate the relationship between sound financial management and enhanced performance,

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providing insights into best practices that can drive growth and competitiveness in the dynamic landscape of small enterprises.

Past research has highlighted various financial management practices crucial for the performance of small enterprises across different contexts. T. Tharmini & A.M.I. Lakshan (2021) studied the impact of financial management practices on the performance of small and medium enterprises (SMEs) in terms of accounting information systems, financial reporting and analysis, working capital management, and financial planning and control. They found that financial reporting and analysis, as well as working capital management, positively impact enterprise performance, whereas the other two variables exhibited inverse results. K.A. Mohammed & A. Suleiman (2022) investigated the performance of enterprises concerning cash flow management, Stock Management, bookkeeping practices, and financial planning. They concluded that working capital management, including stock and Cash Management, significantly affects enterprise performance alongside financial planning. R. Rahmah & F.O. Peter (2024) examined financial management practices in the manufacturing sector in Indonesia and discovered that Capital Budgeting, working capital, and financial analysis strongly impact performance. Their study further revealed that units managing investment decisions effectively derive long-term benefits. L. Sooriyakumaran *et al.* (2022) found a significantly positive relationship between financial management planning and firm performance. Specifically, working capital management, accounting recording and reporting, the use of information systems, and Capital Structuring were identified as significant factors affecting performance, although investment decisions yielded insignificant results. G.S. Ahinful *et al.* (2021) emphasised that firms with better governance achieved improved financial results. They suggested transitioning to a formal ownership model and developing operational capacities to enhance performance. P.G. Matare & T.N. Sreedhara (2020) highlighted the importance of working capital management, balancing receivables management, and inventory management in determining enterprise profitability and growth. Their findings suggested that long-term stability requires financial innovation, investment, and risk management. Z.L. Anangwe & A. Malenya (2020) identified financial issues as the primary cause of failure among small and medium enterprises in Kenya. Their findings showed that working capital management, asset management, Cash Management, and financial reporting significantly impact enterprise performance. They recommended adopting these practices to ensure sustainability and success. G. Adda (2020) reported that enterprises in Ghana struggle due to inadequate financial management skills. The study indicated the need for enhanced practices, especially in financial recording, reporting, and working capital management. L.K. Kangangi & J. Omagwa (2020) explored the effects of working capital practices, such as cash, debtors', creditors', and inventory management, on SMEs. They found that cash and debtors' management practices significantly impact performance, underscoring the importance of liquidity and credit management policies to avoid bad debts. D.K. Chalmers *et al.* (2020) examined working capital management practices in Italian SMEs and concluded that enterprises with shorter working capital cycles perform better than those with longer cycles.

Overall, the body of research collectively illustrates that robust financial management practices are essential for the success and sustainability of SEs. By focusing on key areas such as Capital Budgeting, Cash Management, Stock Management, receivables management, Capital Structuring, the Use of Information Technology, financial expertise, and Tax Planning, small enterprises can better navigate challenges and enhance their competitive edge in the marketplace. More specifically, in Southern Assam – a region that serves as a commercial hub connecting four Indian states (Mizoram, Manipur, Meghalaya, and Tripura) and sharing borders with Bangladesh in the Karimganj and Hailakandi districts – small enterprises play a significant role in the regional economy.

The purpose of this research was to examine the impact of financial management practices on the performance of SEs in Southern Assam, as perceived by the concerned entrepreneurs. Based on this purpose, the following hypotheses were formulated: Null Hypothesis (H_0) – there is no significant relationship between the performance of small enterprises and financial management practices as perceived by the concerned entrepreneurs. Alternative Hypothesis (H_1) – there is a significant relationship between the performance of small enterprises and financial management practices as perceived by the concerned entrepreneurs.

Materials and Methods

This research study identified the financial management practices commonly employed by SEs in Southern Assam. The study employed a purposive sampling method, selecting only those small enterprises registered with the District Industries Centre (DIC), Silchar (South Assam) from 1 April 2007 to 31 March 2019. The total number of registered SEs during this period was 76, including 67 manufacturing and 9 service units (DIC, Silchar). A pilot study conducted on 12 SEs – 8 manufacturing and 4 service units – revealed that data collection was feasible only from the manufacturing sector. Consequently, the study was concentrated solely on manufacturing enterprises. Out of 67 manufacturing enterprises, 6 were found to be non-functioning and 4 were non-traceable. This left a total of 57 operational enterprises. To determine the sample size, Taro Yamane's formula was applied. Taro Yamane's formula was widely

used in research to calculate an appropriate sample size for finite populations, balancing precision with resource constraints. The formula is:

$$n = \frac{N}{1+N(e^2)}, \quad (1)$$

where *n* is the sample size; *N* is the population size = 57; *e* is the margin of error = 0.05.

$$n = \frac{57}{1+57(0.05^2)} = 50 \text{ units.}$$

The sample size of 50 enterprises was drawn, and data were collected using random sampling through an interview schedule. The interview schedule included two sections. The first section gathered background information on the respondents, including their age, gender, and type of ownership. The second section contained statements on financial management practices, addressing parameters such as Capital Budgeting, Cash Management, Stock Management, Receivable Management, Capital Structuring, the Use of Information Technology, Tax Planning, and the presence of financial experts. The interview schedule was designed to capture entrepreneurs' perceptions of how financial management practices in SEs impact the performance (Net Profit) of the firm, using a 5-point Likert scale. On this scale, 1 indicated "strongly disagree", 2 indicated "disagree", 3 indicated "neutral", 4 indicated "agree", and 5 indicated "strongly agree". To achieve the study's objectives, descriptive statistics, such as frequency, percentage, mode, and standard deviation, were employed. Spearman rank correlation was conducted to examine the relationship between financial management practices and firm performance. Additionally, an ANOVA test was performed to evaluate the study's hypotheses. ANOVA was used to determine whether significant differences exist in the means of the dependent variable across the groups of independent variables.

The study's model was expressed as P = f (CB, CM, SM, RM, CS, UIT, FME, TP), where: Dependent Variable – Performance of the enterprise (Net Profit of the enterprise, P). Independent Variables – CB = Capital Budgeting; CM = Cash Management; SM = Stock Management; RM = Receivable Management; CS = Capital Structuring; UIT = Use of Information Technology; FME = Financial Management Expertise; TP = Tax Planning. A reliability test was conducted to evaluate the consistency of the eight variables related to financial management practices. Cronbach's Alpha coefficient was used for this purpose (Table 1).

Table 1. *Test of reliability*

No. of items	Cronbach's Alpha
8	.773

Source: *developed by the authors*

The overall coefficient was measured at 0.773, and all individual items showed values above 0.700, indicating that the data are reliable and acceptable (Table 2). To test the data's normality, the Shapiro-Wilk test was used, as it is suitable for small sample sizes (Razali & Wah, 2011) (Table 3).

Table 2. *Item-wise Cronbach's Alpha values*

Statements	Cronbach's Alpha
Financial management practices (No. of items = 8)	.773
Capital Budgeting techniques help the enterprise improve its performance (CB)	.811
Cash Management prevents cash shortages in the enterprise and influences its performance (CM)	.764
Stock Management ensures the smooth functioning of production and influences enterprise performance (SM)	.747
Receivable Management reduces bad debts and enhances profitability (RM)	.748
Capital Structuring optimises the enterprise's profits (CS)	.748
The use of computerised systems to manage income and expenses improves financial management (UIT)	.760
Financial Management Expertise enables sound business decisions, influencing performance (FME)	.803
Proper Tax Planning reduces tax liabilities and increases profitability (TP)	.807

Source: *developed based on P. Mishra et al. (2019)*

Table 3. *Test of normality*

Financial management practices	Shapiro-Wilk		
	Statistic	df	Sig.
Capital Budgeting (CB)	.835	50	.000
Cash Management (CM)	.876	50	.000
Stock Management (SM)	.854	50	.000
Receivable Management (RM)	.860	50	.000
Capital Structuring (CS)	.877	50	.000

Table 3, Continued

Financial management practices	Shapiro-Wilk		
	Statistic	df	Sig.
Use of Information Technology (UIT)	.883	50	.000
Financial Management Expertise (FME)	.580	50	.000
Tax Planning (TP)	.836	50	.000

Source: *developed by the authors*

Table 3 indicated that all variables considered in the study have p-values below the typical significance level of 0.05, showing that the data are not normally distributed. Based on N.M. Razali & Y.B. Wah's (2011) study, non-parametric tests were suitable for such data. To avoid the impact of COVID-19 on the performance of SEs in Southern Assam, the study focused exclusively on the 12 years preceding the pandemic. Consequently, the study wasn't include post-COVID-19 impacts on enterprises.

Results and Discussion

This section presents the analysis and interpretation of data based on the objectives of the study. To investigate the perception of entrepreneurs regarding the financial management practices of SEs in Southern Assam, data were collected using a 5-point Likert scale. The responses were tabulated and analysed using percentage and mode (Table 4).

The results in Table 4 indicated the percentage of responses to each statement. It showed that 34% of the respondents strongly agreed and 24% agreed with statement 1, indicating Capital Budgeting as crucial for SEs. However, 22% were neutral, 4% disagreed, and 16% strongly disagreed with the statement. This suggested that Capital Budgeting was widely viewed as an important tool for business improvement. For statement 2, 12% strongly agreed and 44% agreed that effective Cash Management was crucial for preventing cash shortages and influencing performance. However, 8% strongly disagreed, suggesting that some entrepreneurs might not consider Cash Management critical or may face challenges in implementing such practices within their enterprises. Statement 3 revealed that 32% of the respondents strongly agreed, and 22% agreed on the importance of Stock Management. However, 14% strongly disagreed, which may reflect variations in how Stock Management was handled across enterprises or differing experiences with inventory control. A significant portion, 12% strongly agreed, and 44% agreed with statement 4, while 20% were neutral, 12% disagreed, and 10% strongly disagreed about the importance of Receivable Management in reducing bad debts. This indicated that while the majority of respondents believe Receivable Management contributes to profitability, some may not perceive significant benefits, possibly due to differences in experiences with credit policies. For statement 5, 22% of respondents strongly agreed, and 38% agreed that Capital Structuring was a key factor in optimising profits. However, 8% strongly disagreed, possibly reflecting scepticism regarding the relationship between capital structure and profitability. Regarding statement 6, mixed responses were observed. While 24% agreed on the importance of information technology (IT) for managing income and expenses, a large proportion (42%) remained neutral. This indicated that the use of IT for financial management wasn't yet fully optimised among SEs.

Table 4. *Perceptions of entrepreneurs on financial management practices*

Statements	SD	D	N	A	SA	Total
1) Capital Budgeting techniques help the enterprise improve its performance (CB)	8 (16%)	2 (4%)	11 (22%)	12 (24%)	**17 (34%)**	**50 (100%)**
2) Cash Management prevents cash shortages in the enterprise and influences its performance (CM)	4 (8%)	8 (16%)	10 (20%)	**22 (44%)**	6 (12%)	**50 (100%)**
3) Stock Management ensures the smooth functioning of production and influences enterprise performance (SM)	7 (14%)	10 (20%)	6 (12%)	11 (22%)	**16 (32%)**	**50 (100%)**
4) Receivable Management reduces bad debts and enhances profitability (RM)	5 (10%)	6 (12%)	10 (20%)	**23 (46%)**	6 (12%)	**50** (100%)
5) Capital Structuring optimises the enterprise's profits (CS)	4 (8%)	5 (10%)	11 (22%)	19 (**38%**)	11 (22%)	**50** (**100%**)
6) The use of computerised systems to manage income and expenses improves financial management (UIT)	5 (10%)	3 (6%)	**21** (**42%**)	12 (24%)	9 (18%)	**50** (**100%**)
7) Financial Management Expertise enables sound business decisions, influencing performance (FME)	**37** (**74%**)	0 (0%)	1 (2%)	5 (10%)	7 (14%)	**50** (**100%**)
8) Proper Tax Planning reduces tax liabilities and increases profitability (TP)	**19** (**38%**)	5 (10%)	9 (18%)	13 (26%)	4 (8%)	**50** (**100%**)

Note: *SD = strongly disagree; D = disagree; N = neutral; A = agree; SA = strongly agree*
Source: *developed by the authors*

Statement 7 showed that 74% of respondents strongly disagreed with the importance of Financial Management Expertise in decision-making, whereas only 14% strongly agreed. This suggested that many entrepreneurs presume financial expertise were already embedded within their organisation's operations, diminishing its perceived value as a differentiator. The statement on Tax Planning revealed that 38% of respondents strongly disagreed, while 26% agreed that Tax Planning reduced tax liabilities and increased enterprise profits. This may reflect a lack of awareness about Tax Planning or a perception that tax issues have minimal impact on profitability in this context. Table 5 illustrated the most frequent responses for each statement on a 5-point Likert scale and their corresponding standard deviation.

Table 5. *Mode responses of entrepreneurs and standard deviation*

Statement	Mode	Standard deviation
CB	5	1.417
CM	4	1.138
SM	5	1.469
RM	4	1.159
CS	4	1.181
UIT	3	1.153
FME	1	1.568
TP	1	1.431
*N = 50		

Source: *developed by the authors*

The analysis of Table 5 revealed the mode response, i.e., the most frequently given score, and the standard deviation, which indicated the variability in responses among entrepreneurs. The highest mode, '5', was observed for Capital Budgeting and Stock Management, indicating that entrepreneurs rated these practices highly. However, there was moderate variability in responses, as reflected by the standard deviations of 1.417 and 1.46, respectively. Cash Management, Receivable Management, and Capital Structuring predominantly received a mode of '4', with lower standard deviations (approximately 1.1), suggesting more consistent perceptions and general agreement among entrepreneurs regarding these practices. Conversely, responses for the Use of Information Technology were centred around a mode of '3' (neutral), accompanied by a low standard deviation, indicating less variability in responses. In contrast, Financial Management Expertise and Tax Planning had modes of '1', with standard deviations of 1.568 and 1.431, respectively. These results indicated strong disagreement among respondents regarding the importance of these practices and substantial variability in how entrepreneurs viewed their significance. Further, to assess the correlation between financial management practices and enterprise performance (measured as Net Profit), Spearman's rank correlation (rho) test was conducted (Table 6).

Table 6. *Correlation of financial management practices with the performance of enterprises*

Variable		Net Profit	CB	CM	SM	RM	CS	UIT	FME	TP
Net Profit	Correlation coefficient p-value	1.000 -								
CB	Correlation coefficient p-value	**.417**** **(.003)**	1.000 -							
CM	Correlation coefficient p-value	**.393**** **(.005)**	.424** (.002)	1.000 -						
SM	Correlation coefficient p-value	**.432**** **(.002)**	.342* (.015)	.185 (.198)	1.000 -					
RM	Correlation coefficient p-value	**.619**** **(.000)**	.408** (.003)	.252 (.077)	.301* (.033)	1.000 -				
CS	Correlation coefficient p-value	**.440**** **(.001)**	.410** (.003)	.391** (.005)	.396** (.004)	.360* (.010)	1.000 -			

Table 6, Continued

Variable		Net Profit	CB	CM	SM	RM	CS	UIT	FME	TP
UIT	Correlation coefficient p-value	**.515** (.000)**	.247 (.084)	.115 (.428)	.415** (.003)	.644** (.000)	.300* (.034)	1.000 -		
FME	Correlation coefficient p-value	-.122 (.398)	-.249 (.082)	-.121 (.403)	-.028 (.848)	.018 (.899)	-.231 (.107)	.002 (.987)	1.000 -	
TP Correlation coefficient p-value .007 (.963)			-.070 (.630)	.102 (.480)	-.074 (.609)	-.224 (.118)	-.291* (.040)	-.182 (.205)	-.247 (.084)	1.000 -
** - correlation is significant at the 0.01 level (2-tailed). * - correlation is significant at the 0.05 level (2-tailed). c. List wise N = 50. The figures in parentheses are all positive										

Note: *CB = Capital Budgeting; CM = Cash Management; SM = Stock Management; RM = Receivable Management; CS = Capital Structuring; UIT = Use of Information Technology; FME = Financial Management Expertise; TP = Tax Planning*
Source: *developed by the authors*

Table 6 presented the results of the Spearman rank correlation analysis, which were discussed as follows: Performance (Net Profit) to Capital Budgeting (CB) – the correlation coefficient of .417, with a p-value of .003, signified that the observed correlation is strongly positive and statistically significant. This indicated that effective Capital Budgeting practices can lead to increased Net Profit. This finding aligned with the research of U.A.H.A. Rathnasiri (2015), which highlighted the importance of Capital Budgeting in enhancing business performance. Performance (Net Profit) to Cash Management (CM) – the correlation coefficient of 0.453, with a p-value of 0.001, indicated a strongly positive and statistically significant relationship. This suggested that improvements in Cash Management practices tend to increase Net Profit by optimising cash flow and reducing liquidity risks. Similar findings were reported by B.K. Agyei-Mensah (2011) and M. Eton *et al.* (2021), emphasised the role of Cash Management in the performance of small enterprises. Performance (Net Profit) to Stock Management (SM) – the correlation coefficient of 0.432, with a p-value of 0.002, indicated a strongly positive and statistically significant correlation. This result highlighted that effective Stock Management is associated with increased Net Profit. Improved Stock Management reduces instances of stockouts and overstocking, minimising losses and maximising sales. These findings were consistent with the studies of M. Isse Abdikadir & M. Abdisalan (2016) and A.L.A. Rauf (2016). Performance (Net Profit) to Receivable Management (RM) – the correlation coefficient of 0.619, with a p-value of 0.000, indicated a very strongly positive and statistically significant relationship. This suggested that effective Receivable Management contributes significantly to Net Profit by reducing working capital needs and ensuring timely revenue generation. The results align with the studies of M. Isse Abdikadir & M. Abdisalan (2016) and I. Nketsiah (2018), which underscored the importance of proper credit policies in reducing bad debt and enhancing profitability. Performance (Net Profit) to Capital Structuring (CS) – the correlation coefficient of .440, with a pvalue of .001, indicated a strongly positive correlation between Capital Structuring and Net Profit. Effective Capital Structuring aided in strategic investment decisions, optimises resource allocation, and maximises returns. This finding supported the research of P.S. Vohra & J.S. Dhillon (2014), which concluded that Capital Structuring has a significant positive impact on firm performance. Performance (Net Profit) to Use of Information Technology (UIT) – the correlation coefficient of .515, with a p-value of .000, indicated a strongly positive and statistically significant relationship. The Use of Information Technology, particularly in computerised accounting, is associated with increased Net Profit due to enhanced efficiency and accuracy in financial management. The results were consistent with the findings of U.A.H.A. Rathnasiri (2015) and A.Y. Hailu & P. Venkateswarlu (2016), which highlighted the significance of using accounting information systems for maintaining accurate financial records and facilitating decision-making. Financial Management Expertise (FME) to Performance (Net Profit) – the correlation coefficient of -.122, with a p-value of .398, indicates a negative and statistically insignificant relationship. This suggested that the presence of a financial management expert may not directly correlate with Net Profit in SEs, likely due to resource limitations that hinder the full utilisation of an expert's skills. Similar results were reported by T. Abanis *et al.* (2013). Tax Planning (TP) to Performance (Net Profit) – the correlation coefficient of .007, with a p-value of .963, indicated a weak and statistically insignificant relationship. This may reflect limited awareness and understanding of tax laws and regulations among SEs owners. The findings align with the study by L. Judijanto *et al.* (2024) on Tax Planning strategies in small and medium enterprises, which underscored the importance of enhancing Tax Planning practices in such organisations. One of the stages of the research included verification through an ANOVA test.

Table 7. *Test of hypothesis*

ANOVA					
	Total variance in Net Profit	**df**	**Mean Square**	**F**	**Sig.**
Explained by FM practices	42.442	11	3.858	19.400	.000 p-value < 0.05 reject the null hypothesis
Unexplained (residual error)	7.558	38	.199		
Total	50.000	49			
Dependent variable: Net Profit					

Source: *developed by the authors*

The ANOVA results presented in Table 7 demonstrated that the regression model was highly significant, with an F-value of 19.400 and a p-value of .000. These results indicated that the predictors (financial management practices) significantly explain 42.442 variations in Net Profit. The p-value, being less than 0.05, supported the rejection of the null hypothesis, establishing a significant relationship between financial management practices and the performance of small enterprises. This finding suggested that the variance in Net Profit can largely be attributed to financial management practices.

Specifically, practices such as Capital Budgeting, Cash Management, Stock Management, Receivable Management, Capital Structuring, and the Use of Information Technology significantly influence the performance of small enterprises in Southern Assam. Enterprises that effectively manage these financial management practices exhibit improved performance.

Conclusions

The findings of this study demonstrated a clear connection between financial management practices and the performance of small enterprises, affirming the research focus on the impact of financial management practices on profitability. The results indicated that the highest percentage of responses – 34% – was for strong agreement on Capital Budgeting, while Cash Management received 44% agreement. Conversely, 74% strongly disagreed regarding the value of having a financial management expert, and 38% strongly disagreed on the importance of Tax Planning, reflecting critical areas for improvement in financial practices among small enterprises. Further, it was found that there is a significant relationship between various financial management practices and the performance of small enterprises. Capital Budgeting, Cash Management, Stock Management, Receivable Management, Capital Structuring, and the Use of Information Technology all exhibited strong positive correlations with Net Profit, indicating that effective management in these areas enhances financial performance. However, Financial Management Expertise and Tax Planning weren't demonstrate a positive association with Net Profit, suggesting potential limitations in leveraging these practices within small enterprises.

These findings suggested that effective implementation of financial strategies can significantly enhance profitability by optimising resources and improving cash flow. The lack of significant correlation between Financial Management Expertise and Tax Planning with Net Profit highlighted potential barriers to maximising financial benefits, such as limited awareness and resource constraints among small enterprises. This underscored the need for targeted education and training to fully leverage financial expertise. These findings encouraged small enterprises to prioritise the adoption of effective financial management strategies to navigate challenges and seize growth opportunities in a competitive business environment. Future research could focus on specific financial management practices to explore the challenges faced by entrepreneurs and to design policies that support the successful adoption and implementation of these practices.

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Conflict of Interest

None.

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Вплив практик фінансового менеджменту на результативність малих підприємств (МП): дослідження, засноване на сприйнятті підприємців у Південному Ассамі, Індія

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Анотація. Практики фінансового менеджменту відіграють важливу роль у формуванні результативності та зростанні підприємств. Фінансовий менеджмент передбачає організацію як короткострокових, так і довгострокових потреб у фінансуванні, забезпечуючи безперебійну роботу підприємств. Метою цього дослідження було вивчити взаємозв'язок між практиками фінансового менеджменту та результативністю малих підприємств, а також вплив цих практик на їх діяльність. Усвідомлюючи важливість фінансового менеджменту в діяльності підприємств, це дослідження було зосереджено на малих підприємствах, які є ключовими чинниками зростання Північно-Східної Індії. Дослідження розглядало сприйняття підприємцями практик фінансового менеджменту та їхній зв'язок із результативністю малих підприємств у Північно-Східній Індії. Дослідження базувалося на первинних даних, зібраних із вибірки з 50 зареєстрованих малих підприємств під керівництвом Окружного промислового центру, Сілчар. Дані було проаналізовано за допомогою описової статистики та рангової кореляції Спірмена. Результати свідчать, що практики фінансового менеджменту, а саме: бюджетування капіталу, управління грошовими коштами, управління запасами, управління дебіторською заборгованістю, структурування капіталу та використання інформаційних технологій для ведення фінансової звітності, суттєво корелюють із результативністю підприємств. Крім того, статистичні тести, проведені за допомогою багатофакторного регресійного аналізу, показали, що ці практики позитивно та суттєво впливають на результативність малих підприємств. Результати цього дослідження допоможуть підприємцям визначити практики фінансового менеджменту, які відіграють ключову роль у підвищенні результативності малих підприємств

Ключові слова: структурування капіталу; бюджетування капіталу; контроль; прибуток; грошові кошти; дебіторська заборгованість

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