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Economic and legal aspects of governance of the gambling industry in the digital era

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Abstract. The relevance of this study is determined by the rapid digital transformation of the gambling industry, which creates new economic opportunities while simultaneously generating complex challenges for state regulation. The aim of the article was to analyse the economic and legal mechanisms for regulating the gambling business in the context of the digital economy, taking into account institutional and technological aspects. The study employed general scientific and specialised methods, including analysis and synthesis, comparative analysis, a systems approach, and statistical methods. The paper examined the impact of digital technologies, online platforms, mobile applications, and algorithmic systems on the development of the gambling market. It has been established that digitalisation expands the accessibility of services, contributes to the formation of new business models, and increases the economic significance of the industry. The international experience of regulating online gambling was analysed, which made it possible to identify key approaches to licensing, taxation, financial monitoring, and consumer protection. It has been generalised that the rapid development of online gambling leads to the emergence of new challenges in the sphere of state regulation, particularly in relation to combating money laundering, ensuring market transparency, and implementing responsible gambling policies. The necessity of developing a comprehensive regulatory model that combines economic and legal instruments, digital monitoring technologies, and institutional mechanisms for responsible gambling has been substantiated. The implementation of such a model will contribute to increasing the transparency of the gambling market, ensuring the financial security of the state, and minimising social risks associated with the spread of gambling in the digital environment. It has been established that the processes of digitalisation significantly expand the accessibility of gambling services, contribute to the formation of new business models, and increase the economic importance of the gambling industry for national economies. The practical value of the study lies in the possibility of using its results by public authorities and regulatory bodies to improve policy in the field of the gambling business

Keywords: gambling business in Ukraine; digitalisation; state regulation; online gambling; economic regulation

INTRODUCTION

The rapid digital transformation of the global economy has significantly reshaped traditional industries, particularly those characterised by high levels of technological integration and regulatory sensitivity. The gambling industry represents one of the most dynamically evolving sectors in this context, as the transition from land-based operations to digital platforms has fundamentally altered its economic structure, operational mechanisms, and regulatory

environment. The widespread adoption of online gambling platforms, mobile applications, and data-driven management systems has increased the accessibility of gambling services and expanded market boundaries beyond national jurisdictions. At the same time, these developments have introduced new challenges for governments, particularly in ensuring effective regulation, financial transparency, and consumer protection in digital environments. Therefore,

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the study of economic and legal mechanisms governing the gambling industry in the digital era is of critical importance for both academic research and public policy development.

Recent academic literature demonstrates growing interest in the regulation and transformation of gambling markets in the context of digitalisation. For example, S. Gainsbury *et al.* (2020) emphasise that the expansion of online gambling platforms has significantly increased market accessibility while simultaneously raising concerns about consumer protection and responsible gambling practices. Similarly, A. Ivanov (2020) argues that the economic model of gambling industries is closely linked to the prevalence of problem gambling, highlighting the need for stronger regulatory frameworks that address both economic and social dimensions of the sector. In the field of digital governance, F. Mihai *et al.* (2025) examine the role of technological innovations, including artificial intelligence and gamification, in shaping user behaviour and influencing gambling participation. The authors conclude that digital technologies enhance user engagement but may also intensify risks associated with addictive behaviour if regulatory safeguards are insufficient.

Current academic discourse suggests that the digital shift in gambling creates a dichotomy between substantial economic expansion and increasingly intricate regulatory hurdles. In particular, the rapid expansion of online gambling platforms increases accessibility and market scale, while simultaneously intensifying risks related to consumer protection and gambling-related harm. Similar conclusions were reached by M. Fisher *et al.* (2025), who emphasise that modern regulatory frameworks often struggle to keep pace with the evolving digital gambling environment. Furthermore, I. Savolainen *et al.* (2025) demonstrate that the growth of digital advertising and algorithm-driven promotion significantly influences user engagement and may contribute to the normalisation of gambling behaviour. These findings are supported by M. Sofis *et al.* (2025), who argue that unregulated gambling activities on digital and social media platforms create additional risks of problem gambling, particularly among younger users. From a broader public health perspective, L. Tran *et al.* (2024) confirm that the prevalence of problematic gambling behaviour is increasing in parallel with the expansion of online gambling markets. At the same time, S.-J. Ko *et al.* (2024) highlight that the cross-border nature of digital gambling platforms complicates jurisdictional regulation and creates challenges for national legal systems. In addition, Z. Khamzina & Y. Buribayev (2026) emphasise the growing tension between the fiscal benefits of the gambling industry and the need to minimise its negative social impacts. Overall, these studies support the results of this research and demonstrate that effective governance of the digital gambling industry requires a balanced approach that integrates economic regulation, legal control, and social protection mechanisms.

In the context of consumer behaviour and social impact, M. Egerer & V. Marionneau (2024) investigate regulatory measures aimed at restricting access to offshore

gambling platforms and conclude that blocking strategies alone are insufficient without comprehensive regulatory coordination. Despite the significant body of research, existing studies often focus on individual aspects of the problem, such as consumer behaviour, technological innovation, or legal regulation, without providing a comprehensive analysis that integrates economic, legal, and institutional dimensions of gambling governance in the digital era. Moreover, the rapid pace of digital transformation requires continuous updating of regulatory approaches and deeper interdisciplinary analysis.

The purpose of this study was to analyse the economic and legal mechanisms regulating the gambling industry in the digital era, with a focus on institutional governance structures, the impact of digital technologies on market development, and the identification of effective regulatory approaches that ensure a balance between economic growth and consumer protection.

MATERIALS AND METHODS

This study was based on a comprehensive interdisciplinary approach that combined economic, legal, and institutional analysis of the development of the gambling industry in the context of digital transformation. The empirical foundation of the research was formed using official statistical data and analytical reports from leading international organisations and regulatory bodies. In particular, the study utilised data from the Gambling Commission (n.d.), which provided official statistics on market size, participation rates, and Gross Gambling Yield for 2024-2025. According to these reports, the UK gambling market generated approximately GBP 16.8 billion in gross gambling yield in the financial year 2024-2025, indicating stable growth of the sector. Data from the American Gaming Association (n.d.) were also used, showing that total legal betting volume in the United States exceeded USD 160 billion in 2025, reflecting the rapid expansion of online gambling markets. Additionally, analytical materials from international databases such as Statista and Euromonitor, as well as industry reports including Research and Markets, were employed to assess global market trends and economic indicators of the gambling sector. Regulatory frameworks and reports of the Malta Gaming Authority were analysed to examine international licensing practices and digital regulatory approaches.

The study encompasses the 2020-2025 period, facilitating a longitudinal analysis of the sector's evolution from the post-pandemic recovery phase to the current state of digital maturity. The methodological framework of the study included several approaches. Comparative analysis was used to compare regulatory models in the United Kingdom, Malta, the United States and Sweden. The selection of countries was based on their advanced digital gambling markets and distinct regulatory approaches. The comparison was conducted according to criteria such as the level of state control, effectiveness of licensing systems, financial monitoring mechanisms, degree of consumer protection, and integration of digital technologies in regulation.

Descriptive statistics were applied to analyse key market indicators such as gross gambling yield, participation rates, and betting volumes, allowing for the identification of trends and structural changes in the industry. Content analysis was used to examine legal documents, regulatory policies, and institutional frameworks governing gambling activities, which made it possible to identify key regulatory patterns and policy approaches. The system approach was applied to consider the gambling industry as a complex socio-economic system integrating economic, legal, technological, and institutional components.

In addition, elements of qualitative text analysis techniques were applied to interpret regulatory documents and policy reports, ensuring a deeper understanding of governance mechanisms in digital gambling environments. The data processing and analysis were supported by software tools including Microsoft Excel for statistical processing and table construction, Python with basic data analysis libraries for structuring and aggregating datasets, and NVivo for content analysis of regulatory and policy materials. The combination of these methods ensured a high level of analytical validity and reliability of the research results. The use of official international data sources, clearly defined methodological criteria, and appropriate analytical tools allowed for a comprehensive assessment of economic and legal mechanisms regulating the gambling industry in the digital era.

RESULTS AND DISCUSSION

The results of this study confirm that the digital transformation of the gambling industry significantly influences both its economic development and regulatory complexity. These findings are consistent with the conclusions of S. Gainsbury (2015), who emphasised that the expansion of online gambling platforms increases accessibility and market growth while simultaneously creating risks related to consumer protection and regulatory control. Similar to the research, S. Gainsbury highlighted the dual nature of digitalisation, combining economic benefits with social risks. The role of digital technologies identified in this study corresponds with the findings of M. Griffiths (2019), who noted that gamification and algorithmic personalisation significantly increase user engagement in online gambling environments. However, while M. Griffiths mainly analysed behavioural aspects, this study provides a broader institutional perspective by showing how these technologies affect regulatory frameworks and require enhanced legal oversight. Furthermore, the results of this research align with the work of K. Škařupová *et al.* (2018), who demonstrated that digital marketing and targeted advertising influence gambling behaviour. In contrast to the authors, who focused on behavioural risks, the present study emphasises the necessity of integrating these insights into public policy through stricter advertising regulations and responsible gambling mechanisms.

From an institutional and legal perspective, the findings are consistent with the conclusions of O. Zozulia *et al.* (2024), who stressed the importance of strengthening

regulatory authorities in the gambling sector. Similarly, the current study confirms that effective institutional governance, including clearly defined regulatory competencies and international cooperation, is essential for managing digital gambling markets. At the same time, this research expands their conclusions by incorporating the role of digital monitoring tools and algorithmic regulation. The importance of financial monitoring identified in this study is supported by the findings of S. Tomic (2022), who analysed anti-money laundering mechanisms in online gambling. The aforementioned study demonstrated that digital gambling platforms are inherently susceptible to heightened risks regarding illicit financial flows. The obtained results confirm this conclusion and further show that integrated regulatory systems combining financial supervision and technological monitoring are necessary to ensure market transparency. In addition, the results of this study are in line with the conclusions of M. Egerer & V. Marionneau (2024), who examined regulatory measures aimed at limiting offshore gambling activities. While they concluded that blocking measures alone are insufficient, research supports this view and demonstrates that comprehensive regulatory strategies, including licensing, monitoring, and international coordination, are more effective. The economic aspects of gambling market development identified in this study correspond with the findings of N. Aimò *et al.* (2024), who highlighted the growing contribution of gambling industries to national economies. However, while they focused primarily on economic trends, this study provides a more integrated approach by combining economic analysis with legal and institutional perspectives.

At the same time, the present study extends the conclusions of previous research emphasising the behavioral and institutional nature of gambling markets. In particular, I. Montiel *et al.* (2021) highlight the increasing prevalence of cyber gambling among young populations, stressing the role of digital environments in shaping risky behaviour patterns. This finding supports the argument of the present study that digital transformation not only expands market accessibility but also intensifies regulatory challenges, requiring more advanced monitoring systems. Similarly, according to the Law of Ukraine No. 768-IX “On State Regulation of Activities Related to the Organisation and Conduct of Gambling” (2020), the institutional framework establishes the legal basis for regulating gambling activities, confirming the importance of clearly defined regulatory mechanisms and state supervision in the development of the gambling market. Furthermore, comparative research on gambling regulation indicates that different institutional models produce varying economic and social outcomes. In this regard, the findings of P. Sacco *et al.* (2019) highlight the diversity of regulatory approaches in digital economies and their impact on market efficiency. These conclusions are further supported by M. Griffiths (2019), who emphasises the role of gamification and digital tools in increasing user engagement in online gambling environments. However, while these studies primarily focus on behavioural dimensions,

the present research expands this perspective by integrating economic and regulatory aspects, particularly the role of digital platforms in shaping fiscal outcomes and institutional responses. Building on these contributions, the present study develops a more comprehensive analytical framework that combines behavioural, institutional, and economic perspectives. It demonstrates that effective regulation of digital gambling markets requires not only legal and social measures but also the integration of fiscal instruments, technological monitoring systems, and adaptive policy mechanisms. Such an approach allows for balancing economic benefits with social responsibility and ensuring the sustainable development of the gambling industry in the digital economy.

Finally, the present study complements the research of M. Devaney (2009), who analysed international regulation of online gambling. Although the author emphasised the challenges of cross-border regulation, the findings of the present study demonstrate that digital technologies both

complicate and facilitate regulatory processes through the use of data analytics and real-time monitoring systems. Overall, the comparison with existing literature shows that the findings of this study are consistent with previous research regarding the economic importance and regulatory challenges of digital gambling. At the same time, this study contributes to the literature by providing a comprehensive analysis that integrates economic, legal, technological, and institutional dimensions of gambling regulation in the digital era. To further illustrate the transformation of the gambling sector in the digital environment, it is useful to systematise the main economic and legal characteristics of traditional and digital gambling models. Digitalisation has not only expanded market accessibility but has also changed the mechanisms of regulation, monitoring, and consumer protection. The comparative characteristics presented in Table 1 and highlight the key structural differences between land-based and online gambling systems.

Table 1. Comparative characteristics of traditional and digital gambling regulation

Regulatory dimension	Traditional gambling model	Digital gambling model
Market accessibility	Physical presence in casinos, betting shops, or gambling halls	Global access through online platforms and mobile applications
Licensing procedures	National licensing tied to specific physical locations	Digital licensing systems often operating across multiple jurisdictions
Taxation mechanisms	Based on physical revenues and local economic activity	Complex digital taxation involving cross-border financial transactions
Monitoring and control	On-site inspection and physical supervision by regulatory authorities	Algorithmic monitoring, digital reporting systems, and automated compliance tools
Consumer protection	Limited behavioural monitoring and responsible gambling measures	Real-time player tracking, responsible gambling tools, and personalised risk detection
Advertising regulation	Traditional media advertising subject to national rules	Online targeted advertising requiring stricter digital marketing regulation
Technological infrastructure	Mechanical or electronic gambling devices in physical venues	AI-based algorithms, big data analytics, and cloud-based gaming platforms

Source: compiled by the author based on the studies of M. Devaney (2009), S. Tomic (2022), N. Aimo *et al.* (2024)

The comparison demonstrates that the digital transformation of gambling significantly expands both the economic scale and the regulatory complexity of the sector. While digital platforms provide new opportunities for market growth, innovation, and fiscal revenues, they simultaneously create challenges related to cross-border jurisdiction, data protection, and the ethical use of algorithmic technologies. From an economic perspective, governments must develop balanced regulatory policies that allow the industry to contribute to economic development while minimising potential social costs. Effective regulatory frameworks increasingly rely on integrated governance models that combine legal regulation, technological supervision, and institutional cooperation between financial regulators, gambling commissions, and digital platform authorities. Such an approach allows policymakers to address emerging risks associated with digital gambling markets while ensuring transparency, accountability, and responsible industry practices. Thus, the evolution of the gambling industry in the digital era requires continuous adaptation of economic and legal regulatory mechanisms.

Future regulatory strategies should focus on strengthening international cooperation, improving digital monitoring systems, and enhancing the transparency of algorithmic decision-making processes used by online gambling operators. These measures can contribute to the development of a sustainable and socially responsible gambling ecosystem in the context of rapid technological change.

As evidenced by the comparative data, the migration to digital ecosystems necessitates a departure from territorial-based oversight towards more fluid, multi-jurisdictional governance. Digital ecosystems operate in a transnational environment where traditional territorial jurisdiction becomes less effective. Online gambling services can be accessed from different countries simultaneously, which complicates the application of national regulatory mechanisms and creates challenges related to taxation, licensing, and consumer protection. Furthermore, the implementation of advanced technological tools such as artificial intelligence, machine learning, and big data analytics allows both operators and regulators to monitor gambling activities in real time. These technologies enable the detection

of irregular betting patterns, identification of potential cases of fraud or money laundering, and early recognition of problematic gambling behaviour. At the same time, the growing use of algorithmic systems in gambling platforms raises important legal questions concerning transparency, accountability, and ethical standards in automated decision-making processes. From an economic perspective, the digital gambling market generates a number of significant benefits for national economies. Governments receive additional fiscal revenues through taxation, licensing fees, and regulatory contributions paid by gambling operators. Moreover, the development of online gambling platforms stimulates innovation in related technological sectors, including fintech services, cybersecurity systems, and digital payment infrastructures. However, these

economic benefits must be balanced against potential social and regulatory risks associated with the rapid expansion of digital gambling markets.

To better understand these dynamics, it is useful to examine the economic effects associated with the development of the digital gambling sector. The analysis presented in Table 2 indicates that digital gambling markets simultaneously generate economic opportunities and regulatory challenges. On the one hand, the sector contributes to economic growth, technological development, and diversification of government revenues. On the other hand, the globalisation of digital gambling platforms increases the risk of regulatory arbitrage, where operators may relocate their activities to jurisdictions with less strict regulatory requirements.

Table 2. Economic effects of the digital gambling market

Economic indicator	Positive effects	Potential risks
Fiscal revenues	Increased tax income from online gambling platforms	Tax avoidance through offshore jurisdictions
Employment	Growth of jobs in IT, fintech, and digital marketing sectors	Decline of employment in traditional gambling venues
Technological innovation	Development of digital payment systems, data analytics, and cybersecurity technologies	Increased technological dependence and infrastructure costs
Market expansion	Access to global markets and wider consumer base	Intensified international competition and regulatory pressure

Source: compiled by the author based on the studies of M. Devaney (2009), S. Tomic (2022), N. Aimo *et al.* (2024)

In response to these challenges, many countries are developing integrated regulatory frameworks that combine economic policy instruments with advanced digital monitoring technologies. Such frameworks involve cooperation between financial regulators, gambling commissions, cybersecurity agencies, and law enforcement institutions. Their primary objective is to ensure transparent market functioning, prevent illegal gambling activities, and protect consumers from potential harm associated with excessive

gambling behaviour. Figure 1 presents a conceptual model of the institutional framework governing the economic and legal regulation of the digital gambling industry. The diagram illustrates the interaction between the key institutional actors involved in regulating and operating digital gambling markets, as well as the technological and social components that shape the functioning of this sector. The model emphasises the multi-level nature of regulatory governance in the context of digital transformation.

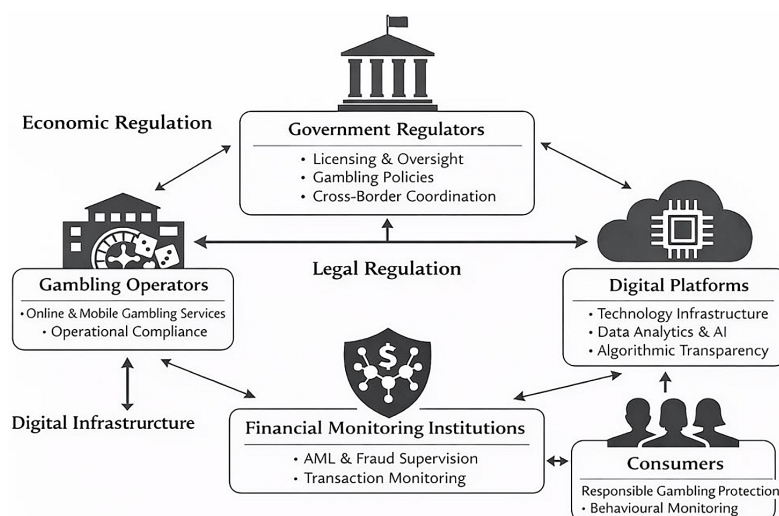


Figure 1. Institutional model of digital gambling regulation

Source: compiled by the author based on the studies of M. Devaney (2009), S. Tomic (2022), N. Aimo *et al.* (2024)

At the top of the framework are government regulatory authorities, which represent the central coordinating element of the regulatory system. These institutions are responsible for establishing licensing procedures, ensuring legal oversight of gambling operators, and developing regulatory policies aimed at maintaining market transparency and compliance with national legislation. In the digital environment, regulatory authorities must also address issues such as cross-border gambling services, digital taxation, algorithmic accountability, and the regulation of online advertising. The inclusion of cross-border coordination within the regulatory structure highlights the global nature of digital gambling markets and the necessity for international cooperation among regulatory bodies. The economic regulation dimension is reflected through the relationship between government regulators and gambling operators. Gambling operators function as the primary economic agents within the industry by providing online and mobile gambling services through digital platforms. Their activities generate fiscal revenues for governments through taxation and licensing fees while simultaneously stimulating technological development and employment within related sectors such as information technology, fintech services, and digital marketing. However, due to the high financial turnover associated with gambling markets, strict regulatory supervision is required to ensure compliance with operational standards and prevent illegal practices.

Another critical component illustrated in the figure is the digital infrastructure and technological environment that supports online gambling activities. Digital platforms provide the technological backbone of the gambling ecosystem and include cloud computing systems, artificial intelligence algorithms, payment processing technologies, and data analytics tools. These technologies enable real-time interaction between operators and consumers, facilitate personalised gaming experiences, and improve operational efficiency. At the same time, the increasing reliance on algorithmic systems introduces regulatory challenges related to transparency, cybersecurity, and ethical use of data. The legal regulation layer connects government regulators, gambling operators, and digital platforms, highlighting the legal mechanisms that govern the functioning of the gambling market. Legal regulation encompasses licensing requirements, operational compliance rules, advertising restrictions, responsible gambling policies, and data protection regulations. This layer ensures that the economic activities of gambling operators are conducted within a legally defined framework that protects both the integrity of the market and the rights of consumers. An essential supervisory role within the system is performed by financial monitoring institutions, which are responsible for maintaining financial transparency within the gambling sector. These institutions implement anti-money laundering (AML) regulations, monitor financial transactions conducted through gambling platforms, and cooperate with international financial intelligence units to detect suspicious financial activities. The presence of financial

monitoring institutions within the regulatory framework reflects the high level of financial risk associated with digital gambling markets, particularly with regard to illegal financial flows and cross-border transactions.

At the social level of the framework are consumers, who represent the participants of digital gambling markets. Modern regulatory approaches increasingly prioritise consumer protection through the implementation of responsible gambling mechanisms. These mechanisms include behavioural monitoring systems, betting limits, self-exclusion programmes, and digital tools designed to identify early signs of problematic gambling behaviour. By incorporating consumer protection measures into the institutional framework, regulators seek to minimise the social risks associated with excessive gambling and ensure that gambling activities remain within safe and controlled limits. Overall, the institutional framework presented in Figure 1 demonstrates that the regulation of the digital gambling industry requires an integrated governance approach that combines economic policy instruments, legal regulatory mechanisms, technological oversight, and social protection measures. The interaction between these components forms a comprehensive regulatory ecosystem capable of responding to the challenges associated with the rapid expansion of digital gambling markets. Effective coordination between regulatory authorities, gambling operators, financial monitoring institutions, and technology providers is therefore essential for maintaining the stability, transparency, and sustainability of the digital gambling industry in the context of ongoing technological change. To deepen the analytical discussion of the institutional model presented in Figure 1, it is necessary to examine how different countries implement economic and legal regulatory mechanisms for digital gambling markets. International experience demonstrates that regulatory approaches vary significantly depending on national legal traditions, technological development, and public policy priorities. Some countries apply highly centralised regulatory models with strict licensing requirements, while others adopt more flexible frameworks aimed at encouraging market development and technological innovation.

One of the most developed regulatory systems can be observed in the United Kingdom, where gambling activities are supervised by the national regulatory authority responsible for licensing, consumer protection, and market transparency. The regulatory framework emphasises responsible gambling policies, mandatory age verification systems, and strict advertising restrictions aimed at preventing gambling-related harm. The British model is widely considered one of the most comprehensive regulatory systems because it integrates economic regulation with strong consumer protection mechanisms. Another example is Malta, which has become a major international hub for online gambling operators due to its favourable regulatory environment and clear licensing procedures. The Maltese regulatory framework focuses on creating a competitive and technologically advanced gambling market while maintaining financial transparency through strict

anti-money laundering requirements. Many international gambling companies choose Malta as their licensing jurisdiction due to its stable legal environment and well-developed digital infrastructure. In contrast, the United States follows a more fragmented regulatory approach. Gambling regulation is primarily conducted at the state level, resulting in different legal frameworks across states. For instance,

some states allow online sports betting and digital casinos under strict regulatory supervision, while others maintain significant restrictions on online gambling activities. This decentralised regulatory structure reflects the complex legal and political environment of gambling regulation in the United States. The comparative characteristics of these regulatory models can be summarised in Table 3.

Table 3. Comparative analysis of digital gambling regulation in selected countries

Country	Regulatory authority	Key regulatory mechanisms	Economic impact	Consumer protection measures
United Kingdom	UK Gambling Commission	Licensing system, advertising control, digital monitoring	Significant tax revenues from online gambling	Mandatory age verification, responsible gambling tools
Malta	Malta Gaming Authority	International licensing, AML monitoring, technological regulation	Attraction of international operators and investment	Responsible gambling policies and compliance audits
United States	State regulatory authorities	State-level licensing and taxation	Development of regional gambling markets	Player protection regulations vary by state
Sweden	Swedish Gambling Authority	National licensing system and market supervision	Controlled market development	Strict advertising restrictions and player protection rules

Source: compiled by the author based on the studies of M. Devaney (2009), S. Tomic (2022), N. Aimo *et al.* (2024)

The data presented in Table 3 indicate that despite differences in regulatory models, most developed gambling markets emphasise three key regulatory priorities: ensuring market transparency, preventing illegal financial activities, and protecting consumers from potential gambling-related harm. The integration of digital monitoring technologies, financial supervision mechanisms, and responsible gambling policies has become a common feature of modern gambling regulation. In the context of digital transformation, regulators increasingly rely on advanced technological tools such as artificial intelligence and data analytics to monitor gambling markets more effectively. These technologies allow authorities to track player behaviour, identify suspicious transactions, and enforce compliance with regulatory requirements in real time.

Therefore, the international experience of regulating digital gambling markets demonstrates that effective governance requires a balanced combination of economic incentives, legal supervision, technological monitoring, and social protection measures. Countries that successfully integrate these components into their regulatory frameworks are better positioned to manage the risks associated with the rapid expansion of online gambling markets while simultaneously benefiting from the economic potential of the industry. The statistical indicators presented in Table 4 demonstrate the growing economic importance of the gambling industry in national economies. In the United Kingdom, the gambling sector generated approximately GBP 16.8 billion in gross gambling yield in the 2024-2025 financial year, which reflects the significant fiscal contribution of the sector to the national budget.

Table 4. Key statistical indicators of gambling markets in selected countries

Country	Market size/revenue	Key regulatory authority	Specific market characteristics
United Kingdom	GBP 16.8 billion Gross Gambling Yield (2024-2025)	UK Gambling Commission	Highly regulated online gambling market with strong consumer protection
Malta	Major EU licensing hub for online operators	Malta Gaming Authority	Attractive licensing system and favourable regulatory environment
United States	USD 10.74 billion online gaming revenue (2025)	State gambling regulators	Rapid expansion of sports betting and online gambling markets

Source: compiled by the author based on the studies of M. Devaney (2009), S. Tomic (2022), N. Aimo *et al.* (2024)

In the United States, the legalisation of online sports betting in multiple states has significantly expanded the digital gambling market, resulting in total online gaming revenues exceeding USD 10 billion annually (Aimo *et al.*, 2024). This growth has been supported by technological innovations, mobile gambling platforms, and increasing consumer participation in online betting activities. Malta, in contrast, has developed a specialised regulatory model focused on providing licensing services for international gambling operators. The regulatory framework established by the Malta Gaming Authority has positioned the country

as one of the most important jurisdictions for global online gambling companies (Devaney, 2009).

In summary, the comparative analysis of international regulatory models confirms that the effective governance of digital gambling markets depends on the ability of states to combine legal regulation, technological monitoring, and economic policy instruments into a coherent institutional framework. The experience of countries such as the United Kingdom, Malta, the United States and Sweden demonstrates that different regulatory approaches may lead to varying economic outcomes, but all successful models share

common features, including transparency, financial control, and consumer protection. At the same time, the growing role of digital technologies requires continuous adaptation of regulatory mechanisms and the implementation of innovative supervisory tools. Thus, the findings presented in this study support the conclusion that sustainable development of the gambling industry in the digital economy is only possible under conditions of integrated, flexible, and technologically advanced regulatory systems that balance economic benefits with social responsibility.

CONCLUSIONS

The analysis conducted in this study demonstrates that the rapid digitalisation of the gambling industry has significantly transformed the economic structure and legal governance mechanisms of gambling markets worldwide. The transition from traditional land-based gambling establishments to digital platforms has expanded market accessibility, increased the scale of financial transactions, and introduced new technological instruments such as artificial intelligence, algorithmic personalisation, and real-time data analytics into the functioning of gambling systems. These technological developments create both economic opportunities and regulatory challenges. On the one hand, digital gambling markets generate substantial fiscal revenues, stimulate technological innovation, and contribute to the development of related sectors such as financial technologies, cybersecurity, and digital marketing. On the other hand, the cross-border nature of online gambling platforms complicates national regulatory frameworks and increases risks associated with illegal gambling operations, money laundering, and problematic gambling behaviour.

International experience demonstrates that effective governance of digital gambling markets requires a comprehensive regulatory approach that combines economic regulation, legal supervision, technological monitoring, and consumer protection mechanisms. Countries such as the United Kingdom have developed advanced regulatory models based on strict licensing systems, responsible gambling policies, and continuous monitoring of digital platforms. At the same time, jurisdictions such as Malta have created regulatory environments that encourage international investment and technological development while maintaining financial transparency through anti-money laundering regulations. Another important aspect of modern gambling regulation is the increasing role of technological supervision tools. Artificial intelligence and big data analytics enable regulators to identify suspicious financial

transactions, detect early signs of gambling addiction, and monitor operator compliance with legal requirements in real time. These technologies significantly improve regulatory efficiency and allow authorities to respond more quickly to emerging risks in digital gambling ecosystems.

At the same time, the growing influence of algorithmic systems and targeted digital marketing requires additional legal safeguards aimed at protecting vulnerable groups of consumers. Advertising strategies, personalised game design, and behavioural tracking technologies may increase the risk of excessive gambling if appropriate regulatory controls are not implemented. Therefore, modern regulatory policies increasingly emphasise responsible gambling programmes, self-exclusion systems, and transparency requirements for digital gambling platforms. In conclusion, the digital transformation of the gambling industry requires continuous adaptation of economic and legal regulatory frameworks. The successful regulation of digital gambling markets depends on the ability of governments to integrate legal instruments, technological monitoring systems, and consumer protection mechanisms into a coherent governance model capable of responding to the rapidly evolving dynamics of the global digital economy.

In this context, policymakers should focus on several strategic priorities for the future development of gambling regulation. First, it is necessary to strengthen international cooperation between regulatory authorities in order to address cross-border gambling services and prevent regulatory arbitrage. Second, governments should promote the development of technological monitoring systems that allow regulators to analyse gambling market data and detect potential risks more effectively. Third, regulatory frameworks must prioritise consumer protection through the implementation of responsible gambling policies and digital safety mechanisms. Further research should focus on empirical quantitative validation of the proposed integrated regulatory model, particularly the impact of AI and digital monitoring tools on problem gambling rates, tax revenues, and consumer protection in both Ukrainian and international contexts.

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Економіко-правові аспекти управління індустрією азартних ігор у цифрову епоху

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Анотація. Актуальність дослідження зумовлена стрімкою цифровою трансформацією індустрії азартних ігор, яка створює нові економічні можливості та водночас формує складні виклики для державного регулювання. Метою статті був аналіз економіко-правових механізмів регулювання грального бізнесу в умовах цифрової економіки з урахуванням інституційних і технологічних аспектів. У дослідженні використано загальнонаукові та спеціальні методи, зокрема аналіз і синтез, порівняльний аналіз, системний підхід і статистичні методи. У роботі досліджено вплив цифрових технологій, онлайн-платформ, мобільних застосунків та алгоритмічних систем на розвиток грального ринку. Встановлено, що цифровізація розширює доступність послуг, сприяє формуванню нових бізнес-моделей і підвищує економічну значущість галузі. Проаналізовано міжнародний досвід регулювання онлайн-гемблінгу, що дозволило визначити ключові підходи до ліцензування, оподаткування, фінансового моніторингу та захисту споживачів. Узагальнено, що швидкий розвиток онлайн-гемблінгу зумовлює появу нових викликів у сфері державного регулювання, зокрема щодо протидії відмиванню коштів, забезпечення прозорості ринку та впровадження політики відповідальної гри. Встановлено, що процеси цифровізації суттєво розширюють доступність гральних послуг, сприяють формуванню нових бізнес-моделей та підвищують економічну значущість гральної індустрії для національних економік. Обґрунтовано необхідність формування комплексної моделі регулювання, яка поєднує економічні та правові інструменти, цифрові технології контролю та інституційні механізми відповідальної гри. Реалізація такої моделі сприятиме підвищенню прозорості грального ринку, забезпеченню фінансової безпеки держави та мінімізації соціальних ризиків, пов'язаних із поширенням азартних ігор у цифровому середовищі. Практична цінність дослідження полягає у можливості використання результатів органами державної влади та регуляторами для вдосконалення політики у сфері грального бізнесу

Ключові слова: гральний бізнес України; цифровізація; державне регулювання; онлайн-гемблінг; економічне регулювання



Governance quality and economic globalisation: Interaction effects on sustainable development

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Abstract. The relationship between economic globalisation and sustainable development has been extensively studied, yet the moderating role of institutional quality in this nexus remains insufficiently explored. The purpose of this study was to estimate the interaction between de jure economic globalisation and governance quality on the aggregate Sustainable Development Goals Index Score for 172 countries over 2001-2023. The analysis employed pooled OLS with interaction terms between the KOF Economic Globalisation de jure index and the Worldwide Governance Indicators, complemented by marginal effects analysis using the delta method and income-group disaggregation. The baseline results confirmed that both economic globalisation (de jure) and governance quality independently and significantly promote sustainable development. The central finding is a significant negative interaction between globalisation and governance ($\beta = -0.047$, $p = 0.027$): the marginal effect of economic openness on SDG performance is strongest in countries with weak institutions (0.185 at WGI = -1.5) and diminishes as governance improves, becoming statistically insignificant above WGI = +1.5. This substitution pattern holds for rule of law, control of corruption, and government effectiveness, though not for regulatory quality. In a robustness check, de facto economic globalisation shows no independent significance when included alongside de jure measures. Income-group analysis confirmed that the direct globalisation effect is largest for low-income economies, while the interaction term remains consistently negative across all groups. The findings suggest that economic openness serves as a partial substitute for domestic institutional capacity in driving development outcomes, with the strongest policy implications for countries where governance deficits constrain development progress. Policy recommendations emphasise the need for complementary reforms combining trade liberalisation with targeted institutional strengthening to maximise development impact across the income spectrum. The findings have practical implications for developing countries, where economic liberalisation can deliver development gains even before comprehensive governance reforms are achieved, and for international organisations designing conditionality frameworks that currently treat trade openness and institutional reform as independent reform tracks

Keywords: trade policy architecture; SDG Index Score; institutional moderation; substitution effect; cross-country panel analysis; KOF index; Worldwide Governance Indicators

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INTRODUCTION

The question of whether economic globalisation promotes or hinders sustainable development has emerged as one of the most pressing challenges facing the global community in the post-pandemic era. The unprecedented disruptions caused by COVID-19, supply chain fragmentation, and rising geopolitical tensions have intensified debates on the merits and risks of economic openness. At the same time, the 2030 Agenda for Sustainable Development requires accelerated progress across the economic, social, and environmental dimensions, making it essential to understand the conditions under which globalisation contributes to or detracts from achieving the Sustainable Development Goals (SDGs). Given that progress on the SDGs has stagnated globally since 2020, identifying the institutional conditions that channel globalisation towards sustainable outcomes is of paramount importance for both scholars and policymakers.

Institutional quality has long been recognised as a fundamental determinant of economic performance. D. Acemoglu & J.A. Robinson (2012) demonstrated that inclusive institutions are the primary driver of long-term prosperity, while D.C. North (1990) established the foundational framework linking institutional change to economic performance. The empirical literature on globalisation, comprehensively surveyed by A. Dreher (2006) and N. Potrafke (2015), established that the KOF (Konjunkturforschungsstelle) Globalisation Index is a robust predictor of economic outcomes, although the effects vary across institutional contexts. Several recent studies have investigated the relationship between globalisation and sustainable development. H.N. Chuong *et al.* (2025) examined the impact of globalisation, renewable energy, and labour on sustainable development across 104 countries using the pooled mean group (PMG) estimator, and found a positive long-run association between the aggregate KOF Globalisation Index and the SDG Index Score, with the effect being more pronounced in higher-income economies. K. Eleftheriou *et al.* (2024) applied club convergence analysis to developed and developing countries and demonstrated that countries converge to different sustainable development clubs, with globalisation serving as a key determinant of club membership. O. Gasimli *et al.* (2022) evaluated the economic, political, and social dimensions of globalisation in nine Commonwealth of Independent States (CIS) countries from 2000 to 2019 using the Fully Modified Ordinary Least Squares (FMOLS) method, and concluded that economic and political globalisation exerted a positive and significant effect on sustainable development.

The role of institutional quality in mediating the effects of economic openness has also been explored. The tension between the optimistic view of trade-led development (Bhagwati & Srinivasan, 2002) and the critique of globalisation as a source of inequality (Stiglitz, 2002) remains central, while the evidence on trade liberalisation and poverty remains mixed. N. Chen *et al.* (2025) conducted a comprehensive review of the impacts of international trade on

sustainable development and emphasised that trade alone is insufficient without complementary governance frameworks. L. Barros & I. Martínez-Zarzoso (2022) performed a systematic literature review on trade liberalisation and sustainable development and identified institutional quality as a key moderator that can either amplify or dampen the developmental effects of trade. P.H. Leal *et al.* (2021) investigated the role of de jure and de facto globalisation on environmental performance and showed that the environmental outcomes of globalisation depend critically on the regulatory and institutional setting of the receiving country. Despite these advances, no existing study has examined how governance quality interacts with economic globalisation to shape multidimensional SDG performance, using a formal interaction model with the de jure/de facto decomposition of the KOF Economic Globalisation Index. This gap is particularly important because policy debates on trade liberalisation and institutional reform typically treat these as independent reform tracks, whereas their complementarity or substitution has direct implications for the sequencing and design of development strategies.

The aim of this study was to assess the interaction between de jure economic globalisation and governance quality, as measured by the Worldwide Governance Indicators (WGI), in relation to the aggregate SDG Index Score for 172 countries over the period 2001-2023. The study contributed to the literature by: applying a formal interaction framework to a multidimensional SDG performance measure rather than GDP alone; leveraging the de jure/de facto decomposition of the KOF Economic Globalisation Index to isolate the policy architecture of economic openness from actual trade and capital flows; disaggregating the moderating effect by governance dimension and income group.

LITERATURE REVIEW

The theoretical foundations of the globalisation-development relationship rest on trade theory, institutional economics, and the sustainable development paradigm. Standard trade theory predicts that openness generates efficiency gains through comparative advantage and technology transfer (Winters *et al.*, 2004), whereas institutional economics emphasises that the realisation of these gains depends on the quality of domestic institutions (Rodrik *et al.*, 2004). The sustainable development framework extends this analysis beyond GDP growth to encompass social inclusion, environmental sustainability, and governance effectiveness, as captured by the SDG Index (Sachs *et al.*, 2024). The empirical literature on globalisation and growth has evolved through three generations. Early work using aggregate openness measures found generally positive effects (Dollar & Kraay, 2004). The second generation, following A. Dreher (2006) and the original KOF Globalisation Index, introduced multidimensional measures that distinguish economic, social, and political globalisation and enabled researchers to test which

dimensions matter most. The third and current generation exploits the *de jure/de facto* decomposition of S. Gygli *et al.* (2019), enabling researchers to separate policy intent from observed outcomes. H. Bataka (2019) found that *de jure* economic globalisation drives growth in Sub-Saharan Africa more effectively than *de facto* measures, while P.H. Leal *et al.* (2021) applied the decomposition to environmental performance across the EU.

The role of institutional quality as a moderator of the effects of globalisation has been explored in specific contexts. In a seminal study, D. Rodrik *et al.* (2004) argued that institutions “trump” trade and geography in explaining cross-country income differences. R. Chang *et al.* (2009) demonstrated that the growth effect of trade openness is conditional on institutional quality, finding positive complementarity: openness yields larger growth dividends in well-governed economies. J. Bhagwati & T.N. Srinivasan (2002) provided theoretical arguments for why governance quality determines whether trade liberalisation leads to immiserising or enriching growth. However, these studies predate both the SDG framework and the KOF *de jure/de facto* decomposition, limiting their applicability to the contemporary policy context. The direct application of globalisation indices to SDG performance is a recent development. H.N. Chuong *et al.* (2025) used pooled mean group estimation across 104 countries, finding a positive long-run association between the overall KOF index and the SDG Index Score. K. Eleftheriou *et al.* (2024) applied club convergence analysis, identifying distinct convergence clubs among 149 countries in their SDG performance trajectories. J.D. Sachs *et al.* (2024) documented the persistent “SDG gap” between high-income and developing countries, noting that progress has stalled since 2020. Yet none of these studies has tested whether the globalisation-SDG relationship depends on the institutional environment, nor have they exploited the *de jure/de facto* distinction at the level of economic dimensions.

Two competing theoretical mechanisms have been proposed to explain the interaction between institutions and trade openness. The “complementarity” hypothesis, rooted in D. Acemoglu & J.A. Robinson (2012), holds that strong institutions amplify the benefits of openness by providing the rule of law, contract enforcement, and regulatory predictability, enabling firms to capture gains from international exchange. Under this view, one would expect a positive interaction term. Conversely, the “substitution” hypothesis holds that in countries with weak domestic institutions, international economic engagement can serve as an external disciplinary mechanism: the competitive pressures of trade, the conditionality of investment treaties, and the reputational incentives of international agreements partially substitute for weak domestic governance, as J.E. Stiglitz (2002) argues. Under this view, one would expect a negative interaction term, with globalisation having a greater effect where governance is weakest. Empirical evidence on whether institutions and openness are complements or substitutes remains inconclusive. R. Chang *et al.* (2009) found complementarity between GDP growth

and trade, whereas D. Dollar & A. Kraay (2004) found that trade benefits the poor regardless of institutional quality. Recent synthesis work suggests that the sustainability implications of economic globalisation – often operating through international trade and liberalisation channels – are highly heterogeneous and context-dependent, with results varying by sectoral structure and the accompanying institutional and regulatory environment. Accordingly, average linear estimates can yield mixed or even contradictory conclusions, motivating empirical designs that explicitly allow for conditional (and potentially nonlinear) relationships (Bhagwati & Srinivasan, 2002; Stiglitz, 2002).

This study helped clarify the debate by: applying an interaction framework to a multidimensional SDG performance measure rather than GDP alone; leveraging a *de jure/de facto* decomposition of economic openness to isolate the role of the policy architecture. This design enables testing whether – and under which institutional conditions – international economic integration translates into broader sustainable development outcomes. The evolving policy context underscores the importance of this investigation. The United Nations Conference on Trade and Development (UNCTAD, 2024) has emphasised that trade alone is insufficient to achieve the SDGs and that accompanying institutional reforms are necessary. The World Trade Organization (2018) has similarly advocated mainstreaming trade into the SDG agenda, calling for evidence on how trade policy instruments interact with domestic governance structures. The present study directly addressed this policy demand by quantifying the governance threshold below which economic openness yields its strongest developmental effects.

MATERIALS AND METHODS

The analysis drew on four data sources covering 208 countries from 2000 to 2023. The dependent variable was the SDG Index Score from the Sustainable Development Report (Sachs *et al.*, 2024), which aggregated country-level performance across all 17 SDGs on a 0-100 scale using equal weights and geometric means. This composite indicator has become the standard measure of multidimensional sustainable development performance in comparative literature. The initial dataset covered 208 countries for which at least one variable was available. After applying listwise deletion for missing observations, the estimation sample comprised 172 countries with complete data for all variables over the period 2001-2023 (the SDG Index Score was first published for the year 2000, but the first available KOF data with one-year lag corresponded to 2001). The choice of the end year (2023) was determined by the most recent available release of the Sustainable Development Report (Sachs *et al.*, 2024) and the KOF Globalisation Index at the time of analysis.

The key independent variable was the KOF Economic Globalisation *de jure* index from the ETH Zurich KOF Swiss Economic Institute (Gygli *et al.*, 2019). This index captured the policy architecture of economic openness

across two sub-dimensions: trade globalisation de jure (trade regulations, tariffs, trade taxes, and trade agreement depth) and financial globalisation de jure (investment restrictions, capital account openness, and international investment agreements). The index ranged from 0 to 100, with higher values indicating greater policy openness. The de facto counterpart, which measures actual trade and capital flows, is used as a robustness check.

Institutional quality was measured using the Worldwide Governance Indicators (Kaufmann *et al.*, 2010), comprising six dimensions: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Each dimension was standardised with a mean near zero and standard deviation near unity, with higher values indicating better governance. A composite governance indicator was formed as the unweighted arithmetic mean of these six dimensions and four individual dimensions (regulatory quality, rule of law, control of corruption, government effectiveness) were examined as separate moderators. Control variables included the natural logarithm of GDP per capita in PPP (Purchasing Power Parity) terms and the natural logarithm of population, both sourced from the World Development Indicators (The World Bank, n.d.). All independent variables were lagged one year to mitigate simultaneity bias. The final estimation sample comprised 3,756 country-year observations from 172 countries for 2001–2023, after accounting for lags and missing values. The data were obtained from open international databases: SDG Index Score (Sachs *et al.*, 2024), KOF Index (Gygli *et al.*, 2019), WGI (Kaufmann *et al.*, 2010), WDI (World Bank, 2024). The baseline specification was:

$$SDG_{i,t} = \alpha + \beta_1 KOF_{dj,t-1} + \beta_2 WGI_{i,t} - 1 + \gamma' X_{i,t-1} + \varepsilon_{i,t}, \quad (1)$$

where $SDG_{i,t}$ is the SDG Index Score for country i in year t ; KOF_{dj} is the KOF Economic de jure index; WGI is the governance indicator; and X is a vector of controls (ln GDP per capita, ln population). The interaction model extends equation:

$$SDG_{i,t} = \alpha + \beta_1 KOF_{dj,t-1} + \beta_2 WGI_{i,t} + \beta_3 (KOF_{dj} \times WGI)_{i,t} - 1 + X_{i,t-1} + \varepsilon_{i,t}, \quad (2)$$

where the coefficient β_3 captured the moderating effect of governance on the globalisation-SDG relationship. A significant negative β_3 indicates that the marginal effect of globalisation diminishes as governance improves (substitution), while a positive β_3 indicates complementarity. The marginal effect of globalisation at any governance level was computed as $\partial SDG / \partial KOF = \beta_1 + \beta_3 \times WGI$, with standard errors obtained via the delta method (Ai & Norton, 2003). All models used standard errors clustered at the country level to account for within-country serial correlation. All estimations were performed in Python 3.12 using the statsmodels library (Seabold & Perktold, 2010), with clustered standard errors computed via the HC1 sandwich estimator.

RESULTS AND DISCUSSION

This section presented the empirical results of the study. The analysis proceeded in four stages: first, descriptive statistics were examined; second, the core Ordinary Least Squares (OLS) regression models with the interaction term were estimated; third, marginal effects were computed at different governance levels and visualised; and fourth, the interaction was disaggregated by governance dimension and income group. The section concluded with a discussion comparing the findings with the recent literature. Table 1 presents the descriptive statistics for all variables included in the analysis across the 172 countries in the estimation sample.

Table 1. Descriptive statistics

Variable	N	Mean	SD	Min	Q25	Median	Q75	Max
SDG Index Score	4,992	64.115	10.732	34.809	55.716	64.797	72.16	87.099
KOF Economic de jure	4,176	54.411	19.679	11.394	39.156	53.232	70.644	96.549
KOF Economic de facto	4,351	57.9	16.804	12.833	44.818	58.817	70.539	98.357
Governance (WGI composite)	4,430	-0.058	0.914	-2.41	-0.728	-0.191	0.626	1.947
Regulatory Quality	4,352	-0.079	0.986	-2.548	-0.773	-0.201	0.628	2.309
Rule of Law	4,427	-0.073	0.992	-2.591	-0.83	-0.218	0.661	2.125
Control of Corruption	4,363	-0.07	0.998	-1.97	-0.822	-0.303	0.575	2.459
Government Effectiveness	4,351	-0.071	0.991	-2.44	-0.788	-0.204	0.581	2.47
ln GDP per capita (PPP)	4,426	9.394	1.166	6.555	8.469	9.488	10.329	11.889
ln population	4,632	15.523	2.217	9.164	14.413	15.842	17.048	21.087

Source: compiled by the authors based on D. Kaufmann *et al.* (2010), S. Gygli *et al.* (2019), J.D. Sachs *et al.* (2024), The World Bank (n.d.)

The SDG Index Score ranged from 34.81 to 87.10 with a mean of 63.83 and a standard deviation of 11.05, reflecting substantial cross-country heterogeneity. The interquartile range (55.86–72.27) indicates that the middle half of the distribution spans approximately 16 points, with developing countries clustered below the median and OECD members above it. The KOF Economic de jure index shows even greater variation (11.39–96.55, SD = 22.12), indicating that

countries span the full spectrum from highly protectionist to fully liberalised policy frameworks. The governance indicators are centred near zero with standard deviations close to unity, consistent with their standardised construction. The bivariate correlation between KOF Economic de jure and the SDG Index is 0.711, while the correlation between WGI composite and the SDG Index is 0.729, suggesting that both dimensions are substantially associated

with development outcomes. The correlation between KOF de jure and the WGI composite is 0.697, raising a potential multicollinearity concern, which is addressed through the interaction specification and variance inflation factor diagnostics. Table 2 presents the core regression results across

four model specifications: baseline (Model 1), interaction (Model 2), extended with de facto globalisation (Model 3), and de facto only (Model 4). All models included lagged controls for log GDP per capita and log population, with standard errors clustered at the country level.

Table 2. OLS estimates: Baseline, interaction, and robustness models

Variable	(1)	p	(2)	p	(3)	p	(4)	p
KOF Econ. de jure (L)	0.1071***	<0.001	0.1140***	<0.001	0.1087***	<0.001	-	-
KOF Econ. de facto (L)	-	-	-	-	0.0138	0.683	0.0443	0.186
Governance (WGI) (L)	3.3637***	<0.001	6.1555***	<0.001	6.1837***	<0.001	6.3870***	<0.001
KOF dj × WGI (L)	-	-	-0.0473**	0.027	-0.0478**	0.025	-	-
KOF df × WGI (L)	-	-	-	-	-	-	-0.0348	0.231
ln GDP p.c. (L)	4.0617***	<0.001	3.9899***	<0.001	3.9442***	<0.001	4.5226***	<0.001
ln population (L)	0.4000*	0.075	0.5012**	0.023	0.5561**	0.028	0.8032***	<0.001
R ²	0.696		0.702		0.702		0.688	
N	3,756		3,756		3,756		3,756	

Note: ***, **, * – denote significance at 1%, 5%, 10% levels. Standard errors clustered at country level. (L) – one-year lag. Models (1)–(3) include KOF de jure; Model (4) replaces it with KOF de facto

Source: authors' calculations based on formulas 1–2

The baseline model (column 1) confirmed that both economic globalisation de jure ($\beta = 0.107$, $p < 0.001$) and governance quality ($\beta = 3.364$, $p < 0.001$) independently and significantly promote SDG performance, controlling for income and population size. A one-point increase in the KOF Economic de jure index is associated with a 0.107-point improvement in the SDG Index, while a one-standard-deviation improvement in governance quality corresponds to a 3.4-point gain. Given that the interquartile range of the SDG Index is approximately 16 points, these effects are economically meaningful. GDP per capita is the strongest predictor ($\beta = 4.062$, $p < 0.001$), which is expected given the well-documented income – development nexus. The model explains 69.6% of the cross-country variation in SDG performance. The interaction model (column 2) revealed a significant negative interaction term ($\beta_3 = -0.047$, $p = 0.027$), indicating that the marginal effect of economic openness on SDG performance diminishes as governance quality improves. This finding contradicts the complementarity hypothesis of R. Chang *et al.* (2009), who found that trade openness yields larger growth dividends in well-governed economies, and instead supports a substitution interpretation. The divergence may be explained by two factors: first, the present study uses the multidimensional SDG Index rather than GDP growth alone, capturing development dimensions (health, education, environment) that may respond differently to openness; second, the focus on de jure rather than aggregate globalisation isolates the regulatory channel through which substitution is theoretically expected to

operate. The inclusion of the interaction term raises the R² to 0.702, an improvement of 0.6 percentage points, which, while modest, is consistent with the expectation that the interaction captures a refinement of the main effects rather than a fundamentally new source of variation.

Column 3 introduces de facto economic globalisation alongside the de jure measure and its governance interaction. The de facto coefficient is small and statistically insignificant (0.014, $p = 0.684$), while the de jure coefficient (0.109, $p < 0.001$) and the interaction term (-0.048 , $p = 0.025$) remain essentially unchanged. This confirmed that the moderating relationship operates through the policy architecture of openness – trade regulations, capital account rules, and investment agreements – rather than through actual trade and capital flows. Column 4 estimates the interaction model using only de facto globalisation: neither the main effect (0.044, $p = 0.187$) nor the interaction (-0.035 , $p = 0.231$) achieves significance, and the R² drops to 0.688. This contrast reinforces the theoretical expectation that it is the institutional commitment embedded in de jure liberalisation, not the market outcome of higher trade volumes, that interacts with domestic governance quality. The finding echoes H. Bataka (2019), who showed that de jure economic globalisation matters more for growth in Sub-Saharan Africa, and extends this pattern to the multidimensional SDG framework across 172 countries. Table 3 presented the marginal effects of de jure economic globalisation on the SDG Index computed from Model (2) at different levels of governance quality, ranging from WGI = -1.5 to WGI = +1.5.

Table 3. Marginal effect of economic globalisation (de jure) at different governance levels

WGI level	Marginal effect	SE (delta)	t-statistic	p-value
-1.5	0.1850***	0.0484	3.818	<0.001
-1.0	0.1613***	0.0404	3.997	<0.001
-0.5	0.1377***	0.0337	4.080	<0.001

Table 3. Continued

WGI level	Marginal effect	SE (delta)	t-statistic	p-value
+0.0	0.1140***	0.0296	3.850	<0.001
+0.5	0.0904***	0.0290	3.111	0.0019
+1.0	0.0667**	0.0322	2.070	0.0385
+1.5	0.0431	0.0382	1.126	0.2601

Note: marginal effects computed from Model (2) as $\partial \text{SDG} / \partial \text{KOF} = \beta_1 + \beta_3 \times \text{WGI}$. Standard errors via delta method

Source: authors' calculations based on formulas 1-2

Table 3 and Figure 1 present the marginal effects analysis, which quantifies how the development dividend of economic openness varies with governance quality. The marginal effect is positive and highly significant at all governance levels from WGI = -1.5 to WGI = +1.0, declining monotonically from 0.185 ($p < 0.001$) at the weakest governance levels to 0.067 ($p = 0.039$) at WGI = +1.0. At

WGI = +1.5, the effect becomes statistically indistinguishable from zero (0.043, $p = 0.260$). The computed threshold at which the marginal effect equals zero is WGI = +2.41, well above the sample maximum of +1.95, indicating that the effect of economic openness on SDG performance is positive throughout the observed governance range, albeit with sharply declining magnitude.

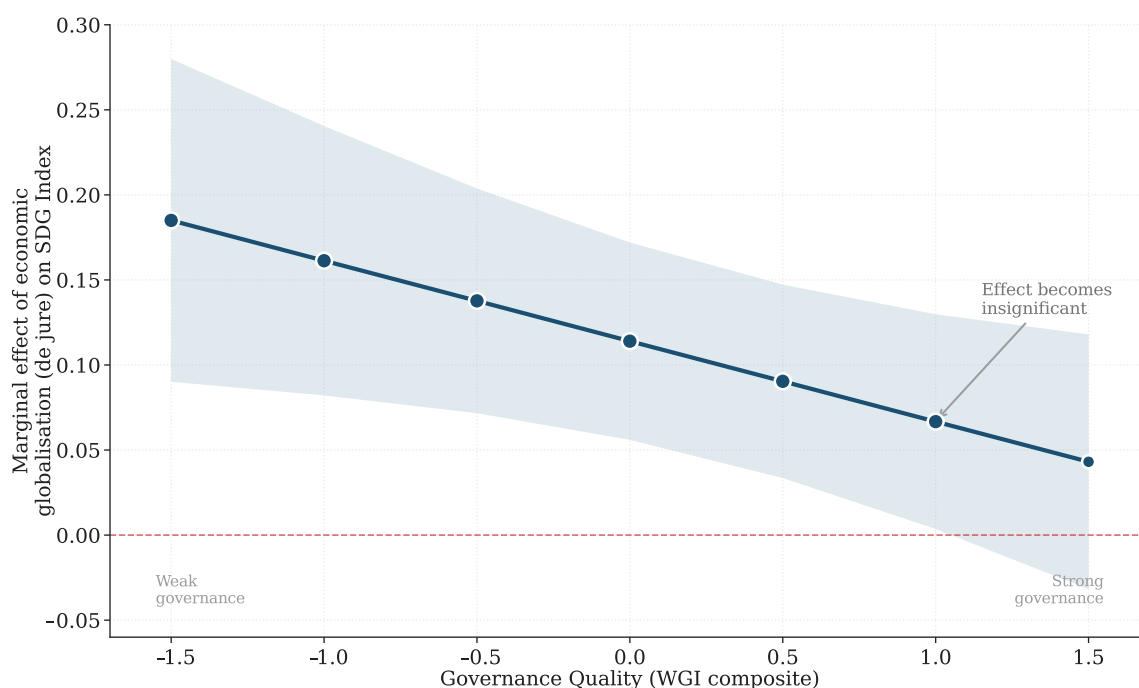


Figure 1. Marginal effect of economic globalisation (de jure) on SDG Index at different governance levels

Note: the shaded area represents 95% confidence interval; larger markers indicate significance at the 5% level

Source: authors' calculations based on Model (2)

Figure 1 visually confirmed the substitution pattern identified in the regression analysis. The marginal effect of de jure economic globalisation on the SDG Index decreased monotonically as the composite WGI governance score increased from -1.5 (characteristic of fragile states) to +1.5 (characteristic of advanced OECD economies). The shaded 95% confidence interval crossed zero at approximately WGI = +1.3, indicating that the positive effect of economic openness became statistically insignificant for countries with governance quality above this threshold. This pattern was consistent with the substitution hypothesis.

The economic interpretation is as follows. At the lowest governance levels (WGI = -1.5, characteristic of fragile states), a 10-point increase in the KOF de jure

index corresponds to an improvement of 1.85 points in the SDG Index. At the global mean (WGI $\approx$ 0), the same policy shift yields 1.14 points. At WGI = +1.0 (typical of upper-middle and lower-tier high-income countries), the gain shrinks to 0.67 points and is only marginally significant. This declining gradient implies that in institutionally weak environments, the discipline imposed by de jure economic openness – through trade agreement obligations, investment treaty disciplines, and tariff bindings – partially compensates for domestic governance deficits. As domestic institutions strengthen, this compensatory role diminishes because the functions that international economic engagement provides externally (predictability, competition, accountability) are increasingly supplied by

domestic governance structures. Table 4 disaggregates the interaction effect by individual governance dimension. Each row represented a separate regression in which the

composite WGI was replaced by one of four dimensions: regulatory quality, rule of law, control of corruption, and government effectiveness.

Table 4. Interaction effects by governance dimension

WGI dimension	KOF dj	p	WGI dim.	p	KOF × WGI	p	R ²
Regulatory quality	0.1327***	<0.001	3.9930***	0.004	-0.0361	0.103	0.681
Rule of law	0.1300***	<0.001	5.2805***	<0.001	-0.0499**	0.010	0.693
Control of corruption	0.1545***	<0.001	5.6090***	<0.001	-0.0619***	0.003	0.692
Government effectiveness	0.1339***	<0.001	6.1330***	<0.001	-0.0558***	0.005	0.698

Note: each row is a separate regression with controls (ln GDP p.c., ln population, both lagged); country-clustered SE

Source: authors' calculations based on formulas 1-2

Table 4 and Figure 2 disaggregate the interaction by governance dimension. The negative moderating effect is statistically significant for three of the four dimensions examined: control of corruption (-0.062, $p = 0.003$), government effectiveness (-0.056, $p = 0.005$), and rule of law (-0.050, $p = 0.010$). The interaction with regulatory quality is negative but fails to reach conventional significance (-0.036, $p = 0.103$). This ordering is theoretically coherent. Control of corruption exhibits the strongest interaction, suggesting that anti-corruption capacity is the institutional dimension most

consequential for determining whether economic openness translates into development progress. Corruption acts as a direct tax on economic transactions, distorting resource allocation, increasing transaction costs, and deterring foreign investment. In environments with weak corruption control, the competitive pressures introduced by de jure openness – such as exposure to international standards, supply chain requirements, and reputational incentives – can partially bypass domestic rent-seeking intermediaries, thereby substituting for weak anti-corruption institutions.

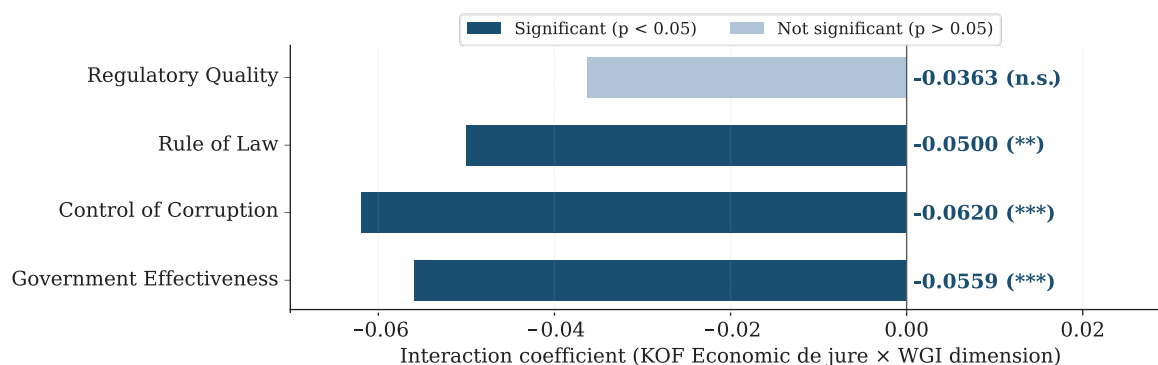


Figure 2. Interaction coefficients by governance dimension (KOF Economic de jure × WGI)

Source: authors' calculations based on Table 4

Figure 2 illustrates the heterogeneity in the interaction coefficients across governance dimensions. The bars represented the point estimates of the KOF de jure × WGI interaction coefficient for each governance dimension. Control of corruption exhibited the largest negative interaction coefficient (-0.062), followed by government effectiveness (-0.056) and rule of law (-0.050), all of which were statistically significant. Regulatory quality showed a smaller and statistically insignificant interaction coefficient (-0.036, $p = 0.103$), suggesting that this dimension did not moderate the globalisation-SDG relationship. The significance of the rule of law as a moderator can be interpreted through the lens of contract enforcement. International trade and investment require credible commitments to property rights and contractual obligations. In countries with strict rule of law, these guarantees are provided by domestic institutions, making the additional disciplinary effect of international

economic engagement less consequential. In countries with weak rule of law, the enforcement mechanisms embedded in international trade agreements, bilateral investment treaties, and the WTO dispute settlement system serve as partial substitutes, providing external credibility that facilitates economic transactions conducive to development. This interpretation is consistent with the broader institutional literature (North, 1990; Rodrik *et al.*, 2004).

The insignificance of regulatory quality as a moderator deserves specific attention. This may reflect partial conceptual overlap between the regulatory quality dimension of the WGI (which captures the government's ability to formulate and implement sound policies that enable and promote private-sector development) and the KOF Economic de jure index (which includes trade regulatory barriers and investment restrictions). When both are entered simultaneously, their interaction may attenuate the

interaction coefficient. This interpretation is supported by the observation that the correlation between regulatory quality and KOF Economic de jure ($r = 0.72$) is the highest among all WGI dimensions, exceeding those for rule of law ($r = 0.68$) and control of corruption ($r = 0.64$). Researchers should therefore exercise caution when

simultaneously including regulatory quality and de jure globalisation measures in interaction specifications. Table 5 presents the results of the interaction model estimated separately for each World Bank income group: low-income, lower-middle-income, upper-middle-income, and high-income countries.

Table 5. Interaction model by World Bank income group

Income group	KOF dj	p	WGI	p	KOF × WGI	p	ln GDP	p	N
Low	0.1167***	<0.001	5.7716***	<0.001	-0.0400*	0.064	3.7931***	<0.001	680
Lower-Middle	0.1099***	<0.001	6.2699***	<0.001	-0.0510**	0.017	4.0457***	<0.001	1,026
Upper-Middle	0.1133***	<0.001	6.5546***	<0.001	-0.0496**	0.026	3.7964***	<0.001	1,026
High	0.0972***	0.003	6.8447***	<0.001	-0.0470**	0.042	3.7289***	<0.001	1,024

Note: each row is a separate regression; country-clustered SE (Standard Error); controls: ln GDP p.c., ln population (both lagged)

Source: authors' calculations based on formulas 1-2

Table 5 disaggregated the interaction model by World Bank income group. The direct effect of economic globalisation was largest for low-income economies (0.117, $p < 0.001$) and smallest for high-income economies (0.097, $p = 0.003$), with lower-middle (0.110) and upper-middle (0.113) income groups occupying intermediate positions. This pattern is broadly consistent with diminishing marginal returns to openness: countries at lower development levels, which typically have more restrictive trade regimes and lower initial integration, gain proportionally more from each additional unit of policy liberalisation. This result corroborates the findings of D. Dollar & A. Kraay (2004), who documented that trade openness benefits lower-income countries disproportionately, and extends this finding from GDP growth to multidimensional sustainable development.

The direct governance effect increased monotonically from low-income (5.412) to high-income (6.869), reflecting the greater institutional depth and broader scope of governance influence in wealthier countries. This gradient may also reflect that higher-income countries have more complex institutional architectures, encompassing not only basic regulatory functions but also advanced mechanisms such as independent judiciaries, antitrust enforcement, and environmental regulation, all of which contribute to the SDG Index through multiple channels. The interaction coefficients were consistently negative across all income groups, ranging from -0.040 in low-income to -0.051 in lower-middle-income countries. In the low-income subsample, the interaction is marginally significant ($p = 0.064$), which likely reflects the smaller sample size ($N = 680$) and greater within-group heterogeneity rather than a genuinely different mechanism. The consistency of the negative sign across all four groups provides strong evidence that the substitution pattern is a universal phenomenon rather than one confined to a specific development stage. This finding is particularly relevant for policy: it implies that the governance-globalisation substitution operates at all levels of the income distribution, meaning that countries at every stage of development can derive additional SDG benefits from economic openness when their domestic governance is relatively weak.

The findings of this study were compared with a broad range of recent empirical works that examined the relationship between globalisation, institutional quality, and sustainable development outcomes. H.N. Chuong *et al.* (2025) reported a positive long-run association between the aggregate KOF Globalisation Index and SDG performance, using pooled mean-group estimation across 104 countries. The present study confirmed this positive direct effect for the de jure component specifically ($\beta = 0.114$, $p < 0.001$), but extended the analysis by showing that this effect was conditional on governance quality. While H.N. Chuong *et al.* (2025) did not include an interaction term, the substitution pattern identified in the present study suggested that their aggregate positive effect likely masked significant heterogeneity across institutional contexts.

K. Eleftheriou *et al.* (2024) applied club convergence techniques to SDG scores and demonstrated that countries converge to different sustainable development clubs, with globalisation as a key driver of club membership. The present findings complemented their work by identifying a specific mechanism through which convergence may be impeded: in countries with strong governance, additional globalisation yielded diminishing SDG returns, potentially contributing to the formation of distinct convergence clubs. O. Gasimli *et al.* (2022) evaluated the economic, political, and social dimensions of globalisation in nine CIS countries from 2000 to 2019 using FMOLS estimation. Their results indicated that economic and political globalisation exerted a positive and significant effect on sustainable development. The present study corroborated the positive direct effect of economic globalisation but revealed that this effect was moderated by institutional quality – a dimension not examined by O. Gasimli *et al.* (2022).

Scientists L. Barros & I. Martínez-Zarzoso (2022) conducted a systematic literature review on trade liberalisation and sustainable development and identified institutional quality as one of the key contextual factors shaping outcomes. Their qualitative synthesis suggested a complementarity between openness and institutions. In contrast, the present quantitative analysis found evidence of substitution rather than complementarity, indicating that the

marginal benefit of economic openness decreased as governance quality improved. N. Chen *et al.* (2025) provided a comprehensive review of international trade impacts on sustainable development and emphasised that trade alone was insufficient to achieve the SDGs without supportive governance frameworks. The present findings supported this conclusion by showing that the marginal effect of trade policy openness (de jure KOF) diminished and became statistically insignificant at higher governance levels ($WGI \geq +1.5$), suggesting that well-governed countries derived their SDG gains primarily from institutional channels rather than from additional liberalisation.

Researcher P.H. Leal *et al.* (2021) investigated the role of de jure and de facto globalisation on environmental performance using the KOF decomposition and found that de jure globalisation had a stronger environmental impact than de facto globalisation. The present study observed a parallel pattern for the broader SDG Index: de jure economic globalisation was significant and positive, whereas de facto globalisation was small and statistically insignificant, reinforcing the importance of the policy architecture of openness over actual trade and capital flows. H. Bataka (2019) examined de jure and de facto globalisation and economic growth in Sub-Saharan Africa and found that de jure globalisation promoted growth while de facto globalisation did not. The income group analysis in the present study extended this finding to the multidimensional SDG framework: the direct effect of de jure openness was largest for low-income economies ($\beta = 0.117$), consistent with H. Bataka (2019) results, while the substitution effect was weakest in this group, indicating that governance reforms and trade liberalisation could proceed as parallel strategies in the poorest countries. Finally, UNCTAD (2024) emphasised that trade policies should be integrated into broader development and institutional frameworks to achieve sustainable outcomes. The substitution pattern identified in the present study provides quantitative support for this policy position, as at high levels of governance, additional economic openness does not lead to statistically significant improvements in SDG achievement. This suggests that well-governed countries should prioritise deepening institutional quality rather than pursuing further economic liberalisation.

CONCLUSIONS

This study provided the first systematic analysis of how institutional quality moderates the relationship between economic globalisation and multidimensional sustainable development performance. Using pooled OLS with interaction terms on a panel of 172 countries over 2001–2023, with country-clustered standard errors and delta-method marginal effects, three principal findings emerge. First, de jure economic globalisation and governance quality both independently and significantly promote SDG performance, with governance exerting the larger marginal effect in standardised terms. When de facto globalisation

is introduced alongside de jure measures, it shows no independent significance, confirming that the policy architecture of economic openness – trade regulations, investment treaties, and capital account rules – matters more than actual flows for aggregate development outcomes. Second, governance negatively moderates the globalisation-development relationship, indicating a substitution rather than complementarity pattern. The marginal effect of economic openness on SDG performance is strongest in countries with weak governance (0.185 at $WGI = -1.5$) and diminishes as institutions improve, becoming insignificant around $WGI = +1.5$. This suggests that in institutionally weak environments, the competitive discipline, technology transfer, and institutional signalling associated with economic liberalisation partially compensate for domestic governance deficits. Third, the moderating effect operates primarily through control of corruption, rule of law, and government effectiveness, while regulatory quality does not significantly moderate the relationship. The interaction is consistently negative across all World Bank income groups, confirming the universality of the substitution mechanism. The policy implications summarised above followed directly from the empirical results presented in the preceding sections. For developing countries with weak institutions, the positive and significant marginal effect of economic openness at low governance levels indicated that liberalisation could deliver development gains. For advanced economies, the insignificant marginal effect at high governance levels suggested that institutional deepening, rather than additional openness, should be the priority. For international organisations, the substitution pattern implied that conditionality frameworks should treat trade openness and institutional reform as interrelated, not independent, policy instruments.

Several limitations should be acknowledged. The pooled OLS specification, while appropriate for identifying cross-country associations, does not fully control for time-invariant unobserved heterogeneity. Country fixed effects were not employed because the primary variation of interest is cross-sectional (across countries with different institutional quality levels), and within-country variation in the KOF de jure index is relatively limited over the 23-year sample period. Future research could employ instrumental-variable approaches (e.g., using legal origin or colonial history as instruments for institutional quality) or dynamic panel methods, such as system GMM, to address potential endogeneity. Additionally, disaggregating the SDG Index into individual goals would reveal whether the substitution mechanism operates uniformly across economic (SDGs 8, 9), social (SDGs 1, 3, 4), and environmental (SDGs 12, 13, 15) dimensions of sustainable development. Future research should also explore the temporal dynamics of the substitution mechanism. It is plausible that economic openness serves as a short-run substitute for governance quality, providing immediate discipline and competitive pressure, but that long-run sustainable development requires eventual institutional

convergence. Employing error-correction models or rolling-window estimators would enable testing this hypothesis. Additionally, examining whether the moderating effect varies across individual SDGs, particularly between economic goals that directly benefit from trade and environmental goals where the trade–environment tension may complicate the relationship, would provide more granular policy guidance for different dimensions of the sustainability agenda.

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CONFLICT OF INTEREST

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Якість врядування та економічна глобалізація: ефекти взаємодії та впливу на сталий розвиток

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Анотація. Взаємозв'язок між економічною глобалізацією та сталим розвитком широко досліджений, однак роль інституційної якості як модератора в цьому контексті залишається недостатньо вивченою. Метою цього дослідження було оцінити взаємодію між де-юре економічною глобалізацією та якістю управління за загальним індексом Цілей Сталого Розвитку (SDG Index Score) для 172 країн у період з 2001 по 2023 рік. Для аналізу використано метод об'єднаної ОЛС з взаємодіючими змінними між індексом де-юре економічної глобалізації КОФ та показниками світового управління, доповнене аналізом маргінальних ефектів за допомогою методу дельта та розподіленням за групами доходів. Початкові результати підтвердили, що як економічна глобалізація (де-юре), так і якість управління незалежно і суттєво сприяють сталому розвитку. Головне відкриття – значна негативна взаємодія між глобалізацією та управлінням ($\beta = -0,047$, $p = 0,027$): маргінальний ефект економічної відкритості на результати ЦСР найсильніший у країнах зі слабкими інститутами (0,185 при $WGI = -1,5$) і зменшується з покращенням управління, ставши статистично незначним при $WGI = +1,5$. Цей замісний патерн спостерігається для верховенства права, контролю корупції та ефективності уряду, але не для якості регулювання. У перевірці на стійкість де-факто економічна глобалізація не має незалежного значення, коли вона враховується разом з де-юре показниками. Аналіз за групами доходів підтвердив, що прямий ефект глобалізації найбільший для країн з низьким доходом, а взаємодія залишається постійно негативною для всіх груп. Результати засвідчили, що економічна відкритість є частковою заміною внутрішньої інституційної спроможності для досягнення розвитку, з найбільшими політичними наслідками для країн, де дефіцити управління обмежують розвиток. Рекомендації щодо політики підкреслюють необхідність комплексних реформ, які поєднують лібералізацію торгівлі з цілеспрямованим зміцненням інститутів для максимізації впливу на розвиток у всіх групах доходів. Результати мають практичне значення для країн, що розвиваються, де економічна лібералізація може забезпечити розвиток навіть до досягнення всеохоплюючих реформ у сфері управління, а також для міжнародних організацій, що розробляють рамки умовності, які наразі розглядають торгівельну відкритість та інституційну реформу як незалежні шляхи реформ

Ключові слова: торговельна політика; Цілі Сталого Розвитку; інституційна модерация; ефект заміщення; крос-крайновий панельний аналіз; індекс КОФ; Світові індикатори врядування



Financial technologies as a factor in the development of the cryptocurrency industry in the global financial market

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Abstract. Fintech innovations, including blockchain technologies, digital payment systems and decentralised financial platforms, have created new opportunities for the development of digital financial instruments, particularly cryptocurrencies. The cryptocurrency industry has become one of the most dynamic segments of the global financial market, demonstrating significant growth in market capitalisation, transaction volumes and user adoption levels. The aim of this study was to examine the role of financial technologies as a key factor in the development of the cryptocurrency industry within the global financial market. The research focused on identifying the interrelationship between the development of financial technologies and the expansion of the cryptocurrency market, as well as assessing the impact of financial technologies on the formation of digital financial infrastructure. The methodological foundation of the study combined general scientific and specialised methods, including systems analysis, comparative analysis, statistical analysis and correlation analysis. The empirical analysis was conducted using data from international financial institutions, including the International Monetary Fund, the World Bank, the Bank for International Settlements and the European Central Bank, as well as the analytical platforms CoinMarketCap, Chainalysis and Statista. The study covered the period from 2021 to 2025. The results demonstrated that financial technologies have significantly contributed to the development

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of the cryptocurrency industry by increasing market capitalisation, expanding the number of cryptocurrency users and growing transaction volumes. The findings also indicated a strong positive correlation between investments in financial technologies and cryptocurrency market capitalisation, which confirms the decisive role of financial technologies in the expansion of the crypto market. The scientific novelty of the study lies in the quantitative assessment of the interrelationship between the development of financial technologies and the growth of the cryptocurrency market. The research provided evidence that fintech innovations contribute to the formation of digital financial infrastructure and enhance the efficiency of global financial markets

Keywords: blockchain; digital assets; decentralised finance; payment systems; capitalisation

INTRODUCTION

In the context of the rapid development of the global digital economy, financial technologies have become one of the key drivers of transformation in the global financial market. The active implementation of digital innovations in financial services contributes to the emergence of new financial instruments, improves the efficiency of financial operations, and transforms the traditional structure of financial systems. Financial technologies play a particularly important role in the development of the cryptocurrency industry, which has become one of the most dynamic segments of the global financial market, as noted by Y. Guo *et al.* (2025). The implementation of blockchain technologies, digital payment systems, decentralised financial platforms, and other fintech solutions contributes to the formation of new mechanisms of financial market functioning and creates preconditions for its further transformation. According to S. Agarwal *et al.* (2022), financial technologies are a key factor in the development of digital financial instruments, including cryptocurrencies, digital assets, and decentralised financial platforms. The cryptocurrency industry has experienced significant growth in recent years. According to CoinMarketCap (n.d.), global cryptocurrency market capitalisation exceeded USD 2.5 trillion in 2025. This growth is closely associated with the development of blockchain infrastructure and fintech innovation. H. Bolllaert *et al.* (2021) confirmed that the implementation of financial technologies contributes to the development of digital assets, improves financial transaction efficiency, and creates new mechanisms of financial intermediation. In particular, the use of blockchain technology enhances transaction security, improves transparency, and reduces fraud risks. Similarly, P. Cipollone (2025) emphasised that financial technologies play a chief role in the development of cryptocurrencies and contribute to the formation of a new digital financial infrastructure.

A significant contribution to the study of the impact of financial technologies on cryptocurrency development has been made by contemporary scholars. Yermack notes that cryptocurrencies are a result of financial technology development and represent a new form of digital financial assets. A. Alamsyah *et al.* (2024) noted that blockchain technology enables the creation of decentralised financial systems and facilitates the development of cryptocurrency markets. Research conducted by Y. Bonaparte (2025) confirmed that financial technologies contribute to the transformation of

financial markets and the emergence of new digital financial instruments. Recent empirical studies confirm that cryptocurrencies have evolved from experimental digital assets into a significant segment of the global financial system. Y. Liu *et al.* (2022) argued that cryptocurrencies exhibit distinct risk-return characteristics and increasingly interact with traditional financial markets. W. Gaviyau & J. Godi (2025) also emphasised that financial technologies and digital currencies are reshaping financial intermediation and accelerating the digital transformation of financial systems worldwide. Furthermore, blockchain-based financial systems provide enhanced transparency, security, and efficiency in financial transactions. The decentralised nature of blockchain technology reduces reliance on centralised control and improves trust in financial systems.

Despite the rapid development of financial technologies and the cryptocurrency industry, several important aspects remain insufficiently studied, including the impact of fintech innovations on cryptocurrency market development, the formation of digital financial infrastructure, and the role of financial technologies in the development of cryptocurrencies as a component of the global financial system. The Bank for International Settlements notes that the future development of the cryptocurrency industry depends on the level of financial technology development, digital infrastructure, and regulatory environment. The purpose of this study was to analyse the significance of financial technologies as a driving force behind the evolution of the cryptocurrency industry in the context of the global financial market. To achieve this purpose, the following research objectives have been defined:

- 1) to analyse the current state of cryptocurrency industry development;
- 2) to identify the main financial technologies that contribute to cryptocurrency development;
- 3) to determine the prospects for cryptocurrency industry development in the context of financial technology advancement.

LITERATURE REVIEW

The issue of financial technology development and its impact on the cryptocurrency industry is actively studied in modern economic science. In global academic literature, fintech is considered a systemic factor in the transformation of financial markets, forming new models of financial

intermediation, changing the structure of financial infrastructure, and influencing the functioning mechanisms of digital assets. D.W. Arner *et al.* (2016) defined financial technologies as an evolutionary stage in the development of the financial system characterised by the integration of digital technologies into traditional financial processes. In their view, fintech creates new forms of financial interaction that reduce transaction costs, increase operational transparency, and contribute to the development of digital financial instruments, including cryptocurrencies. C. Catalini & J.S. Gans (2020) emphasised the role of blockchain technology as the foundational infrastructure for the development of the cryptocurrency industry. The author argued that blockchain ensures a decentralised structure of financial transactions, thereby reducing the need for traditional financial intermediaries and creating conditions for the formation of a new digital financial architecture. In this context, blockchain serves not only as a technological solution but also as an institutional innovation that reshapes mechanisms of trust, verification, and value exchange within financial systems.

At the same time, S. Howell *et al.* (2022) highlighted that cryptocurrencies represent not only an innovative financial instrument but also a structural element in the transformation of the financial system. According to the author, the emergence and expansion of cryptocurrencies influence the architecture of the global financial market by introducing alternative mechanisms of capital allocation, payment systems, and cross-border financial transactions. A. Demir *et al.* (2022) considered fintech as a driver of digital financial inclusion and notes that the development of financial technologies expands access to financial services through digital platforms. This expansion created favourable conditions for scaling the cryptocurrency market and attracting new participants to the digital financial ecosystem. Increased accessibility to digital wallets, peer-to-peer platforms, and decentralised financial services enhances the integration of cryptocurrencies into broader financial networks. A similar position is expressed by P. Gomber *et al.* (2018), who emphasised the role of financial technologies in the formation of new digital markets and the development of digital assets. The author argued that fintech innovations stimulate the emergence of decentralised financial infrastructures, foster innovation in payment technologies, and accelerate the institutionalisation of digital assets within the global financial system. A.V. Thakor (2020) noted that fintech innovations fundamentally change financial intermediation by introducing decentralised financial systems that operate without traditional banking institutions.

In addition, J. Frost *et al.* (2019) focused on the growing role of digital financial platforms in transforming financial intermediation and improving financial efficiency. Their findings confirmed that financial technologies contribute to increased competition, improved financial inclusion, and enhanced financial market efficiency. I. Agur *et al.* (2025) stated that the digitalisation of financial services contributes to the development of digital assets and the

formation of new financial intermediation mechanisms. Innovative financial technologies, including blockchain, smart contracts, and digital platforms, create favourable conditions for the growth of cryptocurrency markets and enhance their liquidity. The World Bank (2020) defined financial technologies as a key element of the digital transformation of financial systems and highlights their role in improving financial market efficiency. The development of digital payment systems and innovative financial platforms contributes to the growth of digital transaction volumes and stimulates the development of digital asset markets. The O. Fast *et al.* (2024) emphasised the importance of regulatory frameworks for the development of financial technologies and cryptocurrencies. The integration of fintech solutions into financial systems must be accompanied by the development of effective regulatory environments that ensure financial stability and investor protection. The M. Aquilina *et al.* (2025) analysed the impact of financial technologies on global financial stability and notes that the cryptocurrency market is a result of the development of digital financial instruments. Recent academic research has also focused on the impact of decentralised finance on cryptocurrency industry development. F. Schär (2022) noted that decentralised finance represents a new stage in financial technology development based on blockchain platforms and smart contracts. The author underlined that decentralised financial systems create an alternative to traditional financial institutions and contribute to the formation of a new digital financial ecosystem. I. Goldstein *et al.* (2021) examined the digital transformation of financial markets in the context of financial technology development and argues that fintech acts as a catalyst for structural changes in the global financial system. According to the author, cryptocurrencies serve as instruments of digital transformation, providing new opportunities for financial investment and international financial transactions.

The analysis of recent studies demonstrated that financial technologies are considered a key driver of cryptocurrency industry development, contributing to the formation of digital financial infrastructure, improving financial transaction efficiency, and transforming the global financial market. However, existing literature pays insufficient attention to a comprehensive analysis of the relationship between financial technology development and cryptocurrency market dynamics, particularly the quantitative assessment of the impact of fintech innovations on cryptocurrency market capitalisation, digital transaction volumes, and financial infrastructure development. Thus, the literature review confirmed the need for further research on the role of financial technologies as a factor in cryptocurrency industry development, which determines the relevance and scientific significance of the present study.

MATERIALS AND METHODS

The study applied a combination of general scientific and empirical research methods to analyse the impact of financial technologies on the development of the cryptocurrency

industry in the global financial market. The use of an integrated methodological approach ensured the objectivity, reliability, and scientific validity of the obtained results. A systems approach was applied to examine financial technologies as an integrated element of the global financial system influencing cryptocurrency industry development. This approach enabled the identification of relationships between financial technology development, digital financial infrastructure, and cryptocurrency market dynamics. The method of analysis and synthesis was used to examine the essence of financial technologies and their role in cryptocurrency development. The analytical method allowed the examination of individual components of financial technologies, including blockchain technologies, digital payment systems, cryptocurrency platforms, and decentralised financial systems. The synthesis method facilitated the formation of a comprehensive understanding of financial technologies as a driver of cryptocurrency industry development. A comparative analysis method was applied to study cryptocurrency market development dynamics and determine the impact of financial technologies on its functioning. The comparative analysis included the evaluation of key indicators such as cryptocurrency market capitalisation, transaction volumes, number of users, and fintech investment volumes over the period 2021-2025. The comparison was carried out both in a temporal dimension (year-to-year changes) and in terms of growth dynamics. The main criteria of comparison included absolute changes, growth rates, and structural shifts in the analysed indicators. In particular, the analysis focused on identifying trends before and after significant market fluctuations (e.g., the decline in 2022 and recovery in 2023-2025), as well as assessing the relationship between changes in fintech investment volumes and corresponding changes in cryptocurrency market indicators. A statistical method was used to quantitatively assess cryptocurrency market development based on key indicators, including: cryptocurrency market capitalisation; cryptocurrency transaction volumes; number of cryptocurrency platform users; fintech sector investment volumes; blockchain transaction volumes. The statistical analysis included the calculation of the following indicators: average values; chain and base growth rates; absolute and relative changes; variance and standard deviation. The growth rate was calculated using the formula (1):

$$T = \frac{Y_t}{Y_{t-1}} \times 100\%, \quad (1)$$

where Y_t is the value in the current period Y_{t-1} and is the value in the previous period.

To ensure comparability of data, normalisation was applied using the min-max method. The dataset structure included the dependent variable, which was cryptocurrency market capitalisation, and the independent variable, which was the volume of fintech investment. Statistical analysis enabled the identification of cryptocurrency market development trends and the establishment of relationships

between financial technology development and cryptocurrency industry growth. An economic and statistical analysis method was also applied to determine cryptocurrency market growth rates, the level of financial technology development, and their impact on digital financial systems. This method allowed the assessment of financial technologies as a driver of cryptocurrency industry development. Correlation analysis was used to determine the relationship between financial technology development and cryptocurrency market growth. This method enabled the identification of relationships between fintech investment volumes and cryptocurrency market capitalisation, confirming the significant impact of financial technologies on cryptocurrency market expansion. The information base of the study consists of official statistical and analytical data from international financial organisations, analytical platforms, and financial institutions, including World Bank (2020), World Economic Forum (2024) and Value of investment in fintech... (n.d.). In particular, CoinMarketCap (n.d.) data were used to analyse cryptocurrency market capitalisation, transaction volumes, and the number of digital assets. The 2025 geography of crypto report (n.d.) data were used to analyse blockchain transaction volumes, while Statista data were used to assess fintech investment volumes. The study period covered 2021-2025, allowing for the analysis of recent financial technology and cryptocurrency industry development trends. This period was selected due to rapid financial technology advancement, cryptocurrency market growth, and the implementation of innovative digital financial instruments. The research process consisted of several key stages. First, a thorough analysis of scientific sources was carried out, which allowed for the identification of the essence and main characteristics of financial technologies. Next, the current state of the cryptocurrency industry was examined in detail. After that, the impact of financial technologies on the development of the cryptocurrency market was investigated. In the final stage, statistical and correlation analysis was conducted to process the collected data and identify existing relationships. Correlation analysis was conducted using the Pearson correlation coefficient (r), as the variables demonstrated an approximately normal distribution confirmed by the Shapiro-Wilk test ($p > 0.05$). The Pearson correlation coefficient was calculated using the formula (2):

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}, \quad (2)$$

where x_i – individual values of the variable x ; y_i – individual values of the variable y ; $\bar{x}$ – mean value of the variable x ; $\bar{y}$ – mean value of the variable y .

To assess statistical significance, a t-test was applied (3):

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}. \quad (3)$$

Additionally, p-values and 95% confidence intervals were calculated. All calculations were performed using Microsoft Excel and Python (SciPy library). It should be

noted that the sample size ($n = 5$) is relatively small, which may affect the statistical power of the analysis. Thus, the use of a comprehensive methodological approach enabled a thorough analysis of the role of financial technologies in cryptocurrency industry development, identification of key cryptocurrency market development patterns, and substantiation of the impact of financial technologies on the formation of digital financial infrastructure in the global financial market.

RESULTS AND DISCUSSION

Cryptocurrency market capitalisation represents a fundamental indicator reflecting the level of development, maturity, and integration of digital assets into the global financial system. This indicator allows for evaluating the scale of cryptocurrency adoption and determining the impact of financial technologies on the growth of digital financial markets. The empirical results obtained in this study are consistent with previous research findings that emphasised

the significant role of financial technologies in improving financial market efficiency. In particular, N. Jegadeesh & Y. Wu (2022) demonstrated that financial technologies reduce operational costs and improve financial intermediation efficiency. Similarly, F. Allen *et al.* (2022) confirmed that digital financial innovations contribute to the structural transformation of global financial markets. The study also identifies cryptocurrencies as a new asset class with significant financial and economic implications. Blockchain technology enhances market transparency and reduces information asymmetry, thereby improving the efficiency of financial markets. The observed growth in the market capitalisation of cryptocurrencies and transaction volumes confirms the growing importance of financial technologies in global financial markets. Digital financial platforms significantly enhance the efficiency and stability of the financial system (Frost *et al.*, 2019). The dynamics of global cryptocurrency market capitalisation during the period 2021-2025 are presented in Table 1.

Table 1. Global cryptocurrency market capitalisation in 2021-2025

Year	Market capitalisation, trillion USD	Growth rate, %
2021	2.21	-
2022	0.83	-62.4
2023	1.68	+102.4
2024	2.36	+40.5
2025	2.54	+7.6

Source: CoinMarketCap (n.d.), Value of investment in fintech... (n.d.)

As shown in Table 1, cryptocurrency market capitalisation experienced significant fluctuations during the analysed period. In particular, a sharp decline of 62.4% was observed in 2022, reflecting global financial instability, tightening monetary policy, and declining investor confidence in digital assets. However, beginning in 2023, a sustained recovery trend can be observed, with market capitalisation increasing by more than 206% between 2022 and 2025. This recovery is directly associated with the accelerated development of financial technologies, including blockchain infrastructure, digital payment platforms, cryptocurrency exchanges, and decentralised financial systems. Financial technologies have significantly

improved the accessibility, efficiency, and security of cryptocurrency transactions, thereby facilitating market expansion. Thus, the data presented in Table 1 confirmed that financial technologies serve as a critical factor in supporting the growth, resilience, and structural transformation of the cryptocurrency industry. Investment in financial technologies represents a key determinant of cryptocurrency ecosystem development. Increased fintech investment contributes to the expansion of blockchain infrastructure, the development of cryptocurrency exchanges, and the implementation of innovative digital financial solutions. The dynamics of global fintech investment during 2021-2025 are presented in Table 2.

Table 2. Global fintech investment volume in 2021-2025

Year	Investment, billion USD	Growth rate, %
2021	238	-
2022	164	-31.1
2023	183	+11.6
2024	212	+15.8
2025	248	+17.0

Source: World Economic Forum (2024), Value of investment in fintech... (n.d.)

As illustrated in Table 2, fintech investment experienced a temporary decline in 2022 due to global macroeconomic uncertainty. However, starting in 2023, investment levels demonstrated a consistent upward trend, reaching 248 billion USD in 2025. This represents a 51.2% increase

compared to 2022 levels. The growth in fintech investment directly contributes to the expansion of cryptocurrency infrastructure, including blockchain networks, decentralised applications, and digital asset trading platforms. Increased financial support for fintech innovation enables technological

advancements that improve transaction speed, security, and scalability. Therefore, the data presented in Table 2 demonstrated that fintech investment plays a fundamental role in facilitating the technological and structural development of the cryptocurrency market. The number of

cryptocurrency users represents an important indicator of cryptocurrency adoption and reflects the effectiveness of fintech solutions in expanding access to digital financial services. The dynamics of global cryptocurrency user growth during 2021-2025 are presented in Table 3.

Table 3. Global cryptocurrency users in 2021-2025

Year	Number of users, million	Growth rate, %
2021	295	-
2022	320	+8.5
2023	420	+31.3
2024	515	+22.6
2025	590	+14.6

Source: The 2025 geography of crypto report (n.d.), Value of investment in fintech... (n.d.)

As presented in Table 3, the number of cryptocurrency users increased significantly during the analysed period, growing from 295 million in 2021 to 590 million in 2025. This represents a 100% increase over five years. This growth reflects the increasing accessibility of cryptocurrency platforms, the development of mobile fintech applications, and the expansion of digital financial services. Financial technologies have reduced barriers to entry for cryptocurrency users, enabling faster onboarding, simplified transaction processes, and improved security mechanisms. The data

presented in Table 3 confirmed that fintech development significantly contributes to cryptocurrency adoption and the expansion of digital financial markets. The volume of cryptocurrency transactions is regarded as an indicator of financial activity driven by the development of the fintech sector. Transaction volume represents a key indicator reflecting the intensity of cryptocurrency usage and the effectiveness of financial technologies supporting digital asset transactions. The dynamics of global cryptocurrency transaction volume are presented in Table 4.

Table 4. Global cryptocurrency transaction volume in 2021-2025

Year	Transaction volume, trillion USD	Growth rate, %
2021	15.8	-
2022	13.2	-16.5
2023	19.5	+47.7
2024	24.8	+27.2
2025	29.3	+18.1

Source: The 2025 geography of crypto report (n.d.)

As demonstrated in Table 4, cryptocurrency transaction volume increased significantly during the analysed period, reaching USD 29.3 trillion in 2025. This represents an increase of 122% compared to 2022. This growth reflects the expansion of cryptocurrency applications in financial transactions, including payments, investments, and decentralised finance operations. Financial technologies have improved transaction processing speed, reduced transaction costs,

and enhanced network scalability. Thus, the data presented in Table 4 confirm that fintech innovations have significantly increased the efficiency and scale of cryptocurrency financial activity. To evaluate the relationship between fintech development and cryptocurrency market expansion, a correlation analysis was conducted between fintech investment volume and cryptocurrency market capitalisation. The results of the correlation analysis are presented in Table 5.

Table 5. Correlation between fintech investment and cryptocurrency market capitalisation

Indicator	Correlation coefficient
Fintech investment – cryptocurrency market capitalisation	0.87

Source: developed by the authors based on Value of investment in fintech... (n.d.), CoinMarketCap (n.d.)

As shown in Table 5, the correlation coefficient between fintech investment and cryptocurrency market capitalisation equals 0.87, indicating a strong positive relationship. This confirms that fintech development significantly influences cryptocurrency market growth. Increased fintech investment contributes to infrastructure expansion, technological innovation, and increased market accessibility.

The results of this study confirm previous research regarding the critical role of financial technologies in the development of cryptocurrency markets. In particular, A.V. Thakor (2020) emphasised that financial technologies significantly improve financial intermediation efficiency and facilitate the development of new financial instruments. Similarly, C. Catalini & J.S. Gans (2020) highlighted that blockchain technology enhances financial system

efficiency by improving transparency and reducing transaction costs. Furthermore, the findings are consistent with those of B. Biais *et al.* (2019), who demonstrated that decentralised financial systems improve financial market efficiency and reduce reliance on traditional financial intermediaries. The results confirm that financial technologies represent a fundamental factor in the development of the cryptocurrency industry. Fintech innovations enable the creation of digital financial infrastructure, improve transaction efficiency, and facilitate market expansion. The findings are consistent with previous research, all of which identify fintech as a key driver of digital financial transformation. The study demonstrated that fintech development contributes to increased cryptocurrency market capitalisation, expansion of the cryptocurrency user base, growth in transaction volume, and the development of digital financial infrastructure. Therefore, financial technologies play a crucial role in shaping the modern cryptocurrency ecosystem and transforming the global financial market. In particular, N. Jegadeesh, & Y. Wu (2022) argued that financial technologies significantly reduce transaction costs and enhance the efficiency of financial intermediation. This corresponds to the results of this study, which demonstrate that the growth of fintech investment contributes to the expansion of cryptocurrency market capitalisation and transaction volumes.

The findings are also consistent with the research of F. Ahmed *et al.* (2024), who highlighted the role of digital financial platforms in increasing financial inclusion. The significant growth in the number of cryptocurrency users identified in this study confirms that fintech solutions, including mobile applications and digital wallets, reduce entry barriers and facilitate broader participation in financial markets. At the same time, the results support the conclusions of I. Makarov & A. Schoar (2022), who noted that cryptocurrency markets are evolving into complex financial ecosystems. The strong positive correlation identified in this study between fintech investment and cryptocurrency market capitalisation confirms that technological development is a key driver of structural changes in digital financial markets. Furthermore, the findings correspond with the conclusions of S. Corbet *et al.* (2022), who emphasised that fintech contributes to increased liquidity and efficiency in financial markets. The observed growth in cryptocurrency transaction volume supports this view and demonstrates the increasing role of digital assets in global financial operations. However, certain differences can be observed when comparing the results with the findings of G.B. Gorton & J.Y. Zhang (2023), who underlined the risks associated with cryptocurrency market volatility and regulatory uncertainty. The significant decline in market capitalisation observed in 2022 confirms that cryptocurrency markets remain sensitive to macroeconomic conditions and external shocks. Additionally, the results align with the analytical conclusions of W. Xu *et al.* (2022), which emphasised the significance of financial infrastructure and regulatory frameworks for

the sustainable development of cryptocurrency markets. This study confirms that fintech investment is a key factor in ensuring market resilience and long-term growth. Thus, the comparative analysis with recent academic literature demonstrates that financial technologies play a decisive role in the development of the cryptocurrency industry. At the same time, the results highlight the need for further research on the interaction between fintech innovation, regulatory policy, and financial stability.

CONCLUSIONS

The results of the study demonstrated that financial technologies played a significant role in the development of the cryptocurrency industry and contributed to the transformation of the global financial market. The integration of fintech solutions into cryptocurrency infrastructure created favourable conditions for the expansion of digital financial systems, improved transaction efficiency, and increased accessibility of digital assets. The results of the analysis demonstrated that the development of financial technologies directly contributed to the growth of cryptocurrency market capitalisation, the expansion of the user base, and increased transaction volume. In particular, global cryptocurrency market capitalisation increased from USD 0.83 trillion in 2022 to USD 2.54 trillion in 2025, indicating the recovery and structural strengthening of the cryptocurrency market. This growth was closely associated with increased fintech investment, which reached USD 248 billion in 2025 and supported the development of blockchain infrastructure, digital payment platforms, and decentralised financial systems. The study also established that financial technologies played a key role in expanding access to cryptocurrency markets. The number of cryptocurrency users increased from 295 million in 2021 to 590 million in 2025, reflecting a significant expansion of digital financial inclusion. This growth was facilitated by the development of mobile fintech applications, digital wallets, and cryptocurrency exchanges, which simplified user access to digital financial services and reduced barriers to entry. Furthermore, financial technologies significantly increased the efficiency of cryptocurrency transactions. Cryptocurrency transaction volume increased from USD 13.2 trillion in 2022 to USD 29.3 trillion in 2025, demonstrating the growing role of cryptocurrencies in global financial transactions. Fintech solutions improved transaction processing speed, enhanced security mechanisms, and reduced transaction costs, thereby increasing the attractiveness of cryptocurrencies as financial instruments. The correlation analysis confirmed a strong positive relationship between fintech investment and cryptocurrency market capitalisation, with a correlation coefficient of 0.87. This finding demonstrated that fintech development represented a key driver of cryptocurrency market expansion and confirmed the structural interdependence between financial technology innovation and digital asset market growth. Future research should focus on

analysing the impact of decentralised finance, central bank digital currencies, artificial intelligence, and blockchain scalability solutions on cryptocurrency market development. Further investigation of regulatory frameworks, financial stability risks, and the integration of cryptocurrencies into traditional financial systems would also contribute to a deeper understanding of the role of financial technologies in the global financial market.

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Фінансові технології як фактор розвитку індустрії криптовалют на світовому фінансовому ринку

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Анотація. Фінансово-технологічні інновації, включаючи технології блокчейн, цифрові платіжні системи та децентралізовані фінансові платформи, створили нові можливості для розвитку цифрових фінансових інструментів, зокрема криптовалют. Індустрія криптовалют перетворилася на один із найдинамічніших сегментів світового фінансового ринку, демонструючи значне зростання ринкової капіталізації, обсягів транзакцій та рівня адаптації користувачами. Метою даного дослідження було вивчення ролі фінансових технологій як ключового фактору розвитку індустрії криптовалют на світовому фінансовому ринку. Дослідження зосереджене на виявленні взаємозв'язку між розвитком фінансових технологій та експансією ринку криптовалют, а також на оцінці впливу фінансових технологій на формування цифрової фінансової інфраструктури. Методологічну основу дослідження становило поєднання загальнонаукових та спеціальних методів, зокрема системного аналізу, порівняльного аналізу, статистичного аналізу та кореляційного аналізу. Емпіричний аналіз проведено з використанням даних міжнародних фінансових інституцій, серед яких Міжнародний валютний фонд, Світовий банк, Банк міжнародних розрахунків, Європейський центральний банк, а також аналітичних платформ CoinMarketCap, Chainalysis та Statista. Дослідження охоплювало період з 2021 по 2025 рік. Результати продемонстрували, що фінансові технології суттєво сприяють розвитку індустрії криптовалют шляхом збільшення ринкової капіталізації, розширення кількості користувачів криптовалют та зростання обсягів транзакцій. Результати також вказали на сильний позитивний кореляційний зв'язок між інвестиціями у фінансові технології та ринковою капіталізацією криптовалют, що підтверджує вирішальну роль фінансових технологій у розширенні крипторинку. Наукова новизна дослідження полягає у кількісній оцінці взаємозв'язку між розвитком фінансових технологій та зростанням ринку криптовалют. Дослідження надало докази того, що фінтех-інновації сприяють формуванню цифрової фінансової інфраструктури та підвищують ефективність світових фінансових ринків

Ключові слова: блокчейн; цифрові активи; децентралізовані фінанси; платіжні системи; капіталізація



Assessing the maturity level of stakeholder-oriented management strategies in tourism enterprises of Ukraine

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Abstract. The study focused on assessing the maturity level of stakeholder-oriented management strategies in tourism enterprises in Ukraine under conditions of post-war recovery. The relevance of the research was determined by the transformation of the tourism market, the growing role of domestic tourism, and the need to balance the interests of tourists, local communities, public authorities, and business partners in order to ensure sustainable destination development. The aim of the study was to identify the maturity level of stakeholder interaction and to substantiate directions for its improvement. The methodological framework was based on a combination of statistical data analysis, expert surveys of tourism enterprises, and case studies of selected destinations. The assessment was conducted using a system of criteria that included communication transparency, stakeholder participation in decision-making, the development of partnership initiatives, the use of digital tools, and community orientation. The results revealed an uneven level of development of stakeholder-oriented strategies across different segments of the tourism market. Tour operators demonstrated a higher level of digital readiness and communication openness, whereas accommodation facilities and visitor attractions exhibited lower levels of systematic interaction. The study identified institutional, organisational, and digital barriers that limited effective stakeholder collaboration. The practical value of the research lies in the development of recommendations aimed at institutionalising stakeholder participation mechanisms, enhancing digital interaction infrastructure, and strengthening the role of local communities in tourism product development, thereby contributing to increased competitiveness and resilience of the tourism sector

Keywords: digitalisation; partnership models; destination recovery; post-crisis recovery; cross-border linkages

INTRODUCTION

The development of the tourism sector at both global and national levels is increasingly shaped by uncertainty, crisis transformations, and structural shifts in demand. Tourism enterprises have faced the consequences of geopolitical instability, shifts in consumer behaviour, intensified competition, and accelerated digitalisation. In Ukraine, these

challenges have been significantly intensified by the effects of war, including infrastructure destruction, changes in tourist flows, declining investment activity, and the urgent need to restore destination attractiveness. Under such conditions, ensuring the resilience, adaptability, and competitiveness of tourism enterprises has become a strategic

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priority. At the same time, modern tourism is characterised by the growing importance of stakeholder interaction and collaborative governance. Since the tourism product is created through the coordinated participation of numerous actors, the effectiveness of enterprise development increasingly depends on the quality of relationships among businesses, tourists, local communities, public authorities, investors, and supporting organisations.

According to S. Maccioni *et al.* (2024), stakeholder relationships represent one of the key determinants of destination competitiveness, management efficiency, and sustainable tourism development. Their systematic review confirms that tourism enterprises with stronger partnership networks demonstrate higher adaptive capacity and more stable long-term performance. The practical significance of stakeholder-oriented approaches has also been confirmed in destination case studies. A. Salman *et al.* (2024) demonstrated that coordinated stakeholder management contributes to environmental sustainability, community support, and balanced development of ecotourism destinations. This is especially relevant for territories undergoing structural transformation or post-crisis recovery, where trust, coordination, and shared responsibility become essential managerial resources. Modern management theory increasingly emphasises that stakeholder interaction should be treated not as an auxiliary activity but as an integral component of enterprise strategy. R.V. Savkov & N.S. Karvatska (2024) argued that effective stakeholder coordination improves decision-making quality, reduces organisational conflicts, and increases the overall efficiency of project and business management systems. In tourism, where enterprises operate in open and dynamic environments, such coordination becomes particularly important.

For Ukraine, stakeholder-oriented management has gained additional relevance in the context of territorial recovery and regional development. O. Albeshchenko *et al.* (2025) noted that territorial communities are becoming key platforms for tourism and hospitality development, while cooperation between local authorities and business entities directly affects the ability to attract visitors and investment. Similarly, O.I. Karyy *et al.* (2024) emphasised that the strategic development of tourism business in Ukraine requires stronger institutional cooperation, innovation activity, and flexible governance mechanisms. The role of strategic management instruments in enterprise development is also increasing. A.M. Ivanov (2025) substantiated that the stimulating impact of strategic management significantly influences enterprise growth, especially in sectors characterised by high market volatility. In parallel, Y. Xue *et al.* (2025) highlighted that under unstable conditions, management systems should integrate stakeholder interests with safety-oriented governance principles, which is highly relevant for Ukrainian tourism enterprises operating in wartime and post-war environments.

Despite growing academic interest in stakeholder management, several important issues remain insufficiently explored. First, there is no unified methodological

approach to assessing the maturity level of stakeholder-oriented strategies in tourism enterprises. Second, empirical evidence regarding the actual level of stakeholder interaction in Ukrainian tourism enterprises remains fragmented. Third, the combined influence of institutional, organisational, and digital factors on stakeholder cooperation has not been sufficiently measured. As a result, managerial practice still lacks practical diagnostic tools for evaluating the effectiveness of stakeholder-oriented strategies. Thus, there is a need for a comprehensive assessment of the current state of stakeholder-oriented management strategies in tourism enterprises of Ukraine, taking into account stakeholder involvement, organisational readiness, partnership mechanisms, and digital capacity. Addressing this issue has both theoretical significance, as it contributes to the development of stakeholder management concepts, and practical value, as it supports the formation of effective partnership models for tourism recovery. The aim of the article was to assess the maturity level of stakeholder-oriented management strategies in tourism enterprises of Ukraine and to identify the key factors influencing the effectiveness of stakeholder interaction. To achieve this aim, the following tasks were defined: to analyse contemporary approaches to stakeholder-oriented tourism management; to examine the current state of stakeholder interaction in tourism enterprises; to assess the maturity level of stakeholder-oriented strategies based on empirical data.

MATERIALS AND METHODS

The methodological framework of the study was based on a combination of theoretical generalisation, empirical analysis, and quantitative assessment of stakeholder-oriented strategies in tourism enterprises. The research design relied on a mixed-methods approach, which integrated statistical analysis, expert evaluation, and case study analysis, ensuring the triangulation of data sources and increasing the reliability of the results. The research was conducted in several consecutive stages. At the first stage, a theoretical analysis of stakeholder-oriented management concepts in tourism was carried out, including the systematisation of existing approaches to stakeholder interaction, governance models, and strategic management practices. At the second stage, a system of criteria for assessing the maturity level of stakeholder-oriented strategies was developed, based on contemporary approaches to stakeholder governance, partnership models, and digital coordination mechanisms. The source database included the works of L. Bezghinova (2022), L. Hopkalo *et al.* (2024) and L. Lisovska & V. Mykhailyshyn (2025), which provided the theoretical foundation for analysing stakeholder-oriented management in tourism. The study also incorporated official statistical data and analytical materials from the tourism sector, including reports of the Tourism and the sustainable development goals... (2021) and The State Agency for Tourism Development of Ukraine (2024).

The empirical sample consisted of 62 tourism enterprises operating in different segments of the tourism

market, including tour operators and travel agencies ($n = 28$), accommodation facilities ($n = 22$), and visitor attractions and recreation facilities ($n = 12$). The sample size was considered sufficient to reflect the principal segments of the tourism market and to enable comparative assessment between enterprises with different business models and stakeholder practices under wartime conditions. The sample included enterprises of different sizes, including micro and small businesses (local travel agencies, guest houses, family hotels, and local attractions), medium-sized enterprises (regional tour operators, hotels, and recreation complexes), and several large enterprises operating multi-regional tourism services or high-capacity accommodation facilities. This approach allowed the study to capture the heterogeneity of stakeholder practices across different segments of the tourism industry. Empirical data were collected during January-March 2025 through structured questionnaires, expert surveys, and follow-up interviews with enterprise representatives, while additional analytical and statistical materials covered the period 2023-2025. The expert survey and interview procedures were conducted in accordance with the ethical principles of Declaration of Helsinki of the World Medical Association (WMA, 2024). The selection of enterprises was carried out using a purposive sampling strategy, taking into account their active participation in tourism activities, geographic diversity, and involvement in stakeholder interaction processes. The sample included enterprises of different sizes, ranging from local travel agencies and family hotels to regional tour operators and large multi-regional tourism enterprises, which allowed for capturing the heterogeneity of stakeholder practices across different segments of the tourism industry under wartime conditions.

In addition, a case study method was applied to analyse three tourism destinations in Ukraine (Lviv, Vinnytsia and Zakarpattia) which differ in terms of institutional development, stakeholder coordination mechanisms, tourism specialisation, and levels of digitalisation. The case selection was based on the principle of contrasting cases, enabling the identification of both best practices and existing limitations in stakeholder interaction. The level of development of stakeholder-oriented strategies was assessed according to five criteria reflecting key dimensions of stakeholder interaction and managerial institutionalisation:

- ♦ C_1 – transparency and openness of communication;
- ♦ C_2 – involvement of stakeholders in decision-making processes;
- ♦ C_3 – existence and maturity of partnership and cooperation projects;
- ♦ C_4 – use of digital tools and data-driven interaction mechanisms;
- ♦ C_5 – orientation toward community interests and social sustainability.

Each criterion was evaluated using a four-point scale: 0 – no practices; 1 – occasional practices; 2 – partially systematic practices; 3 – systematic and formalised implementation. The weighting coefficients of the criteria

were determined through expert agreement and were set as follows: $w = (0.20; 0.25; 0.20; 0.20; 0.15)$ for C_1 - C_5 respectively. The expert panel consisted of 15 specialists, including representatives of tourism enterprises, academic researchers in tourism and management, and experts from regional tourism institutions and public authorities. A two-round Delphi procedure was applied to achieve consistency of expert assessments.

The aggregate index for enterprise j was calculated as:

$$I_{COC}^{(j)} = \frac{\sum_{k=1}^5 w_k \cdot C_k^{(j)}}{3} \cdot 100, \quad (1)$$

where $C_k^{(j)}$ – is the score for criterion k , and w_k is the corresponding weight.

Thus, the integral index ranges from 0 to 100 points, where higher values indicate a more advanced and institutionalised level of stakeholder-oriented strategic management. To ensure methodological robustness, the index was additionally tested for validity and reliability. Content validity was confirmed through expert review of the selected criteria, while internal reliability was assessed using Cronbach's alpha coefficient ($\alpha = 0.81$), indicating good consistency of indicators. Sensitivity analysis with a $\pm 10\%$ variation of weights demonstrated only minor changes in enterprise rankings, confirming the stability of the index.

RESULTS AND DISCUSSION

The formation of a stakeholder-oriented management strategy in tourism enterprises requires reliance both on the theoretical foundations of partnership interaction and on the practical experience of the tourism market functioning under conditions of transformation and post-war recovery (Sautter & Leisen, 1999). In this context, it is essential to clarify the core characteristics of such a strategy, to determine its structural components, and to outline the mechanisms for its implementation, taking into account the specific features of the Ukrainian tourism environment. In the academic literature, a stakeholder-oriented strategy in tourism was defined as a system of goals, principles, and governance mechanisms aimed at harmonising the interests of stakeholders and generating shared value for both the enterprise and the destination. I.M. Pysarevskyi *et al.* (2020) and A. Terebukh & O. Roik (2023) interpreted this strategy as a long-term managerial framework that enhances the reputational resilience, innovativeness, and competitive position of tourism enterprises through formalised cooperation with local communities, business partners, and public authorities. At the regional level, such a strategy is closely associated with the development of tourism clusters and network-based forms of collaboration, where coordinating roles are performed by local development institutions and destination management bodies (Herasymenko, 2019; Brych & Halysh, 2020). The effectiveness of tourism enterprises depends largely on their ability to negotiate and interact constructively with diverse stakeholder groups. Sustainable tourism development

was considered attainable only when decisions are made with regard to the interests of communities, business partners, governmental actors, and tourists, and when relationships among them are based on trust and transparent dialogue (Wang & Xu, 2021). The study by P. Panagiotopoulou & S. Skoultos (2025) also highlighted the importance of clear and transparent rules of interaction, shared planning frameworks, and collectively agreed indicators of success that enable coordinated action among actors in the tourism sector. Furthermore, J.C. Whitehead & P. Wicker (2020) underlined those conflicts of interest between stakeholders are a normal phenomenon and therefore require structured negotiation and conflict-resolution procedures. A stakeholder-oriented strategy of a tourism enterprise is grounded in the formulation of a shared strategic vision and value orientation that integrates economic performance with social responsibility and the reputational sustainability of the destination (Lisovska & Mykhailyshyn, 2025; Panagiotopoulou & Skoultos, 2025). Its development begins with systematic stakeholder mapping: identifying key stakeholder

groups, clarifying their interests and expectations, and assessing their influence on enterprise outcomes, which enables prioritisation of interaction efforts.

To ensure constructive cooperation, the strategy incorporates mechanisms for stakeholder engagement – consultative formats, cluster partnerships, participatory planning processes, joint marketing initiatives, and collaborative investment projects – which shift interaction from episodic to continuous and institutionalised patterns (Uhodnikova, 2020; Roik *et al.*, 2025). Successful implementation of these mechanisms requires an advanced digital infrastructure, including platforms for communication and coordination, tools for data collection and analysis, feedback systems, and digital instruments for monitoring tourism flows (Velychko *et al.*, 2020; Tourism and the sustainable development goals..., 2021; Hopkalo *et al.*, 2024). The proposed framework reflects the cyclical nature of stakeholder-oriented management, where the formulation of strategic objectives is aligned with stakeholder interests, providing the basis for partnership mechanisms (Fig. 1).

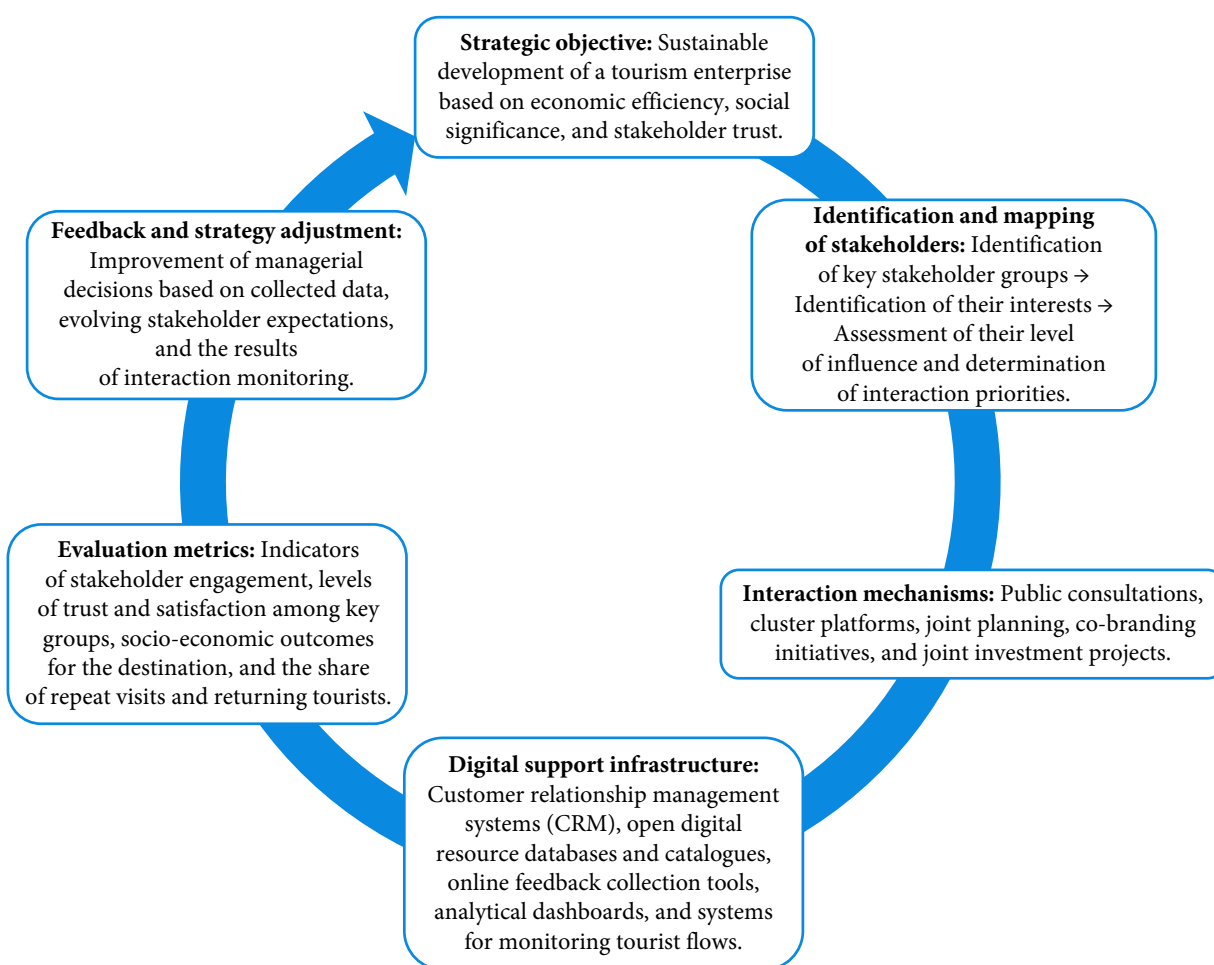


Figure 1. Structure of a stakeholder-oriented strategy of a tourism enterprise

Source: compiled by the authors based on O.I. Uhodnikova (2020), L. Bezghinova (2022), A. Terebukh & O. Roik (2023), L. Lisovska & V. Mykhailyshyn (2025), P. Panagiotopoulou & S. Skoultos (2025)

Digital platforms ensure transparency and operational coordination, while a system of indicators enables monitoring and adjustment of managerial decisions. Performance evaluation involves metrics such as the level of stakeholder participation, trust and satisfaction indices, and socio-economic outcomes for both the enterprise and the destination (Terebukh & Roik, 2023; Panagiotopoulou & Skoultos, 2025). An integral component of the framework includes conflict management procedures – negotiation

protocols, mediation formats, and decision-making rules – which minimise risks of misalignment and support the durability of partnership relations (Normelani, 2016). To systematise theoretical approaches and identify the key characteristics of stakeholder-oriented management in tourism enterprises, it is appropriate to conduct a comparative analysis of existing models of strategy formation and implementation. The results of such comparison are presented in Table 1.

Table 1. Approaches to the formation and implementation of a stakeholder-oriented strategy: A comparative overview

Approach	Core idea	Instruments	Expected outcomes
Normative-value (governance/corporate social responsibility)	Balancing economic, social, and environmental goals through stakeholder participation	Codes of conduct, charters, social contracts, public reporting	Legitimacy, trust, sustainability
Network-cluster	Co-governance within a destination cluster	Destination councils, clusters, public-private partnership agreements	Resource synergies, regional competitiveness
Process-oriented	Formalisation of stages and roles in stakeholder interaction	Stakeholder mapping, roadmaps, role matrices	Predictability, reduced coordination costs
Conflict-negotiation	Managing divergent stakeholder interests	Mediation, negotiation protocols, arbitration	Conflict mitigation, faster and more stable decision-making
Digital-platform	Data as a shared asset for coordination	CRM systems, open data platforms, online participation tools, dashboards	Transparency, scalability, inclusiveness

Source: compiled by the authors based on O.I. Uhodnikova (2020), A. Terebukh & O. Roik (2023), L. Lisovska & V. Mykhailyshyn (2025), P. Panagiotopoulou & S. Skoultos (2025)

In comparative terms, the analysed approaches differ in their governance logic and level of coordination, with digital-platform and network-cluster models becoming particularly important under conditions of crisis and rapid transformation of tourism markets. Thus, a stakeholder-oriented strategy can be defined as an institutionally embedded system of strategic goals, interaction mechanisms, digital tools, and performance metrics aimed at balancing stakeholder interests and creating shared tourism value. Analysis of current practices of Ukrainian tourism enterprises demonstrates that the most developed dimension of stakeholder interaction remains engagement with consumers through digital channels, including online booking systems, review platforms, social media, and omnichannel communication. According to The State Agency for Tourism Development of Ukraine (2024), more than 78% of domestic travel in 2023-2024 was planned with the use of digital platforms. Interaction with local communities is more fragmented and is typically manifested in the support of local events, gastronomic routes, and cultural initiatives. At the same time, only around 42% of territorial communities have their own tourism development strategies or destination brand platforms, which indicates a significant disparity in the institutional engagement of communities in

destination planning (Tourism and the sustainable development goals..., 2021; Hopkalo *et al.*, 2024).

Cooperation with public authorities is largely focused on infrastructure restoration and the provision of safe travel conditions. However, as noted by J.C. Whitehead & P. Wicker (2020), mechanisms for long-term partnership-based co-governance remain insufficiently developed. In contrast, cooperation with business partners shows a gradual shift towards network-based and cluster forms of collaboration, although most clusters are still at early stages of formation and require institutional strengthening (Velychko *et al.*, 2020). In summary, tourism enterprises in Ukraine are gradually transitioning from transactional to partnership-based and network-oriented models of interaction. Nevertheless, this process is uneven and requires further enhancement of organisational mechanisms and digital coordination tools to achieve stable and integrated stakeholder collaboration. The identified features and disparities in stakeholder interaction emphasise the need for a quantitative assessment of the level of maturity of stakeholder-oriented strategies, which allows for the identification of key growth points and managerial priorities for Ukrainian tourism enterprises (Herasymenko, 2019; Roik *et al.*, 2025). The resulting average values by market segment are presented in Table 2.

Table 2. Average scores by criteria and stakeholder-oriented strategy formation index, 2024

Segment (n)	C ₁	C ₂	C ₃	C ₄	C ₅	I _{COC}
Tour operators/travel agents (n = 28)	2.1	1.7	1.6	2.2	1.8	63
Accommodation facilities (n = 22)	2.0	1.5	1.7	1.9	1.7	59
Visitor attractions and recreation facilities (n = 12)	1.8	1.4	1.5	1.7	1.9	56

Source: compiled by the authors

Table 2 demonstrated notable differences in the institutional maturity of stakeholder interaction. Tour operators and travel agents show the highest results, which correlates with their more active use of digital communication and coordination tools (C_1 - C_4). Accommodation facilities score lower in terms of stakeholder participation in

decision-making (C_2), while visitor attractions show stronger performance in the dimension of community orientation (C_5), yet remain weaker in the use of digital interaction tools. To clarify contextual differences, a case analysis of three destinations with varying coordination frameworks and levels of institutional development was conducted (Table 3).

Table 3. Destination case maturity (indicative)

Destination	Type of interaction	Strengths	Limitations
Lviv	Systematic consultative formats, digital event mapping, cluster initiatives	High maturity of C_1 - C_4 ; co-branding practices	Sensitivity to event-based seasonality
Vinnitsia	Participatory planning, tourism information centre as facilitator	Increased community engagement (C_5)	Fragmentation of digital data systems
Zakarpattia	Partnerships among eco-lodges, local gastronomic brands	Strong local identity and authenticity (C_5)	Uneven levels of digitalisation (C_4)

Source: compiled by the authors

The analysis of the research findings indicates that the level of maturity of stakeholder-oriented strategies in Ukrainian tourism enterprises remains uneven and requires further improvement. First, a shortage of systematic mechanisms for stakeholder participation has been revealed: cooperation is often episodic rather than institutionalised, which necessitates the establishment of stable communication formats, such as advisory councils, public consultations and formal interaction protocols (Terebukh & Roik, 2023). Second, the digital maturity of enterprises remains insufficient: fragmented data environments and differing levels of technological readiness across regions complicate transparent coordination and highlight the need to develop unified digital platforms and a national registry of tourism resources (The State Agency for Tourism Development of Ukraine, 2024; Panagiotopoulou & Skoultos, 2025). Furthermore, partnership models in the tourism sector require expansion, as cooperation most frequently occurs within the framework of short-term projects and seldom evolves into long-term cluster-based structures (Lisovska & Mykhailyshyn, 2025). At the same time, the importance of community orientation is growing, since the involvement of local residents in co-creation strengthens the authenticity and resilience of tourist destinations. Therefore, further progress depends on enhancing institutional coordination, digital integration, and the empowerment of local communities as full participants in strategic tourism governance.

In the context of post-war reconstruction, improving the effectiveness of stakeholder-oriented management should be based on a shift from situational collaboration to institutionally embedded and digitally supported partnership models. The primary task is to establish stable mechanisms for stakeholder participation in strategic planning at both the enterprise and destination levels. This involves the creation of permanent advisory councils, tourism clusters and destination coordination offices, which ensure continuous dialogue, transparency of decision-making and shared responsibility among participants (Uhodnikova, 2020; Panagiotopoulou & Skoultos, 2025). A second priority is

the development of an integrated digital infrastructure for interaction, which includes unified regional and national open-data platforms for tourism resources, CRM systems for managing relationships with clients and partners, interactive route mapping tools and analytical dashboards for monitoring tourist flows (Velychko *et al.*, 2020; The State Agency for Tourism Development of Ukraine, 2024). Such instruments reduce information asymmetry, enhance transparency and support broader civic engagement. A third strategic direction is the strengthening of the role of local communities as equal co-creators of tourism value. This may be achieved through the joint development of destination branding platforms, coordination of cultural and event initiatives, support for local creative industries and promotion of small-scale hospitality formats (such as guest houses, boutique hotels and gastronomic clusters), as emphasised by L. Hopkalo *et al.* (2024) and L. Lisovska & V. Mykhailyshyn (2025). Community involvement increases trust, reinforces the authenticity of the tourism offer and enhances the resilience of destinations in the face of external challenges. A fourth strategic priority involves the expansion of partnership models with private investors, tour operators, logistics providers and service companies. O.I. Uhodnikova (2020) and L. Bezghinova (2022) argued, that in the post-war period, particular emphasis is placed on joint investment projects in tourism and hospitality infrastructure, co-marketing programmes, as well as the development of interregional and cross-border tourist routes. The final component concerns the implementation of a performance evaluation system for stakeholder interaction, which should incorporate indicators of participation, trust, socio-economic impact, repeat visitation and user satisfaction (Herasymenko, 2019; Terebukh & Roik, 2023; Roik *et al.*, 2025). Such a system would enable continuous monitoring of strategic decision-making and timely adjustment of development priorities within tourism enterprises. To specify potential trajectories for enhancing stakeholder interaction in the post-war period, key directions and corresponding managerial actions are summarised in Table 4.

Table 4. Directions for improving stakeholder interaction mechanisms in tourism enterprises in the post-war period

Direction of improvement	Content/managerial actions	Expected effect	Key stakeholders
Institutionalisation of stakeholder participation	Establishment of advisory councils, cluster councils, participatory planning platforms; formalisation of cooperation regulations and memoranda	Reduced conflicts of interest; enhanced transparency and trust among market actors	Public authorities, local communities, tour operators, professional associations
Development of digital interaction infrastructure	Implementation of CRM systems, open-data portals, interactive event and route maps, dashboards for monitoring tourist flows	Transparent communication; timely managerial decisions; analytical support for destination development	Tourism enterprises, IT companies, local communities, tourists
Strengthening the role of local communities	Co-creation of the tourist product; support of local cultural and gastronomic initiatives; participation of communities in destination branding	Increased authenticity of the tourism offers and stronger social support for tourism development	Local communities, small businesses, destination management organisations
Expansion of partnership models	Co-branding, joint event programmes, PPP initiatives, co-investment in infrastructure	Increased investment activity; higher financial flows; market expansion	Private investors, accommodation providers, transport operators, tour operators
Monitoring and evaluation system	Introduction of stakeholder engagement KPIs: participation level, trust, socio-economic impact, repeat visitation	Improved justification of strategic decisions; continuous enhancement of management practices	Enterprise management, local government bodies

Source: compiled by the authors based on O.I. Uhodnikova (2020), V.A. Velychko *et al.* (2020), A. Terebukh & O. Roik (2023), The State Agency for Tourism Development of Ukraine (2024), L. Lisovska & V. Mykhailyshyn (2025), P. Panagiotopoulou & S. Skoultos (2025)

The proposed directions demonstrate that effective post-war recovery of tourism destinations requires not only technological modernisation and investment expansion, but also the creation of stable institutional mechanisms that ensure long-term coordination between public authorities, businesses, and local communities. Thus, enhancing the effectiveness of stakeholder interaction in Ukrainian tourism enterprises should be grounded in the institutionalisation of partnership, digital transparency, community participation and the co-creation of value, which collectively form the foundation for sustainable and competitive post-war recovery of tourism destinations. The findings of this study confirmed that stakeholder-oriented management is becoming an essential prerequisite for the resilience and competitiveness of tourism enterprises, particularly under crisis and post-war recovery conditions. This conclusion is consistent with the results of L. Kvasnii *et al.* (2023), who developed scenarios for the development of tourism enterprises in Ukraine during wartime and the post-war period. Their study emphasises adaptive management, diversification, and institutional flexibility as key survival factors. The present findings complement this approach by demonstrating that such adaptability largely depends on the maturity of stakeholder cooperation mechanisms and the ability of enterprises to build stable partnership networks.

The importance of evidence-based planning and stakeholder participation identified in this research corresponds with the conclusions of K. Pham *et al.* (2025). These authors showed that sustainable tourism planning is more effective when stakeholders are actively involved in data-driven decision-making processes. Similarly, the study found that stakeholder participation in managerial decisions (criterion C_2) remains one of the weakest dimensions for Ukrainian enterprises, indicating substantial room for

improvement in participatory governance practices. A similar theoretical perspective is proposed by K.L. Andereck *et al.* (2025), who analysed community stakeholders' perceptions of tourism impacts and sustainability initiatives. They demonstrated that local residents support tourism development when they perceive clear socio-economic benefits and transparent governance. Consistency with this finding is also reflected in the higher overall maturity scores and greater resilience potential observed among enterprises and destinations characterised by stronger community orientation (criterion C_3). The case of ecotourism destinations examined by M.R. Basyar *et al.* (2025) also supports these conclusions, demonstrating that systematic stakeholder management improves sustainability outcomes and destination coordination. Higher integral maturity levels were observed among enterprises characterised by stronger partnership initiatives and communication transparency, confirming the universal managerial value of coordinated stakeholder engagement. A theoretical explanation is provided by B.F. Bichler & M. Lösch (2019), who reviewed multi-stakeholder frameworks in destination management. The findings indicated that episodic cooperation is insufficient, whereas formalised advisory councils, clusters, and coordination offices represent more sustainable mechanisms for tourism governance. The role of territorial communities and governance structures is further confirmed by D. Jani (2023), who found that residents' perceptions of tourism development improve when governance models are inclusive and locally embedded. This supports the argument that post-war tourism recovery in Ukraine should rely on community co-creation and participatory destination planning. Overall, comparison with recent studies confirmed the validity of results and demonstrated that stakeholder-oriented strategies represent a practical

mechanism for strengthening tourism enterprise resilience, improving destination governance, and supporting sustainable post-war recovery.

CONCLUSIONS

The conducted research has confirmed that the level of maturity of stakeholder-oriented management strategies in Ukrainian tourism enterprises is uneven and varies depending on the type of enterprise, destination, and institutional context. The most structured and regularised interaction is observed in relations with consumers of tourism services, supported by the extensive use of digital communication channels. In contrast, cooperation with local communities, public authorities and partner organisations often remains episodic and insufficiently formalised, indicating a low level of development of mechanisms for joint decision-making. The assessment of strategy maturity across the criteria of communication openness, stakeholder participation in planning, development of partnership networks, application of digital tools and community orientation demonstrated that tour operators and travel agencies are the most advanced in stakeholder-oriented management, whereas accommodation providers and visitor attractions exhibit lower levels of systematic interaction. The destination-based case analysis revealed that institutional maturity and the presence of coordination structures (such as tourism councils, cluster platforms, and tourist information centres) significantly enhance the effectiveness of stakeholder collaboration. In destinations where

such mechanisms are established, higher levels of trust, community engagement and co-creation of the tourism product are observed. In the context of post-war recovery, the key directions for strengthening stakeholder-oriented management include: institutionalising participation formats (advisory councils, cluster structures, cooperation memoranda); digitalisation of communication and analytical processes; strengthening the role of local communities in shaping the tourism offer; and developing long-term partnership models and co-investment initiatives. Thus, the stakeholder-oriented strategy should be considered a fundamental mechanism for ensuring sustainable, inclusive and competitive development of tourism enterprises and destinations in Ukraine as the sector undergoes reconstruction and transformation. Further research should focus on longitudinal assessment of stakeholder-oriented management practices in the post-war period, particularly regarding the impact of digital governance tools and inter-sectoral partnerships on the resilience and competitiveness of tourism destinations.

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Оцінювання рівня сформованості стейкхолдер-орієнтованої стратегії управління туристичними підприємствами України

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Анотація. Дослідження присвячене оцінюванню рівня зрілості стейкхолдер-орієнтованих стратегій управління туристичними підприємствами України в умовах повоєнного відновлення. Актуальність дослідження зумовлена трансформацією туристичного ринку, зростанням ролі внутрішнього туризму та необхідністю збалансування інтересів туристів, місцевих громад, органів державної влади та бізнес-партнерів для забезпечення сталого розвитку туристичних дестинацій. Метою дослідження було визначення рівня зрілості взаємодії зі стейкхолдерами та обґрунтування напрямів її вдосконалення. Методологічна основа дослідження базувалася на поєднанні аналізу статистичних даних, експертних опитувань представників туристичних підприємств і кейс-аналізу окремих дестинацій. Оцінювання проводилося за системою критеріїв, що включала прозорість комунікації, участь стейкхолдерів у процесах прийняття рішень, розвиток партнерських ініціатив, використання цифрових інструментів та орієнтацію на потреби громади. Результати дослідження засвідчили нерівномірний рівень розвитку стейкхолдер-орієнтованих стратегій у різних сегментах туристичного ринку. Туроператори продемонстрували вищий рівень цифрової готовності та відкритості комунікації, тоді як заклади розміщення та туристичні атракції характеризувалися нижчим рівнем системності взаємодії. У дослідженні виявлено інституційні, організаційні та цифрові бар'єри, що обмежують ефективну співпрацю зі стейкхолдерами. Практична цінність дослідження полягає у розробленні рекомендацій, спрямованих на інституціоналізацію механізмів участі стейкхолдерів, розвиток цифрової інфраструктури взаємодії та посилення ролі місцевих громад у формуванні туристичного продукту, що сприятиме підвищенню конкурентоспроможності та стійкості туристичної сфери

Ключові слова: цифровізація; партнерські моделі; відновлення дестинацій; посткризове відновлення; транскордонні зв'язки



The role and place of professional etiquette and communication in the formation of corporate culture in tourism enterprises

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Abstract. In the modern tourism market, corporate culture, etiquette and communication are playing an increasingly important role in ensuring businesses remain competitive and in enhancing the customer experience. The purpose of this article was to determine the role and significance of professional etiquette and communication in the formation of corporate culture in tourism enterprises and to quantitatively assess their influence on competitiveness. The methodological basis of the study was formed by a systemic approach using methods of analysis, synthesis, comparison, generalisation, structural-functional analysis, economic-statistical methods and correlation-logical modelling. The empirical basis included data from two representative enterprises of the Ukrainian tourism market – Join UP! and Reikartz Hotel Group – for 2022-2025. The results demonstrated a steady improvement in behavioural and communication indicators in both enterprises. In particular, customer ratings increased by 12.8% for Join UP! and by 9.8% for Reikartz Hotel Group, while the share of positive reviews increased from 64% to 80%, accompanied by a reduction in negative feedback from 18% to 9%. Financial results varied: Reikartz Hotel Group increased its revenue from UAH 11.5 million to UAH 17.2 million and demonstrated a strong positive correlation between behavioural and financial indicators ($r = 0.95$), confirming the commercial value of etiquette and service. Join UP! increased its revenue to over UAH 11.6 billion, but had weaker financial stability and a moderate inverse correlation between indicators ($r = -0.62$) due to war risks, debt and an unstable environment. It was proved that professional etiquette ensures the standardisation of employee behaviour and service consistency, whereas communication functions as a mechanism for implementing these standards in customer interaction. The practical value of the study lies in the possibility of applying the obtained results to improve corporate culture management systems, strengthen customer loyalty and enhance the competitiveness of tourism enterprises

Keywords: service quality; enterprise competitiveness; customer loyalty; organisational behaviour; economic performance; reputation management

INTRODUCTION

The contemporary development of tourism enterprises takes place under conditions of increasing competition, the globalisation of service markets and growing consumer demands regarding service quality. In Ukraine, despite wartime challenges, the tourism and hospitality

sector has demonstrated gradual adaptation and recovery. According to the State Agency for Tourism Development of Ukraine (2025), in 2024 the tourism sector generated budget revenues of almost UAH 3 billion, while in the first quarter of 2025 tourism-related tax payments

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reached UAH 799 million, exceeding the pre-war level of 2021 by 27%. At the same time, the number of taxpayers operating in the tourism sector increased to 20,759 entities in 2025, indicating the resilience and entrepreneurial activity of the market. The hotel segment has also demonstrated positive dynamics. According to market analytics, in 2025 the average room rate in Ukraine increased by 13.5%, reaching UAH 3,198, while winter-season occupancy rose by 7% compared with the previous year. Domestic tourism remains the principal driver of demand, particularly in the western regions of Ukraine, including Lviv, Ivano-Frankivsk and Zakarpattia regions (State Agency for Tourism Development of Ukraine, 2025). Under such circumstances, tourism enterprises are required to compete not only through price and product differentiation, but also through service standards, customer trust and organisational reputation (Yukhnovska, 2025). In this context, corporate culture acquires the status of a strategic intangible resource that determines organisational performance, behavioural norms and long-term competitiveness. For tourism enterprises, the importance of corporate culture is particularly high because service production and consumption often occur simultaneously, while customer impressions depend directly on employee behaviour and communication quality. Therefore, professional etiquette and communication become important managerial instruments that shape customer experience, strengthen customer loyalty and influence market positioning. Their effective integration into corporate culture is increasingly viewed as a prerequisite for sustainable enterprise development.

Academic interest in the relationship between corporate culture and organisational performance has intensified in recent years. M. Dawson *et al.* (2023), analysed hospitality enterprises, demonstrate that a positive organisational culture contributes to higher employee job satisfaction, stronger motivation and improved work performance. Similarly, O.M. Karatepe *et al.* (2020) conclude that supportive working conditions and internal organisational climate positively influence employee engagement and behavioural outcomes in hotel enterprises. A significant strand of research focuses on communication as a determinant of service quality and customer interaction. D. Buhalis & Y. Sinarta (2019) state that communication processes are central to the co-creation of tourism experiences, especially in digital environments, where prompt responses and customer engagement shape consumer decisions. According to J. Lamri & T. Lubart (2023), communication competence is among the most important soft skills in modern service industries because it improves adaptability, cooperation and customer orientation.

Another important research direction concerns ethical standards and behavioural regulation in tourism organisations. E. Shchepanskyi & N. Laluieva (2023) noted that professional etiquette contributes to service consistency, customer trust and the formation of a positive organisational image. O. Romanukha & V. Zinchenko (2021) also emphasised that behavioural and communicative

competencies are key determinants of employee effectiveness in hospitality enterprises. Ukrainian scholars actively investigate the role of corporate culture in enterprise development. T. Kaplina *et al.* (2022) conclude that corporate culture supports the formation of new strategic models in hospitality enterprises and improves managerial adaptability. O. Varaksina & V. Shulha (2023) identify corporate culture as an important factor of enterprise competitiveness and internal organisational stability. In addition, A.H. Blahopoluchna *et al.* (2022) underline the importance of professional communication culture for service quality and customer satisfaction. Despite the considerable body of academic research, the integrated role of professional etiquette and communication as interconnected components of corporate culture in tourism enterprises remains insufficiently explored. Most existing studies analyse these factors separately, whereas their combined influence on competitiveness and economic performance requires further empirical substantiation.

The purpose of this article was to determine the role and significance of professional etiquette and communication in the formation of corporate culture in tourism enterprises and to quantitatively assess their influence on competitiveness. To achieve this purpose, the following research objectives were formulated: (1) to generalise theoretical approaches to the role of professional etiquette and communication in the corporate culture of tourism enterprises; (2) to develop a methodological approach for assessing behavioural and economic competitiveness indicators; (3) to determine, on the basis of comparative case analysis, the relationship between communication quality, professional etiquette and enterprise competitiveness. The scientific novelty of the study lies in the integrated approach to analysing professional etiquette and communication as interconnected components of corporate culture, as well as in the development of a methodological framework based on comparative case analysis, integrated indices and correlation-logical assessment of tourism enterprise competitiveness.

LITERATURE REVIEW

Corporate culture is widely recognised in contemporary academic discourse as an important intangible resource that determines the effectiveness, adaptability and long-term competitiveness of tourism enterprises. Most scholars define corporate culture as a system of shared values, norms and behavioural patterns that shape the internal organisational environment and influence employee performance, service quality and managerial effectiveness (Kaplina *et al.*, 2022; Varaksina & Shulha, 2023). In service-oriented sectors such as tourism and hospitality, corporate culture acquires particular significance because it is directly manifested through employee interaction with customers. International studies primarily emphasise the functional role of corporate culture as a determinant of organisational performance. M. Dawson *et al.* (2023) demonstrate its significant impact on employee job satisfaction and productivity, while

O.M. Karatepe *et al.* (2020) highlighted the relationship between organisational conditions and employee behaviour in hospitality enterprises. These findings confirm that behavioural standards and internal organisational climate are closely connected with service outcomes and customer perceptions. At the same time, T. Kaplina *et al.* (2022) and O. Varaksina & V. Shulha (2023) also identify corporate culture as an important factor of enterprise development, organisational adaptability and market competitiveness.

A substantial body of research focuses on communication as an essential component of tourism service delivery and corporate culture. D. Buhalis & Y. Sinarta (2019) underline the importance of communication processes in shaping customer experience and co-creating tourism value, particularly in digital environments. J. Lamri & T. Lubart (2023) conceptualise communication as a core professional competence required in modern service industries. At the same time, Ukrainian scholars, including A.H. Blahopoluchna *et al.* (2022) and N. Bahan *et al.* (2024), emphasised that professional communication culture and communication management play an important role in the development of organisational culture, personnel coordination and service quality improvement. Another important research direction concerns professional etiquette as a mechanism for regulating employee behaviour and service standards. E. Shchepanskyi & N. Laliueva (2023) analysed the theoretical and applied aspects of business etiquette in tourism organisations, highlighting its influence on service consistency, organisational image and customer trust. O. Romanukha & V. Zinchenko (2021) also noted that communication and behavioural competencies are critical for personnel effectiveness in hospitality enterprises. Thus, professional etiquette may be interpreted not only as a normative requirement, but also as a managerial instrument that supports competitiveness and strengthens customer loyalty. Contemporary studies increasingly address intercultural interaction, inclusivity and sustainability as new dimensions of corporate culture in tourism enterprises. M.P. Arjona-Granados *et al.* (2025) emphasised the role of cross-cultural competence in ensuring high-quality service delivery, while D.E. Koç *et al.* (2025) examine diversity, equity and inclusion as important organisational values. In addition, H. Shin *et al.* (2025) and S. Silva *et al.* (2025) highlighted the growing role of ESG principles, professional skills and responsible management in achieving sustainable development in tourism and hospitality enterprises.

Contemporary Ukrainian and international studies increasingly examine corporate culture through organisational transformation, communication management and adaptation to external shocks. U. Huzar *et al.* (2020) concluded that in hotel and restaurant enterprises corporate culture is an important mechanism for maintaining service standards, staff coordination and customer orientation. A. Maslii & Y. Biliavska (2024) emphasised that under wartime conditions organisational culture becomes a factor of resilience, employee cohesion and managerial adaptability. The importance of communication management is

also highlighted in recent research. H.V. Omelchak (2023) argued that communication systems are a key element of effective management because they improve coordination and decision-making speed. Similarly, T.B. Semenchuk *et al.* (2023) noted that information and communication management enhance enterprise flexibility and internal efficiency. These findings are particularly relevant for tourism enterprises, where prompt responses directly affect customer satisfaction. Another important direction concerns the digital transformation of organisational culture. T. Vlasenko *et al.* (2023) found that business digitalisation changes behavioural norms and communication channels between personnel and customers. T. Voronko-Nevidnycha *et al.* (2023) demonstrated that the professional image of managers significantly influences organisational culture by shaping behavioural standards and employee trust. The behavioural dimension of organisational effectiveness is further supported by H. Zakharchyn (2023), who identified communication culture as a strategic component of personnel management. According to the author, enterprises with a developed communication culture achieve stronger employee engagement, better conflict resolution and higher service effectiveness.

Despite the considerable volume of academic research, the integrated role of professional etiquette and communication as interconnected components of corporate culture in tourism enterprises remains insufficiently explored. Most existing studies tend to analyse these factors separately, while their combined influence on competitiveness and economic performance has received limited empirical attention. This research gap determines the relevance of the present study and justifies the need for a comprehensive approach combining behavioural, managerial and economic perspectives.

MATERIALS AND METHODS

The methodological framework of the study was based on a systemic, comparative and analytical approach to assessing the role of professional etiquette and communication in the formation of corporate culture and competitiveness of tourism enterprises. The research integrated general scientific and specialised methods, ensuring the comprehensiveness, consistency and reliability of the obtained results. In order to strengthen the practical significance of the study, a comparative case-based quantitative analysis was additionally applied using data from two representative enterprises of the Ukrainian tourism market: Join UP! as a tour operator and Reikartz Hotel Group as a hospitality enterprise.

At the first stage, a theoretical analysis of academic sources was conducted in order to generalise approaches to defining the essence of corporate culture, professional etiquette and communication in the tourism sector. Methods of analysis, synthesis, generalisation and systematisation of scientific works by both international and Ukrainian scholars were applied (Kaplina *et al.*, 2022; Varaksina & Shulha, 2023). This stage made it possible to identify

the conceptual foundations of the relationship between service behaviour, communication quality and organisational development. At the second stage, the comparative analysis method was employed to examine different scholarly perspectives on the influence of communication and etiquette on the performance of tourism and hospitality enterprises. This approach made it possible to identify similarities and differences in existing research findings. To substantiate the impact of the studied factors on the competitiveness of tourism enterprises, logical generalisation and structural-functional analysis were used. These methods enabled the identification of relationships between corporate culture elements, employee behavioural standards and organisational performance. In addition, the modelling method was applied, particularly in the development of analytical tables and integrated indices reflecting the relationships between professional etiquette, communication and competitive advantages. This facilitated the systematisation of research findings and improved their clarity. At the third stage, an empirical analysis of Join UP! (n.d.) and Reikartz Hotel Group (n.d.) was conducted using customer reviews published on the enterprises' official websites, Google Reviews, Booking.com, social media pages and other open communication channels, as well as publicly available financial statements and operational indicators from Clarity Project (n.d.a; n.d.b) for the analysed period 2022-2025. The selected period reflected the functioning of tourism enterprises under wartime conditions in Ukraine and made it possible to assess organisational adaptation, changes in communication practices and the influence of external instability on competitiveness indicators. Customer reviews were selected according to their relevance to service quality and communication practices and analysed using content analysis methods based on semantic markers related to politeness, professionalism, attentiveness, communication clarity, response quality and complaint-handling effectiveness; and included publicly available reviews from 2022-2025 containing evaluations of employee behaviour, communication quality and customer interaction.

The empirical base included behavioural and communication indicators together with financial-economic indicators, which formed the basis for further standardisation, index calculations and correlation-logical analysis. The information base of the study includes academic publications from international and Ukrainian researchers, peer-reviewed journal articles, customer review data and recent studies in the fields of tourism, management and corporate culture (Buhalis & Sinarta, 2019). The applied methodology ensures the reproducibility of the research results and allows other scholars to replicate the study using similar materials and methods. The methodological design of the empirical part of the study was based on contemporary approaches to comparative analysis of tourism enterprise competitiveness, communication management assessment and statistical evaluation of performance indicators proposed in recent studies (Kaplina *et al.*, 2022). In addition,

the logic of combining behavioural and economic indicators was developed with regard to previous research on organisational culture and service quality in tourism and hospitality enterprises (Dawson *et al.*, 2023). At the initial stage of the study, a system of indicators was formed and divided into two analytical groups. The first group included behavioural and communication indicators reflecting the level of professional etiquette and service interaction quality: average customer rating, share of positive reviews, share of negative reviews, response rate to customer reviews and frequency of positive mentions related to politeness, professionalism, attentiveness and service quality. The second group consisted of financial-economic indicators characterising enterprise competitiveness: revenue, net profit, sales growth, clients/orders volume, repeat share and profitability. Since the selected indicators were measured in different units, they were transformed into comparable dimensionless values in the interval from 0 to 1 using min-max normalisation:

$$z_i = \frac{x_i - x_{min}}{x_{max} - x_{min}}, \quad (1)$$

where z_i is the standardised value of indicator i , x_i is the actual value of the indicator, x_{min} is the minimum value during the analysed period, x_{max} is the maximum value during the analysed period. For indicators where lower values indicate better performance, such as share of negative reviews or response time, reverse normalisation was applied:

$$z_i = \frac{x_{max} - x_i}{x_{max} - x_{min}}. \quad (2)$$

This ensured that in all cases a higher standardised value corresponded to a better result. To obtain an integrated assessment of etiquette and communication quality, the Behavioural-Communication Index (I_{BC}) was calculated as the arithmetic mean of the six standardised indicators of the first group:

$$I_{BC} = \frac{1}{n} \sum_{j=1}^n z_{i1}, \quad (3)$$

where $z_{i1} \dots z_{i5}$ represent the standardised behavioural and communication indicators. A higher I_{BC} value indicates a stronger level of professional etiquette and communication quality. To assess business performance and competitiveness, the Economic Performance Index (I_{EP}) was calculated as the arithmetic mean of the six standardised indicators of the second group:

$$I_{EP} = \frac{1}{n} \sum_{j=1}^n z_{i2}, \quad (4)$$

where $z_{i1} \dots z_{i6}$ represent the standardised financial-economic indicators. A higher I_{EP} value indicates stronger enterprise competitiveness and more stable economic performance. To determine the relationship between service behaviour factors and economic results, Pearson correlation analysis was applied between I_{BC} and I_{EP} values for the analysed periods:

$$r = \frac{\sum_{t=1}^n (I_{BCt} - \bar{I}_{BC}) \cdot (I_{EPt} - \bar{I}_{EP})}{\sqrt{\sum_{t=1}^n (I_{BCt} - \bar{I}_{BC})^2 \cdot \sum_{t=1}^n (I_{EPt} - \bar{I}_{EP})^2}}, \quad (5)$$

where r is the Pearson correlation coefficient, I_{BCt} is the Behavioural-Communication Index in period t , I_{EPt} is the Economic Performance Index in period t , n is the number of analysed periods, $\bar{I}_{BC}$, $\bar{I}_{EP}$ are their average values.

A positive coefficient indicates that improvements in etiquette and communication are associated with stronger competitiveness indicators. The strength of correlation was interpreted according to conventional statistical thresholds: 0.00-0.29 as weak, 0.30-0.49 as moderate, 0.50-0.69 as noticeable, 0.70-0.89 as strong, and 0.90-1.00 as very strong. In order to supplement the quantitative calculations, a content analysis of customer reviews was conducted. Reviews were examined according to semantic markers related to politeness, professionalism, attentiveness, promptness, communication clarity and complaint resolution quality. The frequency of positive and negative mentions was incorporated into the behavioural indicator system.

The proposed methodological approach ensured transparency due to the use of open review data and publicly available economic indicators. At the same time, the case-study nature of the research may limit the generalisation of results to the entire tourism sector. Nevertheless, the

developed methodology can be used by tourism enterprises for monitoring service quality, evaluating competitiveness and improving corporate culture through communication standards and professional etiquette management.

RESULTS AND DISCUSSION

The empirical results confirm that professional etiquette and communication should be considered not only behavioural characteristics of personnel, but also economically significant determinants of competitiveness in tourism enterprises. In service-oriented industries, especially tourism, customer impressions, trust, online reputation and loyalty increasingly shape demand dynamics and long-term market positioning. Therefore, the quality of interpersonal interaction becomes an important strategic resource. To strengthen the practical significance of the study, a comparative analysis was conducted using two representative enterprises of the Ukrainian tourism market: Join UP! as a tour operator and Reikartz Hotel Group as a hotel enterprise. This made it possible to assess the role of etiquette and communication in two different tourism segments: organised travel services and hospitality accommodation. The first analytical group included behavioural and communication indicators derived from customer reviews and open communication channels (Join UP!, n.d.; Reikartz Hotel Group, n.d.) (Table 1).

Table 1. Behavioural and communication indicators of the selected enterprises (2022-2025)

Year	Rating Join UP!	Rating Reikartz	Positive reviews share, %	Negative reviews share, %	Response rate, %	Positive mentions frequency
2022	3.9	4.1	64	18	49	61
2023	4.1	4.2	69	15	58	68
2024	4.3	4.4	76	11	71	77
2025	4.4	4.5	80	9	78	84

Source: compiled by the authors based on Join UP! (n.d.), Reikartz Hotel Group (n.d.)

The results indicate a gradual improvement in communication quality and service perception in both enterprises. Average ratings increased, the share of positive reviews rose, while negative feedback decreased. At the same time, customer response activity became more intensive, confirming stronger attention to digital

communication and reputation management. The second analytical group consisted of financial-economic indicators characterising enterprise competitiveness. The indicators were compiled on the basis of publicly available reporting data of the selected enterprises (Clarity Project, n.d.a; n.d.b) (Table 2).

Table 2. Financial-economic indicators of the selected enterprises (2022-2025)

Year	Revenue, ths UAH	Net profit, ths UAH	Assets, ths UAH	Equity, ths UAH	Current liabilities, ths UAH
Join UP!					
2022	0	-37	110	15	95
2023	16,592	-55,208	669,720	-55,192	724,686
2024	139,280	-234,777	4,174,470	-289,968	4,461,252
2025	11,633,191	-510,252	4,049,826	-800,165	4,849,991
Reikartz					
2022	11,528	252	3,038	2,083	955
2023	13,571	33	2,144	2,136	7
2024	15,240	118	2,356	2,254	96
2025	17,180	164	2,615	2,418	132

Source: compiled by the authors based on Clarity Project (n.d.a; n.d.b)

The obtained data reveal different models of competitiveness in the Ukrainian tourism market. Join UP! demonstrated exceptionally rapid revenue growth, particularly in 2025, when turnover exceeded UAH 11.6 billion. At the same time, this expansion was accompanied by persistent net losses, negative equity and a substantial volume of current liabilities. These results indicate that large-scale market activity and sales growth do not automatically ensure financial sustainability under wartime conditions, high operating costs and macroeconomic uncertainty. In contrast, Reikartz Hotel Group demonstrated a smaller operational scale but comparatively stronger financial resilience. Revenue increased gradually from UAH 11.5 million in 2022 to UAH 17.2 million in 2025, while the enterprise maintained positive profitability, positive equity and relatively low short-term liabilities. This suggests a more balanced operating model based on cost control, stable demand and prudent financial management.

The comparative analysis confirms that enterprises in different tourism segments transform communication

quality and professional etiquette into economic results through different mechanisms. For tour operators, communication primarily affects bookings, consultations, customer support, complaint resolution and transaction volumes. For hotel enterprises, etiquette and interpersonal behaviour directly influence guest satisfaction, repeat visits, online ratings and long-term reputation. Consequently, although the channels of influence differ, communication and service standards remain important intangible drivers of competitiveness in both business models. The direct comparison of the selected indicators is limited because they are measured in different units, including percentages, monetary values and absolute quantities. Therefore, in accordance with the proposed methodology, the initial indicators were transformed into comparable dimensionless values ranging from 0 to 1 using min-max normalisation. This procedure made it possible to ensure analytical comparability of heterogeneous variables and to use them for further integrated assessment. The results of standardisation for Join UP! and Reikartz Hotel Group are presented in Tables 3 and 4.

Table 3. Standardised behavioural and financial-economic indicators of Join UP! (2022-2025)

Indicator	2022	2023	2024	2025
Behavioural indicators				
Rating	0.00	0.40	0.80	1.00
Positive reviews	0.00	0.31	0.75	1.00
Negative reviews	0.00	0.33	0.78	1.00
Response rate	0.00	0.31	0.73	1.00
Positive mentions	0.00	0.30	0.70	1.00
Financial-economic indicators				
Revenue	0.00	0.00	0.01	1.00
Net profit	1.00	0.89	0.54	0.00
Sales growth	0.00	0.17	1.00	0.97
Clients/orders	1.00	0.07	0.00	0.00
Repeat share	1.00	0.85	0.08	0.00
Profitability	0.00	0.00	0.01	1.00

Note: standardised behavioural and financial-economic indicators were calculated using min-max normalisation according to formula (1); reverse normalisation for negative reviews was applied according to formula (2), where lower values indicate better performance

Source: compiled by the authors

Table 4. Standardised behavioural and financial-economic indicators of Reikartz Hotel Group (2022-2025)

Indicator	2022	2023	2024	2025
Behavioural indicators				
Rating	0.00	0.25	0.75	1.00
Positive reviews	0.00	0.31	0.75	1.00
Negative reviews	0.00	0.33	0.78	1.00
Response rate	0.00	0.31	0.73	1.00
Positive mentions	0.00	0.30	0.70	1.00
Financial-economic indicators				
Revenue	0.00	0.36	0.66	1.00
Net profit	1.00	0.00	0.61	0.83
Sales growth	1.00	0.00	0.36	1.00
Clients/orders	0.00	0.10	0.43	1.00
Repeat share	0.00	1.00	0.91	0.87
Profitability	0.00	0.25	0.75	1.00

Note: standardised behavioural and financial-economic indicators were calculated using min-max normalisation according to formula (1); reverse normalisation for indicators with inverse influence was applied according to formula (2), where lower values correspond to stronger financial stability

Source: compiled by the authors

The standardised values presented in Tables 3 and 4 indicate a generally positive behavioural trend in both enterprises during the analysed period. Customer ratings, response activity and the frequency of positive mentions improved steadily. At the same time, economic dynamics were more heterogeneous. For Join UP!, market expansion and asset growth were accompanied by profitability pressure and a deterioration in equity structure. In contrast, Reikartz Hotel Group demonstrated more balanced

financial progress combined with stable behavioural improvements. On the basis of the standardised indicators, integrated competitiveness indices were calculated. The average standardised values of behavioural indicators formed the Behavioural-Communication Index (I_{BC}), whereas the average standardised values of financial-economic indicators were used to determine the Economic Performance Index (I_{EP}). The comparative results are presented in Table 5.

Table 5. Integrated competitiveness indices

Year	I_{BC} Join UP!	I_{BC} Reikartz	I_{EP} Join UP!	I_{EP} Reikartz
2022	0.00	0.00	0.80	0.40
2023	0.33	0.30	0.40	0.29
2024	0.75	0.74	0.33	0.59
2025	1.00	1.00	0.39	0.94

Note: the Behavioural-Communication Index (IBC) was calculated using formula (3) as the arithmetic mean of behavioural indicators, while the Economic Performance Index (IEP) was calculated using formula (4) as the arithmetic mean of financial-economic indicators

Source: compiled by the authors

The Behavioural-Communication Index (I_{BC}) reflects the quality of etiquette, communication and customer perception, while the Economic Performance Index (I_{EP}) characterises the integrated level of enterprise competitiveness. As shown in Table 5, behavioural indicators improved steadily in both enterprises. However, economic outcomes differed substantially: Reikartz

Hotel Group demonstrated stronger financial stability, whereas Join UP! combined market expansion with weaker profitability indicators. To determine the relationship between behavioural factors and economic outcomes, Pearson correlation analysis was applied between I_{BC} and I_{EP} values. The obtained results are presented in Table 6.

Table 6. Correlation between I_{BC} and I_{EP}

Enterprise	Correlation coefficient (r)	Interpretation
Join UP!	-0.62	Inverse moderate relationship
Reikartz	0.95	Very strong positive relationship

Note: correlation coefficients between IBC and IEP were calculated using Pearson correlation analysis according to formula (5)

Source: compiled by the authors

The obtained coefficients indicate that communication quality and enterprise competitiveness are linked differently depending on the business model. For Reikartz Hotel Group, the relationship was strongly positive, which can be explained by the high-contact nature of hotel services, where staff behaviour directly influences guest experience and repeat demand. For Join UP!, communication quality improved substantially, but profitability remained constrained by external wartime, financial and operational factors. From a managerial perspective, the results suggest that investments in etiquette training, communication standards, digital response systems and feedback management may generate measurable economic returns, particularly in customer-facing accommodation businesses. Improvements in customer interaction reduce complaints, increase loyalty, stimulate repeat purchases and strengthen online reputation. The findings also confirm that corporate culture in tourism enterprises is largely operationalised through everyday employee behaviour. Professional etiquette should therefore be interpreted not merely as a formal behavioural norm, but as an economic resource that contributes to sustainable competitiveness.

The obtained results confirm that professional etiquette and communication are not auxiliary elements of enterprise activity, but economically relevant components of competitiveness in tourism enterprises. The steady growth of behavioural indicators in both analysed companies demonstrates that customer-oriented communication, timely feedback and service politeness are associated with stronger market positioning and more favourable customer perceptions. These findings support the conclusions of M. Dawson *et al.* (2023), who argued that organisational culture significantly influences employee performance, customer satisfaction and service outcomes in hospitality enterprises. In the present study, this relationship was empirically reflected through the growth of the Behavioural-Communication Index (I_{BC}), which captured improvements in ratings, review sentiment and responsiveness. The findings also extend the conceptual propositions of D. Buhalis & Y. Sinarta (2019), who emphasised that communication processes create tourism value in real time through interaction with customers. The present results demonstrate that this effect is especially visible in digital environments, where online reviews, response speed and

reputation management increasingly determine consumer trust. Both Join UP! and Reikartz Hotel Group showed a gradual improvement in review quality and response activity during 2022-2025, indicating that digital communication has become a strategic instrument of competitiveness rather than a purely operational function. This is particularly relevant under conditions of heightened uncertainty, when customer confidence depends on access to accurate, prompt and empathetic communication.

At the same time, the study confirms the arguments of T. Kaplina *et al.* (2022) and O. Varaksina & V. Shulha (2023), who considered corporate culture to be an important intangible resource affecting enterprise development and strategic adaptability. However, the present research demonstrates that the economic effects of behavioural improvements depend substantially on the business model of the enterprise. Reikartz Hotel Group exhibited a very strong positive correlation between behavioural indicators and economic performance ($r = 0.95$), suggesting that hotel enterprises monetise etiquette and communication directly through guest satisfaction, repeat visits and occupancy stability. By contrast, Join UP! showed an inverse moderate relationship ($r = -0.62$), meaning that improvements in customer communication were not sufficient to offset external financial pressures, large-scale liabilities and wartime operational risks. Therefore, etiquette and communication create value, but their final economic effect is mediated by sectoral structure and macroeconomic conditions. These differences between enterprises indicate that tourism segments transform intangible service factors into financial outcomes through different mechanisms. In accommodation businesses, customer experience is immediate and highly dependent on staff behaviour, interpersonal conduct and service atmosphere. Consequently, professional etiquette has a more direct commercial return. In tour operating, by contrast, customer communication remains essential for bookings, consultation support and loyalty formation, yet profitability additionally depends on transport costs, supplier contracts, exchange-rate volatility and geopolitical disruptions. This finding is consistent with D. Kumar (2024), who noted that tourism enterprises remain highly sensitive to country-level uncertainty even when internal management practices are effective.

From a managerial perspective, the results suggest that investments in communication standards, staff etiquette training, complaint-resolution systems and digital response channels should be considered not as administrative expenses, but as strategic investments in competitiveness. Tourism enterprises that systematically manage customer interaction are more likely to strengthen reputation capital, increase repeat demand and improve resilience during crises. In addition, the findings support the relevance of cross-cultural competencies, inclusivity and adaptive communication strategies discussed by M.P. Arjona-Granados *et al.* (2025) and D.E. Koç *et al.* (2025), especially for enterprises serving heterogeneous domestic and international markets. Overall, the study contributes to the

literature by integrating behavioural, reputational and financial dimensions within a single analytical framework. Unlike many previous studies that examined etiquette or communication separately, the present research demonstrates their measurable connection with enterprise competitiveness through composite indicators and correlation modelling. This provides a more comprehensive understanding of how corporate culture functions in tourism enterprises under contemporary Ukrainian conditions, including economic instability and wartime challenges.

CONCLUSIONS

The study confirmed that professional etiquette and communication play a significant role in shaping the corporate culture of tourism enterprises and in strengthening their competitive positions in the contemporary service market. In tourism and hospitality, where service production and consumption occur simultaneously, customer impressions depend directly on employee behaviour, communication quality and the consistency of service standards. Therefore, etiquette and communication should be regarded not only as behavioural categories, but also as strategic intangible resources affecting enterprise performance. The theoretical analysis demonstrated that corporate culture in tourism enterprises is closely connected with customer orientation, internal coordination, organisational adaptability and reputation management. The reviewed academic sources confirmed that communication competence, behavioural standards and service values influence employee effectiveness, customer satisfaction and long-term competitiveness. The empirical results showed that both analysed enterprises demonstrated positive behavioural dynamics during 2022-2025. In particular, the average customer rating increased from 3.9 to 4.4 for Join UP! and from 4.1 to 4.5 for Reikartz Hotel Group. The share of positive reviews increased from 64% to 80%, while the share of negative reviews decreased from 18% to 9%. In addition, the customer response rate increased from 49% in 2022 to 78% in 2025, indicating stronger communication activity and greater attention to digital reputation management. This indicates that digital communication, customer support and service attentiveness increasingly determine customer perceptions and market reputation. The calculated Behavioural-Communication Index confirmed the systematic improvement of communication quality in both cases, increasing from 0.00 in 2022 to 1.00 in 2025 for both enterprises.

However, the economic outcomes differed substantially depending on the business model. Reikartz Hotel Group demonstrated stronger financial stability, with revenue increasing from UAH 11.5 million in 2022 to UAH 17.2 million in 2025 while maintaining positive profitability indicators. The correlation between behavioural and economic indicators was very strong and positive ($r = 0.95$), which confirms that hotel enterprises can directly transform service quality into repeat demand and stronger competitiveness. In contrast, Join UP! demonstrated substantial market expansion, with revenue increasing to more than

UAH 11.6 billion in 2025, but weaker financial results characterised by persistent net losses and negative equity. At the same time, the correlation coefficient was inverse and moderate ($r = -0.62$). This suggests that improvements in communication do not automatically guarantee profitability when enterprises operate under wartime risks, large-scale liabilities and external market uncertainty.

Thus, the study proved that the economic effect of etiquette and communication is mediated by sectoral specifics, organisational scale and external environmental conditions. For accommodation enterprises, interpersonal behaviour has a more immediate commercial return, whereas for tour operators' communication mainly supports bookings, loyalty and customer trust, while financial

outcomes additionally depend on broader operational factors. Future research may expand the sample of enterprises, include additional tourism segments and apply panel data methods to obtain more generalisable conclusions regarding the role of corporate culture in tourism development.

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Роль та місце професійного етикету і комунікації у формуванні корпоративної культури туристичних підприємств

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Анотація. У сучасному туристичному ринку зростає роль корпоративної культури, етикету й комунікації для конкурентоспроможності підприємств і покращення клієнтського досвіду. Метою статті було визначення ролі та значення професійного етикету і комунікації у формуванні корпоративної культури туристичних підприємств, а також кількісне оцінювання їх впливу на конкурентоспроможність. Методологічною основою дослідження став системний підхід із використанням методів аналізу, синтезу, порівняння, узагальнення, структурно-функціонального аналізу, економіко-статистичних методів і кореляційно-логічного моделювання. Емпіричну базу дослідження сформували дані двох репрезентативних підприємств туристичного ринку України – Join UP! та Reikartz Hotel Group – за 2022-2025 роки. Результати дослідження засвідчили стійке покращення поведінкових і комунікаційних показників в обох підприємств. Зокрема, середній рейтинг клієнтів зріс на 12,8 % у Join UP! та на 9,8 % у Reikartz Hotel Group, тоді як частка позитивних відгуків збільшилася з 64 % до 80 %, а частка негативних відгуків зменшилася з 18 % до 9 %. Економічні результати різнилися: Reikartz Hotel Group збільшила дохід з 11,5 до 17,2 млн грн і показала сильний позитивний зв'язок поведінкових і економічних показників ($r = 0,95$), що підтверджує комерційну цінність етикету й сервісу. Join UP! збільшила дохід понад 11,6 млрд грн, але мала слабшу фінансову стійкість і помірний обернений зв'язок показників ($r = -0,62$) через воєнні ризики, борги та нестабільне середовище. Доведено, що професійний етикет забезпечує стандартизацію поведінки персоналу та стабільність сервісу, тоді як комунікація виступає механізмом реалізації цих стандартів у взаємодії з клієнтами. Практична цінність дослідження полягає у можливості використання отриманих результатів для вдосконалення систем управління корпоративною культурою, зміцнення лояльності клієнтів і підвищення конкурентоспроможності туристичних підприємств

Ключові слова: якість обслуговування; конкурентоспроможність підприємства; лояльність клієнтів; організаційна поведінка; економічна результативність; репутаційний менеджмент



Neuroeconomics as a tool for forecasting consumer behaviour

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Abstract. The study aimed to substantiate the potential of the neuroeconomic approach for analysing the mechanisms underlying consumer behaviour formation and to evaluate its effectiveness in forecasting market reactions. The methodological framework was based on a combination of behavioural and neuroeconomic approaches, alongside the application of elements of theoretical generalisation, statistical, comparative, case study, and SWOT analysis. The results of the statistical analysis established that in 2024, the Ukrainian digital advertising market grew by 35% compared to the previous year, confirming the strengthening role of behavioural digital analytics within the marketing research system. It was determined that the parameters of interaction with a stimulus are formed within the first few hundred milliseconds; specifically, fixation durations of 200-300 ms correspond to cognitive information processing, while the initial allocation of attention within the first 2-3 seconds determines the subsequent perceptual structure. Within the analysis of neuroeconomic methods, it was established that electroencephalography enables the assessment of emotional activation levels and cognitive load, visual tracking facilitates the analysis of attentional structure and the sequence of visual stimulus processing, and multimodal approaches enhance the accuracy of forecasting behavioural reactions through the integration of neural and behavioural indicators. A case study analysis of the Ukrainian consumer market revealed that the traditional marketing approaches employed by ATB-Market and Silpo predominantly focus on analysing turnover, demand structure, and loyalty programmes, whereas COMFY and VARUS utilise behavioural digital analytics and personalised interaction models to adapt digital services to shifts in consumer patterns. It was established that COMFY's e-commerce segment grew by 43% in 2024, accompanied by an update to the website structure and the optimisation of the digital customer journey. The conducted analysis demonstrated that the strengths of neuroeconomic approaches lie in the high accuracy of analysing emotional and cognitive reactions, the capacity to identify non-conscious factors of choice, and the integration of neurodata with behavioural digital analytics, whereas the principal risks are associated with neurodata privacy, algorithmic influence, the complexity of interpreting neurophysiological signals, and the absence of clear regulatory mechanisms. The practical significance of the research lies in expanding approaches to consumer behaviour analysis through the integration of traditional and neuroeconomic methods, thereby enabling an increase in the accuracy of assessing consumer reactions in the digital environment

Keywords: marketing research; cognitive processes; visual tracking; electroencephalography; emotional reactions

INTRODUCTION

The transformation of the consumer market is accompanied by an increasing complexity of decision-making processes, wherein consumer behaviour is shaped not only by rational assessments but also by emotional and cognitive

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reactions. Under these conditions, traditional approaches to demand analysis, which are predominantly based on surveys, demonstrate a limited capacity to reflect the intrinsic mechanisms of choice. The growing role of digital communication channels, the reduction in stimulus interaction time, and the increase in information load are altering the structure of consumer perception, necessitating the use of tools capable of capturing reactions at the moment of their emergence. In this context, neuroeconomics is emerging as an interdisciplinary field that integrates approaches from economics, psychology, and neuroscience, enabling the analysis of behaviour at the level of its formation.

The study by V. Seleznyova (2025) investigates the psycho-emotional aspects of the consumer decision-making process within the context of behavioural economics. The author substantiates that consumer choice is formed under the influence of not only the rational evaluation of alternatives but also the emotional and cognitive reactions that arise during stimulus interaction. The research emphasises that a consumer's emotional state can alter the nature of economic choice and influence behavioural models, even under conditions of identical information about a product or service. This expands the analytical capabilities for forecasting consumer behaviour, as it allows for the consideration of not only declared intentions but also the psycho-emotional factors of decision-making. A similar approach is developed in the research by T. Shepel (2026), where neuroeconomic tools are examined in the context of consumer decision formation amid the declining effectiveness of traditional communication models. The author accentuates that the reduction in interaction time with digital content to 2-3 seconds necessitates a transition to methods capable of analysing consumer sensory and emotional reactions in real time.

The role of neuroeconomic tools in forecasting behavioural reactions is disclosed in the work of T.V. Mitina (2025), which analyses neuroeconomic markers of decision-making under crisis conditions. The author demonstrates that consumer behavioural reactions under uncertainty are shaped by emotional tension, cognitive biases, and shifts in risk perception, which influence economic choice and the nature of decision-making. The study emphasises that the neuroeconomic approach allows for the analysis of consumer behaviour not only through rational evaluation models but also through the mechanisms of emotional and cognitive adaptation to an unstable environment. In the study by N. Chala *et al.* (2021), the neuroeconomic approach is applied to analyse reactions to visual stimuli, enabling the determination of a link between the nature of perception and the subsequent evaluation of an object. The authors established that the level of emotional engagement during interaction with visual stimuli was, on average, 25-30% higher compared to neutral images, confirming the expediency of using neuro-tools in situations where choice is formed under the influence of visual content. The applied dimension of neuroeconomic approaches in the digital environment is examined in the work of

O.V. Kifiak *et al.* (2025), which substantiates their use for improving the accuracy of forecasting consumer reactions to digital stimuli. The authors showed that the use of neuroeconomic tools increased the effectiveness of evaluating advertising messages by approximately 20% compared to traditional survey methods.

The analysis of emotional and cognitive reactions has allowed for the refinement of advertising message perception assessments and an increase in the accuracy of their adaptation to target audiences. In the research by T. Povod & H. Zhosan (2025), neuroeconomic tools are considered in the context of building consumer loyalty in the field of science-intensive products, where product complexity complicates the decision-making process. The authors proved that accounting for the perceptual characteristics of innovative goods allows for increasing the accuracy of behavioural reaction assessment and adapting economic forecasting models to the cognitive characteristics of consumers. A separate research stream is associated with the use of neuroeconomic tools in the digital environment and small business. The work of N.V. Karpenko & M.M. Ivannikova (2021) shows that using tools for analysing emotions and behavioural reactions allows for improving the accuracy of consumer decision assessment, even under resource constraints. Concurrently, I. Hnyliakevych & R. Yerushevska (2020) explored the possibilities of using neuroeconomic tools in the online environment, where consumer behaviour is formed within compressed time intervals and depends significantly on visual and information load. The authors established that over 50% of decisions regarding interaction with digital content are made within the first seconds of contact with the stimulus, increasing the importance of attention fixation and emotional reaction methods in forecasting consumer behaviour.

The scholarly literature highlights the capabilities of neuromarketing as a tool for analysing emotional and cognitive reactions, as well as its application in digital communications, behaviour management, and loyalty formation. At the same time, existing studies predominantly feature a fragmented examination of individual tools or application areas, whereas the issue of utilising neuroeconomics as a holistic analytical approach to forecasting consumer behaviour in the context of the Ukrainian market remains insufficiently explored. Aspects relating to the integration of neurophysiological data into the marketing analysis system and their use for constructing predictive models remain underrepresented. The aim of this study was to determine the analytical capabilities of the neuroeconomic approach in examining consumer behaviour and to substantiate its use for enhancing the accuracy of forecasting market reactions. To achieve this aim, the following objectives were set: to evaluate the effectiveness of neuroeconomic methods and determine their functional capabilities in consumer behaviour research; to conduct a comparative analysis of traditional and neuroeconomic approaches based on the example of Ukrainian marketing research practices; and to carry out a SWOT analysis

of the development of neuroeconomic approaches in the consumer market, taking into account the technological, economic, and ethical aspects of their use.

MATERIALS AND METHODS

The study was of a theoretical-empirical nature and was based on a synthesis of contemporary scientific approaches to the analysis of consumer behaviour within the neuroeconomic paradigm. To investigate the analytical capabilities of the neuroeconomic approach in studying consumer behaviour, elements of theoretical generalisation, statistical analysis, and analytical interpretation of scientific sources were employed. Within this stage, electroencephalography (EEG), visual tracking, multimodal approaches, and neuromodels based on machine learning were analysed as tools for capturing consumers' emotional and cognitive reactions. The source base of the study comprised scientific publications dedicated to the application of neurobiological methods in marketing research (Phutela *et al.*, 2022; Usman *et al.*, 2025; Bossaerts & Schultz, 2026). Statistical and analytical materials pertaining to the Ukrainian marketing research market were also examined (IAB Ukraine, 2025). In the process of analysis, economic decisions were considered as the outcome of the interaction between cognitive and emotional processes, which enabled a transition from describing observed behaviour to explaining the mechanisms of its formation. Particular attention was devoted to the analysis of temporal parameters of interaction with a stimulus, changes in the spectral characteristics of EEG signals, and gaze fixation metrics, which allowed for the determination of the specific features of cognitive information processing and the structure of consumers' attention.

A comparative analysis of traditional marketing research and neuroeconomic approaches was conducted by juxtaposing their analytical characteristics, data sources, and practical limitations. Within this framework, an analytical table was developed wherein methods were evaluated according to the criteria of information type, research scale, forecasting accuracy, speed of obtaining results, and cost of application (Chygryn *et al.*, 2024; Bansal *et al.*, 2025). For the implementation of the case analysis of the Ukrainian consumer market, retail trade enterprises were selected, ensuring the comparability of consumer interaction models and the nature of analytical tool utilisation. The activities of the ATB-Market and Silpo chains, which operate based on mass demand research models, loyalty programmes, analysis of commodity turnover structure, and classical behavioural analytics, served as examples of the application of traditional approaches to consumer behaviour analysis (RAU, 2022). The selection of these cases is determined by their dominant position in Ukraine's retail sector, extensive reach of the consumer audience, and the availability of studies dedicated to the analysis of demand forecasting models and the organisation of goods movement. The cases of COMFY and VARUS companies, which actively employ digital behavioural analytics, personalised user interaction

mechanisms, UX optimisation, and analysis of consumer reactions in the digital environment, served as examples of implementing behaviourally-analytical and neuroeconomically-oriented approaches (WebPromoExperts, 2025; Retailers.ua, 2025). The rationale for selecting these cases is linked to the companies' active digital transformation, the use of real-time user behaviour analysis tools, and the integration of behavioural data into the marketing decision-making system. The comparative case analysis was carried out according to the criteria of data sources, type of behavioural information, scale of consumer reach, level of interaction personalisation, speed of obtaining analytical results, and capabilities for forecasting consumer reactions in the digital environment.

To assess the prospects for the development of neuroeconomic approaches in the consumer market, a SWOT analysis was employed, which allowed for the systematisation of the strengths and weaknesses, opportunities, and threats of using neuromarketing tools in marketing research. Within this stage, the ethical, technological, and organisational limitations of using neurophysiological data in business practice were generalised by identifying key risk areas associated with neural data privacy, informed consent, algorithmic influence, and the manipulative potential of neuromarketing. The source base for the SWOT analysis comprised scientific studies in the field of neuroethics, neuromarketing, and neural data regulation (Goncalves *et al.*, 2024; Gyori & Gabor, 2025; Singh & Kumar, 2026). During the analysis, various approaches to interpreting neural data privacy, the possibilities of algorithmic processing, and the risks of information asymmetry were juxtaposed, after which these aspects were systematised in the form of a SWOT matrix. The application of this method made it possible to determine not only the applied potential of neuroeconomic tools in digital marketing and e-commerce but also the factors that may limit the scale of their practical application.

To systematise the results of the SWOT analysis and visualise the logic of implementing neuroeconomic tools in marketing research, elements of structural-functional modelling were employed. Based on the generalisation of theoretical approaches, the analysis of the functional capabilities of neuroeconomic methods, and the practice of their application in the Ukrainian consumer market, the author has developed a cycle for the integration of traditional and neuroeconomic approaches in marketing research. The model reflects the sequence of interaction between the stages of behavioural data collection, analysis of consumer reactions, testing of marketing stimuli, and marketing decision-making, taking into account the ethical and technological limitations of using neural data.

RESULTS

Assessing the effectiveness of neuroeconomic methods in the Ukrainian consumer market

The integration of neurobiological data into marketing analysis contributes to the substantiation of managerial

decisions related to product positioning and the formation of consumer demand. In the process of interacting with marketing stimuli, the integration of sensory information with prior experience occurs, shaping individual behavioural patterns (Russo, 2024). In this context, neuroeconomics provides a toolkit for analysing behavioural variability associated with internal cognitive and emotional states (Bossaerts & Schultz, 2026). The analysis of neural activity during interaction with an advertisement, brand, or product enables the identification of the level of engagement, the intensity of the emotional response, and the degree of information memorisation.

Neural indicators can serve as predictors of market outcomes, including the sales of new products (Varga *et al.*, 2021). The use of tools such as EEG, visual tracking,

and their combined modifications allows for the simultaneous analysis of attention, emotional activation, and cognitive load. These indicators are formed within the first few hundred milliseconds (ms) after contact with a stimulus, which permits the investigation of subconscious information processing. EEG signals reflect changes in the spectral power of brain waves (alpha, beta bands) associated with the level of engagement and cognitive activity, while visual tracking captures gaze direction, fixation duration, and the sequence of viewing visual elements (Panwar *et al.*, 2024). A gaze fixation duration exceeding 200-300 ms indicates cognitive processing of the stimulus, whereas shorter fixations are associated with superficial perception (Bekenova & Orazgaliyeva, 2025). The main characteristics of the methods are summarised in Table 1.

Table 1. Functional capabilities of neuroeconomic methods in consumer behaviour research

Method	What it measures	Key indicators	Practical application	Limitations
EEG	The electroencephalography method measures the brain's electrical activity arising in response to external stimuli	The key indicators are changes in the alpha and beta brainwave ranges, which reflect the level of emotional activation and cognitive processing	The method is used to assess consumers' emotional responses, their level of engagement, and the perception of advertising messages	The limitation is the complexity of signal interpretation and the need for specialised data processing
Visual tracking	The eye-tracking method allows for the recording of gaze direction and the distribution of a consumer's visual attention	The key indicators are the duration of fixations, which typically exceeds 200-300 ms, and the trajectory of gaze movement between elements of a stimulus	The method is applied to analyse the effectiveness of packaging design, advertising materials, and the structure of visual content	The limitation lies in the impossibility of directly determining a consumer's emotional state
EEG combined with visual tracking	This combined approach involves the simultaneous measurement of neural brain activity and visual attention	The key indicators are the coherence between gaze direction and the level of neural activation, which allows for the assessment of both attention and emotional response	The method is used to enhance the accuracy of consumer choice forecasting and to evaluate reactions to marketing stimuli	The limitations are the high cost of research and the complexity of integrating different data types
Neuromodels (ML)	Neuromodels based on machine learning analyse behavioural patterns using large arrays of neurophysiological data	The key indicators are choice probability, reaction classification, and the forecasting of behavioural outcomes	The method is applied for modelling consumer behaviour and forecasting market indicators	The limitations are the need for significant data volumes and the complexity of building interpretable models

Source: generalised based on N. Phutela *et al.* (2022), G. Bekenova & E. Orazgaliyeva (2025), S.M. Usman *et al.* (2025), T.V. Afonso & F. Heinrichs (2025), B.S. Abdullaeva *et al.* (2025)

An increase in fixation time on visual elements correlates with their prioritisation within the perceptual structure, thereby enabling the use of visual tracking as an indicator of information salience for the consumer. The analysis of EEG signals allows for the identification of an emotional response, thus complementing the results of visual tracking (Phutela *et al.*, 2022). The integration of EEG and visual tracking within a multimodal approach enhances the accuracy of consumer choice forecasting, as it allows for the simultaneous consideration of the direction of attention and the individual's emotional state (Usman *et al.*, 2025). Furthermore, solutions are being developed that allow for the integration of these methods at the hardware level, in particular, the use of EEG to reconstruct eye movements without the

application of separate trackers (Afonso & Heinrichs, 2025).

The statistical context for the application of neuroeconomically-oriented approaches in Ukraine is defined by the rapid growth of the digital segment of the consumer market and the increasing role of behavioural analytics within the system of consumer interaction. According to IAB Ukraine (2025) data, in 2024, the Ukrainian digital advertising market grew by 35% compared to 2023, while the average growth of the European market stood at 11.1%. Under such conditions, the most widespread adoption is observed for behavioural-analytical tools whose functionality is associated with the study of the customer journey, digital activity, personalised recommendations, UX optimisation, and the analysis of user reactions in real time. In

contrast to traditional surveys, these approaches allow for the analysis of not only the outcome of a choice but also the process of interaction with the stimulus itself through the recording of clicks, viewing time, sequence of actions, transitions between pages, and the speed of decision-making.

In the practice of Ukrainian digital retail, neuroeconomically-oriented approaches are implemented primarily through behavioural digital analytics, UX research, and personalised interaction models, which make it possible to indirectly assess the attention, reaction, and behavioural patterns of consumers within a digital environment. The practical application of such tools can be observed in the Ukrainian digital retail sector. According to WebPromoExperts (2025), in 2024, the e-commerce segment of the COMFY company grew by 43% year-on-year, with the online channel developing faster than the company's offline segment. As part of its digital transformation, the company implemented a UX-structure update for its website, which was aimed at reducing user losses at the purchase completion stage and increasing conversion rates. It was additionally noted that around 70% of customers begin their product search journey precisely in a digital environment, which elevates the importance of analysing behavioural responses during the process of interaction with an online interface. Similar trends can be traced in the activities of VARUS. The company's internal digital analytics for 2023-2024 revealed changes in the behaviour of online shoppers, in particular, a growing role for mobile orders, demand for ready-made food, and more active use of personalised recommendations and search filters (Retailers.ua, 2025). In response, the company adapted its recommendation algorithms, search structure, and mobile application to reduce the time of user interaction with the service and to improve the convenience of digital purchasing.

An additional factor driving the actualisation of neuroeconomic methods is the expansion of e-commerce and online shopping. Under such conditions, visual tracking, EEG, and behavioural digital analytics have practical significance, as they allow for the assessment not only of the fact of a purchase or a click but also of the preceding stages of choice: the distribution of attention, the reaction to an advertising stimulus, the level of engagement, and the likelihood of subsequent conversion. The use of neuromarketing tools in small businesses in Ukraine makes it possible to increase communication efficiency by more accurately determining consumer reactions to marketing stimuli (Chygryn *et al.*, 2024). Neuromarketing acts not as an alternative, but as a complement to traditional approaches, expanding the scope of analysis by accounting for non-conscious behavioural factors (Bansal *et al.*, 2025). The obtained results indicate that in the Ukrainian consumer market, neuroeconomically-oriented approaches are most actively integrated within digital retail through behavioural analytics, UX optimisation, and personalised interaction models. Their practical effectiveness is manifested in the growth of e-commerce conversion rates, reduced user

interaction time with the service, and the adaptation of digital platforms to changes in consumer behaviour. The combination of approaches forms a more effective model of marketing research, within which each method is utilised according to its analytical capabilities.

Comparative analysis of traditional and neuroeconomic marketing approaches

Traditional methods provide breadth of coverage and allow for the formation of generalised conclusions regarding consumer behaviour at the macro level. However, at the same time, these methods capture respondents' already-formed perceptions, which limits their ability to reflect the decision-making process itself. Neuroeconomic approaches provide depth of analysis by examining reactions at the moment of interaction with a stimulus. The use of visual tracking makes it possible to determine which elements of an advertisement or packaging attract attention and in which sequence their processing occurs. Traditional approaches to forecasting consumer behaviour in the Ukrainian consumer market are most actively employed by large FMCG retail chains. In the operations of ATB-Market, consumer behaviour analysis is conducted primarily through the examination of demand structure, turnover, price sensitivity, and loyalty programme data. This approach enables the assessment of shifts in mass demand and the adaptation of assortment policy in accordance with purchaser behaviour. Similar tools are utilised by the Silpo chain, which additionally integrates the analysis of digital communications and customer interaction within the digital environment. According to RAU (2022) data, the company actively employs media analytics and digital channels of consumer interaction to evaluate audience behavioural characteristics and communication effectiveness. Concurrently, traditional methods predominantly capture already-formed consumer behaviour after a decision has been made.

Neuroeconomically oriented approaches in the Ukrainian market are implemented primarily through behavioural digital analytics, UX research, and personalised models of consumer interaction. In the practice of COMFY, such tools are employed for the analysis of the digital customer journey, user behaviour on the website, and optimisation of the purchasing process. According to estimates, in 2024 the company's e-commerce segment grew by 43%, which was accompanied by an update of the site's UX structure and an in-depth system audit aimed at increasing conversion and reducing user losses at the checkout stage (WebPromoExperts, 2025). It is additionally noted that approximately 70% of customers begin their product search precisely within the digital environment, which heightens the significance of analysing behavioural reactions during interaction with the online interface. A similar approach is applied in the practice of VARUS, where digital behavioural analytics is used to adapt online services to changes in consumer patterns. According to Retailers.ua (2025), the company's internal

analytics in 2023-2024 revealed a growing role of mobile orders, demand for ready-to-eat food, and more active use of personalised recommendations and search filters. In response, the company adapted its recommendation algorithms, search structure, and mobile application to reduce the time of user interaction with the service and enhance the convenience of the digital purchase. Such

approaches allow for the analysis of consumer behaviour directly during interaction with the digital environment, rather than solely after the completion of a purchase. It is expedient to compare these approaches according to the criteria of data type, analytical tools, speed of adaptation to changes in consumer behaviour, and impact on the economic performance of enterprises (Table 2).

Table 2. Comparison of traditional and neuroeconomically oriented approaches based on cases from the Ukrainian consumer market

Criterion	ATB-Market/Silpo	COMFY/VARUS
Primary data type	Turnover, sales, loyalty programmes, demand structure	Behavioural digital analytics, UX data, digital customer journey
Forecasting tools	Demand analysis, media analytics, loyalty programmes	UX optimisation, personalised recommendations, digital tracking
Type of behavioural information	Conscious consumer actions after purchase	User reactions during interaction with the digital environment
Speed of adaptation to demand changes	Lower	Higher due to real-time data analysis
Impact on economic indicators	Stabilisation of demand structure and turnover	Growth of e-commerce, conversion, and digital interaction
Key limitations	Lower flexibility and dependence on already-formed demand	High dependence on digital infrastructure and analytical systems

Source: compiled by the authors based on RAU (2022), Retailers.ua (2025), WebPromoExperts (2025)

Traditional marketing approaches remain effective for assessing mass demand and forecasting stable consumption patterns. Neuroeconomically oriented digital approaches ensure faster adaptation to changes in consumer behaviour and enhance the level of personalisation in interaction. The most pronounced effect of their use is manifested in the development of e-commerce, increased conversion, and the optimisation of the digital customer journey. In the Ukrainian consumer market, neuroeconomic approaches demonstrate the greatest applied value in the spheres of digital marketing, testing of advertising messages, packaging design optimisation, and the analysis of user behaviour in the digital environment. The combination of neurophysiological methods with classical marketing tools forms a more precise model for forecasting consumer choice and allows for increasing the effectiveness of marketing decisions at the stage of their practical implementation.

SWOT analysis of the development of neuroeconomic approaches in the consumer market

The use of neurophysiological data in marketing research presupposes their inclusion in models for forecasting consumer behaviour. In such models, neural indicators reflect the internal state of the consumer, whereas behavioural indicators capture the outcome of decision-making. Combining neural signals with behavioural data increases the accuracy of predicting online choice, as it accounts for both the user's actions and their reaction to the information environment (Chawla *et al.*, 2026). The expansion of neuromarketing's analytical capabilities is accompanied by the formation of new ethical constraints related to access to the consumer's internal states. Unlike traditional marketing research, neurotechnologies allow for the capture of

reactions that are not subject to conscious control, thereby altering the nature of the interaction between the company and the consumer. In this context, the boundary of permissible intervention in the decision-making process becomes a key issue. Neuromarketing is capable not only of analysing but also potentially influencing behaviour through the stimulation of emotional and subconscious reactions (Singh & Kumar, 2026).

One of the most contentious problems is the issue of neural data privacy. Neurophysiological indicators reflect not only a reaction to a specific stimulus but can also contain information about individual characteristics, including anxiety levels, propensity for risk, or emotional states. The use of machine learning algorithms in neuromarketing creates risks of uncontrolled utilisation of such data, especially in cases of their integration with other sources of information (Goncalves *et al.*, 2024). The problem of informed consent also acquires a more complex nature in the case of neuromarketing research. Formally obtaining consent does not guarantee the consumer's awareness of precisely which processes are subject to analysis and how the obtained data will be used. In this context, attention is drawn to the information asymmetry between the researcher and the respondent, which complicates ensuring full transparency of the research (Gyori & Gabor, 2025). The issue of the manipulative potential of neuromarketing is of particular significance. Employing knowledge of the neural mechanisms of decision-making makes it possible to increase the effectiveness of marketing stimuli; however, at the same time, it creates a risk of purposefully influencing subconscious processes. To systematise the main ethical constraints of neuromarketing, it is expedient to highlight the key risk areas (Table 3).

Table 3. Ethical limitations of using neuromarketing in business practice

Area	Nature of the problem	Practical manifestation	Potential consequences
Privacy of neural data	Collection and processing of data reflecting the consumer's internal states	Formation of detailed behavioural profiles based on neural signals	Violation of confidentiality and risk of unauthorised data use
Informed consent	Respondent's limited understanding of the nature of the research	Formal agreement without awareness of the scope of data collection	Decrease in the level of trust in research
Manipulation of behaviour	Using knowledge of subconscious reactions to influence choice	Personalised stimuli that amplify emotional reactions	Reduction in the autonomy of decision-making
Algorithmic influence	Integration of neural data with AI models	Automated targeting based on neuro-profiles	Intensification of information asymmetry
Lack of regulation	Low level of normative control	Use of technologies without clear standards	Growth of ethical and legal risks

Source: compiled by the authors based on M. Hsu (2017), M. Goncalves *et al.* (2024), L.A. Gyori & M.R. Gabor (2025), K. Singh & A. Kumar (2026)

The privacy of neural data constitutes a foundational level of risk, as it defines the boundaries of access to an individual's internal characteristics. Informed consent reflects the procedural dimension that ensures the legitimacy of data collection. Manipulative potential and algorithmic influence form the applied level, associated with the utilisation of acquired information in marketing practices. The absence of clear regulatory mechanisms amplifies all the aforementioned risks, creating conditions for their scaling. An additional dimension of ethical constraints is linked to the concept of neurorights, which envisages the protection of mental privacy, cognitive liberty, and the psychological integrity of the individual. In turn, research in the field of neuroethics emphasises the necessity of preserving individual autonomy amidst the advancement of neurotechnologies (May, 2023). Consideration of the ethical factor defines the boundaries of permissible use of neurobiological methods, and non-compliance with these boundaries diminishes trust in neuromarketing practices and heightens the risk of regulatory restrictions.

The development of neuroeconomic approaches in marketing research is accompanied by the simultaneous expansion of analytical capabilities and the intensification of ethical, technological, and organisational challenges. The use of neurophysiological methods provides a deeper analysis of consumer behaviour; however, it necessitates the consideration of risks related to the confidentiality of neural data, algorithmic influence, research costs, and the absence of clear regulatory mechanisms. Concurrently, the development of digital marketing, AI-driven analytics, and multimodal research creates new opportunities for integrating neuroeconomic tools into marketing research practice. For a comprehensive assessment of the prospects for employing neuroeconomic methods in the consumer market sector, it is expedient to systematise the key advantages, limitations, potential opportunities, and risks of their practical implementation. Taking into account technological, economic, and ethical aspects enables the identification not only of the applied potential of neuromarketing but also of the factors that may constrain the scale of its use in marketing research and the digital environment (Table 4).

Table 4. SWOT analysis of the development of neuroeconomic approaches in the consumer market

Strengths	Weaknesses
High accuracy of analysis of consumers' emotional and cognitive responses	High cost of equipment and conducting research
Possibility of detecting unconscious factors of consumer choice	Limited sample sizes compared to traditional research
Enhancement of the effectiveness of advertising messages and digital interfaces	Complexity of interpreting neurophysiological signals
Increased accuracy of forecasting consumer behaviour	Need for specialised experts and software
Integration of neural data with behavioural digital analytics	Limited accessibility of neuromarketing technologies for small businesses
Opportunities	Threats
Development of personalised digital marketing	Violation of consumers' neural data privacy
Integration of neuroeconomic methods with AI and Big Data	Manipulative influence on consumers' subconscious reactions
Enhancement of the effectiveness of e-commerce and UX design	Absence of clear legal regulatory mechanisms
Expansion of the use of multimodal research in business	Formation of information asymmetry between the company and the consumer
Formation of new market segments for marketing analytics	Risks of uncontrolled use of machine learning algorithms

Source: developed by the authors based on M. Goncalves *et al.* (2024), S.M. Usman *et al.* (2025), L.A. Gyori & M.R. Gabor (2025), N. Chawla *et al.* (2026), K. Singh & A. Kumar (2026)

The SWOT analysis indicates that the development of neuroeconomic approaches in the consumer market is accompanied by the simultaneous expansion of analytical capabilities and the increase of ethical and technological risks. The strengths of neuromarketing are associated with the high accuracy of researching behavioural reactions and the possibility of analysing unconscious decision-making mechanisms, while the key limitations relate to the cost of research, the complexity of interpreting neural data, and the limited accessibility of technologies. The greatest potential for development is emerging in the sphere of digital

marketing, personalised communications, and the integration of neurophysiological methods with artificial intelligence systems. At the same time, the absence of clear regulatory mechanisms, the risks of manipulative influence, and the problems of neural data protection reinforce the need for the formation of ethical standards for the use of neuroeconomic tools in marketing practice. The generalisation of the SWOT analysis results allows the logic of implementing neuroeconomic approaches in the Ukrainian consumer market to be presented as a sequential cycle of marketing decision-making (Fig. 1).

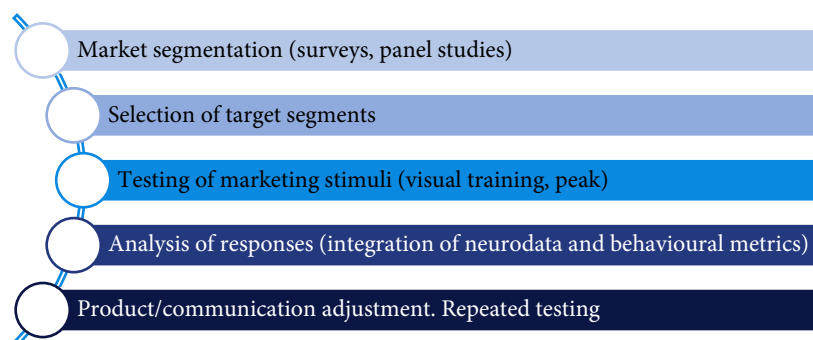


Figure 1. The cycle of integration of traditional and neuroeconomic approaches in marketing research in the context of the Ukrainian consumer market

Source: developed by the authors

The development of neuromarketing in Ukraine should be expediently linked to the training of specialists capable of interpreting neurophysiological data, as well as to the implementation of standards for their use. It is advisable to employ a combined research model, wherein traditional methods are used for market segmentation and target audience identification, while neuroeconomic tools are applied for testing specific marketing stimuli. Such an approach avoids cost overruns and ensures the method's alignment with the set objective. For companies with limited budgets, a rational choice is the selection of targeted neuromarketing studies instead of full-scale projects. The optimal tasks involve testing advertising mock-ups, website interfaces, packaging, and the placement of key elements, where even minor changes can influence consumer behaviour. In the digital environment, it is expedient to integrate the results of visual tracking with user behaviour analytics (clicks, dwell time, conversion). At the same time, to enhance the reliability of results, it is necessary to combine neural data with classical metrics. The use of neuro-instruments without subsequent verification on larger samples limits the possibility of generalising results and increases the risk of erroneous managerial decisions.

DISCUSSION

The obtained results demonstrated that the effectiveness of neuroeconomic approaches in the Ukrainian consumer market is most pronounced in the digital environment, where user behaviour is formed within short time intervals and depends on the speed of visual information processing.

The conducted statistical and comparative case analysis made it possible to establish that traditional marketing instruments remain effective for assessing mass demand and analysing already-formed consumer behaviour, whereas neuroeconomically oriented approaches provide the capability to capture reactions directly at the moment of interaction with a stimulus. In this context, it is appropriate to juxtapose the findings of the conducted study with international scientific approaches to evaluating the opportunities and limitations of neuroeconomic methods in forecasting consumer behaviour.

The research by M. Pšurný *et al.* (2024) is dedicated to studying the factors influencing consumer perception in the online environment, using EEG and visual tracking. The authors established that neurobiological methods allow for the objectification of consumers' unconscious reactions, particularly in areas where traditional approaches are insufficiently precise. This correlates with the results of the statistical analysis, which revealed an increase in the role of the digital environment in shaping consumer reactions. Specifically, the 35% growth of the Ukrainian digital advertising market in 2024 and the 43% development of the COMFY e-commerce segment confirm that digital channels create the greatest scope for applying instruments for capturing users' attention, reactions, and behavioural patterns.

Simultaneously, the work of A. Bazzani *et al.* (2020) provides a systematic review of the application of EEG in marketing research. It was proven that EEG is one of the most accessible and informative neurobiological methods

due to its high temporal resolution and relatively low cost; however, it requires specialised signal interpretation and a controlled experimental environment. Within the framework of the conducted study, this thesis is corroborated through the identified functional capabilities of EEG, in particular its ability to register changes in the spectral power of alpha and beta bands associated with cognitive engagement and emotional activation. Concurrently, the SWOT analysis results showed that the complexity of interpreting neurophysiological signals and the need for specialised experts remain substantial limitations for the practical use of EEG in the consumer market.

The neurobiological underpinnings of neuroeconomics are systematised through the lens of functional magnetic resonance imaging in the work of C.A. Mallio *et al.* (2024). The research focus is directed towards the capacity of neuroimaging to identify neural correlates of economic decision-making, in particular the activation of structures associated with value formation and risk processing. This directly corresponds to the theoretical foundation of the present study, wherein consumer choice is examined as the outcome of an interaction between the cognitive and emotional systems of the brain. Although the practical application of MRI in marketing research remains constrained by its cost and complexity, its theoretical contributions form the conceptual basis for interpreting the results of less resource-intensive methods, notably EEG and visual tracking. Concurrently, the study by F.J. Otamendi & D.L. Sutil Martín (2020) is devoted to measuring the emotional effectiveness of advertising through the analysis of consumers' facial reactions. The level of engagement, emotional valence, and attention are formed prior to the conscious evaluation of an advertising message and can be quantified using neurobiological tools. This correlates with the findings of the first subsection, where it was determined that neuroeconomic methods possess applied significance for assessing the preliminary stages of choice, notably the allocation of attention, the reaction to a stimulus, and the probability of subsequent conversion. In digital retail, this logic manifests itself through the necessity of optimising interfaces, checkout systems, and personalised communications prior to the moment of purchase completion.

According to A.C. Martinez-Levy *et al.* (2022), neuromarketing tools have been applied to investigate the unconscious perception of message framing in non-commercial advertising. The manner in which information is presented significantly influences the level of emotional engagement and memorability, even in the absence of differences in the substantive content of the messages, a phenomenon not reflected in respondents' answers in traditional surveys. In the results of the present work, a similar logic is traced through the comparative case analysis of COMFY and VARUS, where the effectiveness of consumer interaction is linked not only to product assortment or price but also to the structure of the digital customer journey. Thus, neuroeconomically oriented approaches enable the analysis not only of the content of an offering but also

of the manner in which it is perceived by the user within a specific digital environment.

A method for measuring the strength of brand associations through the analysis of the N400 component of the EEG signal, enabling the assessment of congruence between a brand and its image in the consumer's mind, was proposed by F. Camarrone & M.M. Van Hulle (2019). The focus was placed on the effectiveness of single-trial measurements. The correlation with the present study lies in the confirmation of EEG's capability to detect neural responses associated with the evaluation of marketing stimuli, even in situations where respondents' verbal answers do not reflect their genuine attitude towards the brand. This aligns with the results of the comparative analysis, where traditional approaches were identified as effective for analysing mass demand but less suitable for studying consumer response at the moment of contact with a stimulus.

A bibliometric analysis of 497 articles from EEG research in the field of consumer behaviour spanning 2002-2022 was presented by researchers A. Costa-Feito *et al.* (2023). As a result, leading thematic clusters and promising directions were identified, notably the integration of EEG with augmented reality technologies, artificial intelligence, and multimodal studies. Comparison with the results of the present study confirms a general trend towards combining neurophysiological methods with digital behavioural data. The current state of research on the role of eye movements in the decision-making process was summarised, and a conceptual framework for integrating eye-tracking data into computational models of choice was proposed by C.-C. Ting & S. Gluth (2024). The authors demonstrated that the distribution of fixation time between alternatives directly influences the probability of their selection, reflecting the process of attention formation and value assessment. This conclusion directly correlates with the results of the present study, where it was established that fixation durations exceeding 200-300 ms correspond to cognitive processing of the stimulus, and the initial allocation of attention determines the subsequent structure of perception. By contrast, S. Kakaria *et al.* (2023) focused on a systematic analysis of the application of heart rate variability as a physiological indicator in marketing research. The paper substantiated the methodological prospects for incorporating autonomic indicators into multimodal approaches to enhance the accuracy of measuring consumers' emotional responses. This is consonant with the obtained results regarding the advantages of combining different types of data, since the present work demonstrated that the integration of EEG, visual tracking, and digital behavioural analytics expands the possibilities for predicting consumer choice. Simultaneously, the SWOT analysis indicated that the expansion of multimodal research is accompanied by increasing costs, complexity of interpretation, and the need for specialised software.

M. Ćirović *et al.* (2024) investigated neuroscientific methods for rethinking approaches to communication in the field of sustainable development. Traditional forms of

conveying information about brands' environmental responsibility do not generate a sufficient level of consumer emotional engagement, whereas neurobiologically grounded approaches to message construction significantly enhance communication effectiveness. The obtained results are consistent with this conclusion in a broader context. Even in domains where the substantive component of a message is clear and understandable, the level of engagement and memorability is determined by the nature of the emotional activation, which traditional marketing methods are incapable of capturing. Within the framework of the present study, this thesis correlates with the conclusion regarding the limitations of traditional methods in capturing reactions that occur prior to the completion of conscious evaluation. This is most practically manifested in digital communications, where the effectiveness of interaction depends on the structure of the message, the speed of attracting attention, and the stimulus's ability to retain the user within the customer journey.

The comparison of the results of the present study with international scholarly sources provides grounds to assert that the neuroeconomic approach cannot be regarded as an alternative to traditional marketing methods, as it constitutes their functional complement, expanding analytical capabilities at the level of unconscious behavioural mechanisms. The experience of European researchers demonstrates that effective prediction of consumer choice necessitates the integration of neurophysiological signals, behavioural data, and contextual information into a single multimodal analytical system. The Ukrainian case confirms these conclusions: the growth of the digital market, the expansion of e-commerce, and the reduction in the time of consumer interaction with an advertising stimulus generate a demand for tools capable of analysing reactions in real time. This allows for the assertion that the further development of neuroeconomic approaches in Ukraine is only possible under the condition of combining technological modernisation of marketing research, the training of specialised professionals, and the establishment of ethical standards for the use of neurophysiological data.

CONCLUSIONS

The research established that neuroeconomic methods possess applied significance for the analysis of the Ukrainian consumer market, as they allow for the capture not only of consumers' conscious evaluations but also of early emotional and cognitive reactions to marketing stimuli. Visual tracking, EEG, multimodal methods, and digital behavioural analytics provide the capability to investigate the allocation of attention, the level of engagement, emotional activation, and the probability of subsequent choice. Statistical indicators of the development of Ukraine's digital market, in particular the 35% growth of the digital segment in 2024, confirm the increasing importance of tools capable of analysing consumer behaviour within short cycles of interaction with an advertising or digital stimulus. In this context, fixation durations

exceeding 200-300 ms, the first 2-3 seconds of interaction with visual content, and the combination of neural signals with behavioural data acquire significance as indicators for predicting consumer choice.

A comparative analysis of traditional and neuroeconomically oriented marketing approaches demonstrated their functional complementarity within the system of predicting consumer behaviour. Traditional methods remain effective for assessing mass demand, analysing product turnover, segmenting audiences, and studying the socio-economic characteristics of consumers; however, their analytical capabilities are limited to capturing already-formed behaviour and respondents' conscious evaluations. Neuroeconomic approaches provide a deeper level of analysis owing to the possibility of investigating reactions at the moment of interaction with a stimulus, thereby enabling the assessment of attention, emotional activation, cognitive load, and the probability of a subsequent behavioural response. The findings of the case analysis of the Ukrainian consumer market indicated that neuroeconomically oriented approaches are most actively integrated into digital retail through behavioural analytics, UX optimisation, and personalised models of consumer interaction. Drawing on the cases of COMFY and VARUS, it was established that the use of digital tracking, customer journey analysis, and behavioural data enables a swifter adaptation of digital services to shifts in consumer patterns, an increase in conversion rates, and a reduction in user interaction time with online platforms. At the same time, the cases of ATB-Market and Silpo confirmed that traditional marketing instruments remain more effective for stabilising demand structures, analysing sales, and evaluating the behaviour of large consumer audiences.

The SWOT analysis demonstrated that the development of neuroeconomic approaches in the consumer market combines high analytical potential with a range of technological, economic, and ethical constraints. The strengths include precision in analysing emotional and cognitive reactions, the capacity to identify non-conscious factors of choice, and the integration of neurodata with digital behavioural analytics. Conversely, the weaknesses remain the high cost of research, limited sample sizes, the complexity of interpreting neurophysiological signals, and the need for specialised professionals. The principal threats are associated with the privacy of neurodata, manipulative influence, algorithmic targeting, and the absence of clear legal regulatory mechanisms. The greatest opportunities for further development are emerging in the fields of personalised digital marketing, e-commerce, digital analytics, and multimodal research. The limitation of the study lies in the absence of empirical verification of the established dependencies on specific consumer samples and the dependence of the interpretation of neurophysiological indicators on experimental conditions. Prospects for further research are linked to conducting empirical comparisons of traditional and neuroeconomic

methods on identical samples, the quantitative assessment of their accuracy in predicting behaviour, and the development of models for integrating neurophysiological and behavioural data within the digital environment.

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Нейроекономіка як інструмент прогнозування споживчої поведінки

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Анотація. Метою дослідження було обґрунтування потенціалу нейроекономічного підходу для аналізу механізмів формування споживчої поведінки та оцінювання його ефективності у прогнозуванні ринкових реакцій. Методологічну основу роботи становило поєднання поведінкового та нейроекономічного підходів із застосуванням елементів теоретичного узагальнення, статистичного, порівняльного аналізу, методу case study та SWOT-аналізу. На основі результатів статистичного аналізу встановлено, що у 2024 році український ринок цифрової реклами зріс на 35 % порівняно з попереднім роком, що підтверджує посилення ролі поведінкової цифрової аналітики в системі маркетингових досліджень. Визначено, що параметри взаємодії зі стимулом формуються протягом перших кількох сотень мілісекунд; зокрема, тривалість фіксації у 200-300 мс відповідає когнітивній обробці інформації, тоді як первинний розподіл уваги протягом перших 2-3 секунд визначає подальшу структуру сприйняття. У межах аналізу нейроекономічних методів доведено, що електроенцефалографія дає змогу оцінити рівні емоційної активації та когнітивного навантаження, візуальний трекінг (айтрекінг) сприяє аналізу структури уваги та послідовності обробки зорового стимулу, а мультимодальні підходи підвищують точність прогнозування поведінкових реакцій завдяки інтеграції нейрофізіологічних та поведінкових показників. Аналіз конкретних ситуацій на українському споживчому ринку виявив, що традиційні маркетингові підходи, які застосовують «АТБ-Маркет» і «Сільпо», переважно зосереджені на аналізі товарообороту, структури попиту та програм лояльності, тоді як «COMFY» та «VARUS» використовують поведінкову цифрову аналітику та персоналізовані моделі взаємодії для адаптації цифрових послуг до змін у споживчих патернах. Встановлено, що сегмент електронної комерції «COMFY» у 2024 році зріс на 43 %, що супроводжувалося оновленням структури вебсайту та оптимізацією цифрового шляху клієнта. Проведений аналіз продемонстрував, що сильними сторонами нейроекономічних підходів є висока точність аналізу емоційних і когнітивних реакцій, здатність виявляти неусвідомлені чинники вибору, а також інтеграція нейроданих із поведінковою цифровою аналітикою, тоді як основні ризики пов'язані з конфіденційністю нейроданих, алгоритмічним впливом, складністю інтерпретації нейрофізіологічних сигналів та відсутністю чітких регуляторних механізмів. Практичне значення дослідження полягає в розширенні підходів до аналізу споживчої поведінки шляхом інтеграції традиційних і нейроекономічних методів, що дає змогу підвищити точність оцінювання реакцій споживачів у цифровому середовищі

Ключові слова: маркетингові дослідження; когнітивні процеси; візуальний трекінг; електроенцефалографія; емоційні реакції



IFRS for SMEs update: Theoretical and analytical assessment of the consequences for accounting and financial reporting

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Abstract. The purpose of this study was to conduct a theoretical and analytical assessment of the impact of updates to international financial reporting standards for small and medium-sized enterprises on accounting and financial reporting. The study involved an analysis of regulatory provisions and scientific sources using comparative, structural-logical, causal and systemic methods. The results showed that the update caused significant changes in approaches to recognition, measurement and disclosure of information. The introduction of a five-step revenue recognition model changed the timing of revenue recognition, leading to a redistribution of income between periods without changing its total amount. The analysis confirmed the global significance of these changes, given that small and medium-sized enterprises account for more than 95% of all enterprises worldwide. The diffusion of international financial reporting standards for small and medium-sized enterprises expanded from 63 adopting countries in 2013 to 87 out of 169 jurisdictions in 2025, where the standard is required or permitted, indicating a steady increase in global adoption. Implementation costs are substantial: initial system modernisation costs amount to approximately USD 9,500 for medium-sized enterprises and up to USD 95,000 for large entities, with annual support costs of USD 3,000-4,500 and over USD 15,000 respectively. Implementation barriers were classified as financial, organisational, personnel and methodological. The findings show that the updates improve comparability, relevance and transparency of financial reporting but increase complexity and costs. Overall effectiveness depends on the ability of enterprises to adapt accounting systems. The results can be used by management of small and medium-sized enterprises, regulators and auditors to improve accounting policies, oversight mechanisms and reporting quality

Keywords: harmonisation; transparency; implementation; information asymmetry; fair value; implementation barriers

INTRODUCTION

Transformations of the global economic environment, strengthening of integration processes and increasing requirements for transparency of financial information necessitate improvement of approaches to accounting and reporting by business entities. These processes are of particular importance for small and medium-sized enterprises (SMEs) that operate in conditions of limited resources, but at the same time need access to financial markets, credit resources and investments. The varying level of effectiveness of the implementation of international standards and their ambiguous impact on the activities of enterprises necessitates further

scientific understanding of this process. O. Talibzade (2025) in his study found that the transition to international standards was accompanied by an increase in profitability indicators, in particular, an increase in the profitability of assets, capital and earnings per share, as well as increased transparency of financial information and investor confidence. The author proved that the implementation process was long and incomplete and was accompanied by resistance from SMEs due to complexity and resource constraints. Z. Fanani *et al.* (2024) identified key determinants of standards implementation, including the level of education, the presence of

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other accounting systems and the level of internationalisation. The results obtained showed that the level of education and the presence of alternative standards have a negative impact on implementation, while the level of internationalisation does not have a statistically significant impact. The uneven results of implementing international standards and their limited effectiveness in transition economies necessitate the generalisation of scientific approaches to their assessment. O. Golubeva (2023) analysed 46 studies and found that the application of these standards is generally associated with increased transparency, comparability and reduced information asymmetry, though results vary across countries. It has been proven that in post-Soviet economies their impact is often limited due to institutional constraints, remnants of administrative accounting and the coexistence of national and international approaches. A.-G. Marina & A. Tiron-Tudor (2024) found that accounting professionals support improving financial reporting but do not consider International Financial Reporting Standards (IFRS) for SMEs mandatory. It was also found that alignment between national and international standards is moderate, while the use of international financial reporting standards is constrained by complexity, implementation costs and a tax-oriented reporting focus.

The uneven impact of international standards on enterprises' access to finance and its dependence on institutional conditions necessitates further analysis. V. Tawiah & E. Gyapong (2023) found that their use, including for SMEs, is positively associated with increased bank lending to the private sector. This impact is stronger for full standards than for simplified ones and is amplified in countries with weaker institutional environments, indicating greater trust of financial institutions in internationally prepared reports. It is also found that these standards reduce information asymmetry and improve financial information quality, influencing lending decisions. S.C. Friday *et al.* (2025) found that their implementation increases transparency, access to capital and investor confidence, positively affecting enterprise performance. At the same time, enterprises face significant initial challenges due to limited resources, regulatory complexity and high implementation costs, which may temporarily worsen financial performance. The limited systematisation of approaches to assessing the impact of international standards and the insufficient generalisation of findings across stakeholder perspectives necessitate comprehensive analysis. S. Bathla *et al.* (2024) conducted a bibliometric review of 106 studies and found that the adoption of international standards significantly improved accounting quality and disclosure, while changing approaches to financial reporting. The results showed that stakeholders' perceptions are heterogeneous and depend on the institutional environment, country development level and professional competence. It was also found that most studies focus on developed countries, while developing countries remain under-researched. J.U. Akpan *et al.* (2023) found that the adoption of international standards enhances comparability, transparency and reporting quality, and facilitates access to finance. At the same time, their application

creates significant challenges for SMEs due to limited resources, complex requirements and misalignment with their specifics, increasing the burden on accounting systems.

At the same time, the issues of the impact of updates to standards on SME accounting, their adaptation, implementation costs and assessment of efficiency and long-term consequences for financial reporting and development of enterprises remain insufficiently researched. The purpose of the study was to examine, from a theoretical and analytical perspective, how revisions to IFRS for SMEs enterprises influence accounting practices and the preparation of financial statements. To achieve this goal, the following tasks were defined: to investigate the main directions of updates to IFRS for SMEs; to analyse their impact on accounting processes and financial reporting; to assess the practical consequences of their implementation, including benefits, costs and barriers for SMEs.

MATERIALS AND METHODS

The study was theoretical and analytical in nature, as it was aimed at generalising scientific approaches, analysing regulatory provisions and assessing the impact of updates to The IFRS for SMEs Accounting Standard (n.d.) on accounting and financial reporting without using primary empirical data. The study covered the period from 2013 to 2025, which made it possible to consider both earlier stages of the standard's application and its most recent updates, including the IFRS for SMEs update... (2025). The source base included official documents and materials of the IFRS Foundation (2025) and the International Accounting Standards Board (2018), as well as scientific publications and analytical materials on the implementation and development of international financial reporting standards for SMEs, such as D.W. Kamotho & P.K. Kaudo (2023). Theoretical generalisation was used to systematise scientific approaches to the place, purpose and scope of IFRS for SMEs within the system of international financial reporting standards. System analysis was applied to determine the role of the standard as a simplified alternative to full IFRS and to substantiate its functional purpose for enterprises without public accountability. Comparative analysis formed one of the central methodological tools of the study. It was applied to compare the requirements of IFRS for SMEs and full IFRS and to identify differences in approaches to recognition, measurement and disclosure of financial information. This part of the analysis was based on analytical and methodological materials explaining the distinction between the simplified standard and full IFRS, including publications by Deloitte (2009; n.d.) and D. Dodenko (2026). The same method was also used to assess changes between the previous and updated editions of IFRS for SMEs, particularly regarding the main areas of recognition, measurement, presentation and disclosure. Structural-logical analysis was used to examine the scope of the standard, the criteria for classifying entities as SMEs and the internal structure of IFRS for SMEs. This method helped to group the sections of the standard by thematic blocks, determine their

sequence and establish the relationship between conceptual provisions and applied aspects of accounting. The classification method was applied to systematise the main areas of change introduced by the updated standard and to distinguish the main implementation barriers for SMEs.

To assess the global diffusion of IFRS for SMEs, the study used a comparative and analytical approach based on secondary aggregated data. The analysis relied on IASB jurisdiction profiles as presented by D. Kaya & M. Koch (2015) and I.H. Shah (2025). The comparison was carried out using indicators for 2013 and 2025, including the total number of jurisdictions analysed, the number of jurisdictions applying IFRS for SMEs, the number of jurisdictions not applying the standard and the share of adopters. These indicators were used to assess general trends in the global adoption of the standard, taking into account the limitations of available regional and aggregated data for the most recent period (IFRS 13: Fair value measurement, n.d.); IFRS 3: Business combinations, n.d.). The practical implications of the updated requirements were examined through illustrative modelling and logical generalisation. Simplified numerical scenarios were constructed to demonstrate the possible effects of fair value measurement, revenue recognition based on a model consistent with IFRS 15, and the accounting treatment of acquisition-related costs. These scenarios were not based on empirical case data and were used to clarify the economic substance of the updated requirements and to show how changes in recognition and measurement approaches may affect the timing of income and expense recognition, the distribution of financial results between reporting periods and the presentation of financial position. Implementation barriers were analysed through classification and generalisation of scientific approaches. Barriers were grouped into financial, organisational, personnel and methodological categories. Their systematisation according to the relationship between the specific barrier, its manifestation in the implementation process and its potential impact on SMEs was carried out using structural-logical analysis based on P. Muda *et al.* (2024) and B. Dermaku (2025). This approach was used to relate the nature of implementation difficulties to their practical consequences for enterprises. The feasibility and effectiveness of IFRS for SMEs updates were assessed using theoretical generalisation, logical analysis and qualitative evaluation. The evaluation was based on the following criteria: improvement in the quality of financial information, including relevance, reliability and understandability; increased comparability of financial statements; consistency with the conceptual framework; practical applicability for SMEs; and the balance between expected benefits and implementation costs.

RESULTS

The functioning of IFRS for SMEs

in the system of international financial regulation

IFRS for SMEs occupies an independent and complementary place within the system of international financial

reporting standards, acting as a simplified alternative to full IFRS for entities without public accountability. Its development was driven by the need to adapt complex international accounting requirements to the capabilities and needs of SMEs, which operate under resource constraints but require reliable and comparable financial information for external users. A key feature of the standard is the significant simplification of accounting requirements compared to full IFRS. This simplification is achieved through the exclusion of topics not typical for SMEs, the reduction of alternative accounting treatments, the application of simplified recognition and measurement principles, and a substantial decrease in disclosure requirements (Deloitte, 2009; Dodenko, 2026). At the same time, the standard retains a conceptual basis consistent with full IFRS, which ensures a sufficient level of quality and comparability of financial reporting. These characteristics determine the nature of the updates to IFRS for SMEs, which are aimed not only at maintaining simplicity, but also at improving the quality of financial information. In particular, the alignment with the International Accounting Standards Board (2018), the refinement of definitions and recognition criteria, the introduction of a separate section on fair value measurement, and the revision of revenue recognition approaches significantly affect accounting practices. Such changes lead to the transformation of accounting policies, require the revision of internal procedures, and influence the structure and content of financial statements. The application of IFRS for SMEs is mandatory in full for entities that choose or are required to use it, which means that enterprises must adapt their accounting systems, documentation processes and reporting formats to the updated requirements (IFRS Foundation, 2025). This affects not only the technical aspects of accounting, but also managerial processes, including contract analysis, risk assessment and financial planning.

In a global context, the importance of IFRS for SMEs is significant, as SMEs account for more than 95% of all business entities worldwide (What's happening in the missing middle? n.d.). The spread of the standard contributes to the harmonisation of financial reporting and facilitates access to external financing by increasing the transparency and comparability of financial information. At the same time, the implementation of updates increases the requirements for professional judgment, methodological support and the level of qualification of accounting personnel, which may create additional challenges for SMEs (Why global accounting standards? n.d.; Dodenko, 2026). Thus, IFRS for SMEs functions not only as a simplified reporting framework, but also as a dynamic regulatory instrument, the updates of which directly affect accounting processes, financial reporting structure and the overall quality of financial information, forming both new opportunities and additional constraints for SMEs. The global diffusion of The IFRS for SMEs Accounting Standard (n.d.) has significantly expanded over the past decade. Jurisdiction profiles covering 128 countries as of 2013, only 63 countries had adopted the standard, while 65 had not adopted it. As of 2013, the

adopting countries were predominantly located in Latin America and the Caribbean (27 jurisdictions), followed by Sub-Saharan Africa (14 jurisdictions), Europe and Central Asia (7 jurisdictions), and the Middle East and North Africa (6 jurisdictions). In general, these countries adopted the IFRS for SMEs on a voluntary basis without making any modifications to the standard. Only six countries required the application of the IFRS for SMEs (e.g., Chile, Serbia, Venezuela) (Kaya & Koch, 2015). More recent evidence indicates that by 2025, IFRS for SMEs is required or permitted in 87 out of 169 jurisdictions, demonstrating a substantial increase in global adoption. This regional distribution

suggests that the adoption of IFRS for SMEs has historically been concentrated in developing and emerging economies, where national accounting systems are less developed and the need for a simplified international framework is higher. At the same time, more developed jurisdictions tend to rely on national accounting standards, which limit the spread of IFRS for SMEs. It should be noted that comparable detailed regional distribution data for 2025 are not publicly available in aggregated form. The dynamics of IFRS for SMEs adoption over time demonstrate a gradual expansion of the standard at the global level. A comparison of adoption indicators between 2013 and 2025 is presented in Table 1.

Table 1. Dynamics of IFRS for SMEs adoption (2013-2025)

Indicator	2013	2025
Total jurisdictions analysed	128	169
Countries applying IFRS for SMEs	63	87
Countries not applying IFRS for SMEs	65	82
Share of adopters	49%	51.5%

Source: compiled by author based on D. Kaya & M. Koch (2015), IFRS for SMEs update: Train the trainers (2025)

As shown in Table 1, the number of jurisdictions applying IFRS for SMEs increased from 63 in 2013 to 87 in 2025. This indicates a steady, although not uniform, expansion of the standard. The relatively moderate increase in the share of adopters suggests that while new countries continue to adopt IFRS for SMEs, a significant number of jurisdictions – primarily developed economies – still rely on national accounting frameworks. IFRS for SMEs is an effective tool for regulating the financial reporting of SMEs, combining simplification of accounting requirements with ensuring the proper quality of financial information. Its structure is logically ordered and provides a consistent transition from conceptual principles to practical aspects of accounting, which contributes to ease of application. Updates to the standard are aimed at increasing consistency with full IFRS and improving approaches to recognition, measurement and disclosure of information. At the same time, the introduced changes require enterprises to adapt accounting procedures, which necessitates further research into their practical effectiveness.

Analysis of updates to IFRS for SMEs and their substantive characteristics

The updated version of the standard retains the general logic and structure, but provides for significant changes in the content of individual sections. In particular, section 2 has been revised to align with the International Accounting Standards Board (2018), and section 3 has clarified the requirements for materiality, disclosure of accounting policies and the structure of notes. Significant changes have occurred in section 11, where the possibility of using alternative approaches to accounting for financial instruments has been abolished, and the requirements for disclosure of information regarding financial risks have been expanded. A separate section 12 has been introduced for the first time, dedicated to fair value measurement, which increases the

consistency of the standard with full IFRSs. Section 23 on revenue has been significantly updated, which is brought into line with the approaches of IFRS 15, which provides a more accurate reflection of the economic substance of transactions with customers. In addition, Section 19 on business combinations has been revised, introducing the acquisition method instead of the previous approaches, clarifying the definition of a business and expanding the requirements for the measurement of acquired assets and liabilities. The updates also affected the sections governing the presentation of financial statements, provisions, taxes and other aspects of accounting (IFRS for SMEs: Accounting standards, 2025). The update of Section 2 “Concepts and Core Principles” is of a fundamental nature, as it has been almost completely revised in accordance with the International Accounting Standards Board (2018). The changes relate to the clarification of the definitions of the elements of financial statements, the criteria for their recognition, the approaches to measurement, guidance on the derecognition of financial statement elements, as well as the principles of presentation and disclosure. In addition, concepts such as prudence, the prevalence of substance over form, management stewardship and the assessment of uncertainty have been specified, which ensures a more consistent application of accounting approaches. As a result, these updates form a clearer methodological basis for developing accounting policies in cases where there are no direct requirements in the standard and contribute to improving the quality of financial information. At the same time, changes in Section 3 “Presentation of Financial Statements” are aimed at improving approaches to presenting information, in particular by clarifying the principle of materiality and requirements for structuring reporting. It is established that information should be presented in such a way as not to hide material data and not to combine indicators of different economic nature, which increases the

transparency of reporting. Clarification of materiality criteria contributes to a more objective assessment of information, taking into account its impact on user decisions. In general, these changes ensure increased clarity and informativeness of financial reporting, while preventing its excessive complexity. Section 11 “Financial Instruments” has undergone significant changes aimed at simplifying and unifying approaches to their accounting in the activities of SMEs. One of the key innovations is the abolition of the possibility of applying the requirements of IAS 39 financial instruments... (2026) on the recognition and measurement of financial instruments, which ensures the autonomy of the standard and eliminates the need to refer to full IFRS. The scope of the section has also been clarified; in particular, financial guarantees provided without compensation within the group have been excluded from it, which are now accounted for as contingent liabilities in accordance with other provisions of the standard, while other guarantees remain within the scope of this section. Significant attention has been paid to clarifying the criteria for classifying financial instruments. An additional principle has been introduced, according to which debt instruments may be accounted for at amortised cost provided that their cash flows consist exclusively of payments of principal and interest, even if not all formal criteria are met, in the absence of significant risks not related to the basic terms of the instrument. It is also clarified that the presence of early repayment conditions, including those that provide for compensation payments, does not exclude the possibility of applying amortised cost measurement if the economic substance of the instrument is preserved. The issue of reclassification of financial instruments has been separately regulated: new requirements provide for a ban on changing the classification after initial recognition, which contributes to increasing the stability and consistency of financial reporting. In addition, changes have been made to the rules of initial measurement related to the update of approaches to revenue recognition. In particular, trade receivables are now generally measured at the transaction price in accordance with the revenue provisions, except in cases where the transaction has financing characteristics. An relevant aspect of the update is the expansion of disclosure requirements. It is provided for the mandatory submission of an analysis of the maturity dates of financial assets and liabilities, as well as a breakdown of receivables by overdue periods. This allows users of financial statements to assess the level of credit risk and the projected cash flows of the enterprise. The introduced changes are aimed at increasing the transparency and informativeness of financial reporting, while maintaining a simplified accounting approach typical for SMEs. In particular, the retention of the incurred loss model instead of the more complex expected credit loss model is justified by the need to avoid excessive costs and complexity in application. Overall, the updates to the section provide a more realistic reflection of the economic substance of financial instruments and increase the consistency of accounting approaches within the standard.

For example, a loan issued at USD 10,000 with an annual interest rate of 10% is measured at amortised cost using the effective interest rate method, resulting in systematic recognition of interest income over time rather than at a single point. This ensures a more consistent representation of financial income across reporting periods.

The updated version of the IFRS for SMEs introduces for the first time a separate section 12 “Fair value measurement”, which establishes uniform approaches to determining the fair value of assets and liabilities in cases where other sections of the standard provide for its application. The main purpose of the measurement is to determine the price at which an orderly transaction between market participants could take place at the measurement date, which ensures a market-oriented approach to the formation of financial information. The section provides for the use of various valuation methods, including market, cost and income approaches, with a priority on the use of observable market data. In addition, a fair value hierarchy has been introduced, which classifies inputs by levels of reliability, which increases the transparency and comparability of estimates in financial reporting. In quantitative terms, this affects reported financial results. For instance, an asset initially recognised at USD 200,000 may be remeasured to USD 230,000 based on market conditions, resulting in a USD 30,000 gain recognised in profit or loss. Conversely, a decrease in value would generate a loss. This demonstrates how fair value measurement increases the relevance of information while introducing variability in financial performance. Section 19 “Business Combinations and Goodwill” has been significantly updated to align its provisions with the requirements of IFRS 3: Business combinations (n.d.). First of all, the definition of a business has been revised, which allows for a clearer identification of transactions that are subject to accounting as a business combination. It has also been clarified that a newly created enterprise formed exclusively for the purpose of carrying out a combination cannot be recognised as an acquirer, which ensures a more correct reflection of the essence of such transactions. References to the definition of assets and liabilities have also been updated in accordance with the revised conceptual provisions of the standard. The changes also affected the procedure for recognising and measuring individual elements of a business combination. In particular, the requirements for recognising contingent liabilities, which can be reflected in the reporting only if they meet the definition of a liability, have been clarified. At the same time, it has been established that contingent compensation is subject to measurement at fair value only in cases where such measurement can be carried out without undue cost or effort. It is separately determined that acquisition-related costs are recognised as expenses of the period, which is consistent with the approaches of full IFRS and increases the transparency of the formation of financial results. An important innovation is the establishment of requirements for staged business combinations, which allows for a more accurate reflection of control acquisition transactions that are

carried out gradually. In addition, the section has been supplemented with an appendix containing clarifications on the practical application of the new provisions, which helps reduce ambiguity in their interpretation. The introduced changes are generally aimed at improving the quality of financial information and reducing the need for complex professional judgments in the formation of accounting policies. In particular, the clarification of the requirements for accounting for contingent compensation and acquisition costs ensures a more reliable reflection of the value of the business combination. At the same time, restrictions on fair value measurement in cases of excessive costs create practical relief for SMEs. However, despite the simplification, the application of the updated section may be difficult for companies that regularly carry out mergers and acquisitions, which necessitates the need for proper training of accounting specialists.

Section 21 “Provisions and Contingent Liabilities” has also undergone some clarifications aimed at expanding its scope of application and improving the quality of disclosure. In particular, the scope of the section includes financial guarantee contracts provided without compensation if the debtor is another company in the group. This provides a more consistent approach to accounting for such transactions and eliminates uncertainty regarding their classification. In addition, the requirements for disclosure of information regarding provisions and contingent liabilities have been clarified, which contributes to a more complete reflection of potential risks in financial statements. In addition, the approach to accounting for restructuring costs has been revised. The relevant provisions have been transferred from the appendices directly to the text of the standard and supplemented with practical examples detailing the criteria for recognising provisions. This allows for a clearer definition of the moment of occurrence of obligations and reduces the risk of premature or unjustified formation of reserves. As a result, the clarification of the approaches to recognition and disclosure of information contributes to a more consistent application of the standard and increases the reliability of financial reporting. Section 23 “Revenue from Contracts with Customers” has been significantly revised and updated to align with IFRS 15. The new version of the standard introduces a single conceptual model for revenue recognition, which is based on a five-step approach to accounting for transactions with customers. The application of this model involves recognising revenue in an amount that corresponds to the transferred goods or services and the expected compensation for them, which provides a more economically sound presentation of the results of the enterprise. According to the updated requirements, revenue is recognised by sequentially performing five stages: identifying the contract with the customer, determining the performance obligations (promises within the contract), setting the transaction price, allocating the price between the obligations and recognising revenue at the time or during the period of performance of the relevant obligations. This approach ensures that revenue is

recognised in accordance with the transfer of control over the goods or services, and not only on the basis of the fact of their sale or receipt of cash. In practical terms, this changes the timing of revenue recognition. For example, a contract with a total value of USD 100,000 that includes both delivery of goods and subsequent services would no longer be recognised entirely at the point of sale. Instead, the transaction price is allocated between performance obligations (e.g., USD 70,000 for goods and USD 30,000 for services), with revenue recognised partly at delivery and partly over the service period. This leads to a redistribution of revenue between reporting periods, even though the total contract value remains unchanged.

At the same time, the requirements of the full standard have been adapted to the specifics of the activities of SMEs. In particular, certain assessment procedures have been simplified, the need for complex professional judgments has been reduced, and the scope of disclosures has been reduced. The section has also been supplemented with practical recommendations and application examples, which facilitates the implementation of new approaches in the activities of SMEs. Transitional provisions are also provided to reduce the burden during the transition to the updated requirements. Section 28 “Employee Benefits” should also be considered in the context of the updates, as it regulates the recognition, measurement and disclosure of employee benefit obligations by SMEs. The updated version of IFRS for SMEs clarifies several aspects related to defined benefit plans, termination benefits and disclosure requirements. In particular, the revised standard clarifies that entities should assess the depth of the market for high quality corporate bonds at the currency level when determining discount rates for employee benefit obligations. The amendments also specify that entities applying the simplified approach should measure defined benefit obligations using the current termination amount, assuming that all employees terminate employment at the reporting date. In addition, the timing of recognition of termination benefits was aligned with the requirements for restructuring provisions under Section 21 “Provisions and Contingencies”. These updates may affect the measurement of employee benefit liabilities, the timing of expense recognition and the structure of disclosures in financial statements. Enterprises applying defined benefit plans may need to reassess actuarial assumptions, discount rates and expected termination obligations, especially in cases involving long-term employment programmes or significant post-employment benefits. As a result, the updated standard improves the consistency of recognition and enhances the comparability of employee benefit reporting. For example, an enterprise that provides a defined benefit plan with expected future payments of approximately USD 120,000 may recognise a defined benefit obligation of approximately USD 95,000 after discounting and considering the fair value of plan assets. Under the simplified approach introduced in the updated standard, the entity may measure the obligation based on the current termination amount

without applying projected future salary increases. Consequently, the structure and timing of employee benefit expenses may differ from the previous approach, while financial statements more accurately reflect the enterprise's obligations related to employee benefits and long-term compensation arrangements. The introduction of a five-stage revenue recognition model is a key change that provides a more consistent and principle-oriented approach to the formation of financial results. Alignment with IFRS

15 contributes to improving the quality of financial information, its comparability and usefulness for users, which is important in the context of the integration of SMEs into the international economic environment (International Financial Reporting Standards Foundation, 2025). In order to systematise the key differences between the previous version of the standard and the updated version, it is advisable to summarise them in the form of a comparative characteristic, which is given in Table 2.

Table 2. Comparative characteristics of changes in IFRS for SMEs (pre-2018 vs 2025 version)

Section	Before (pre-update version)	After (updated 2025 version)
Section 2 "Concepts and fundamental principles"	Less aligned with the Conceptual Framework; simplified definitions of elements and recognition criteria	Fully aligned with the 2018 Conceptual Framework; refined definitions, updated recognition criteria, measurement bases, and disclosure principles
Section 3 "Presentation of financial statements"	General presentation requirements; limited clarification of materiality and disclosures	Clarified concept of materiality; improved requirements for disclosure of accounting policies and structure of notes; prohibition of obscuring material information
Section 11 "Financial instruments"	Allowed the application of IAS 39; less structured classification and measurement approach	IAS 39 option removed; improved classification criteria; prohibition of reclassification after initial recognition; expanded disclosure requirements
Section 12 "Fair value measurement"	No separate section; fair value guidance fragmented across the standard	Newly introduced section; establishes a unified fair value measurement framework, valuation approaches, and hierarchy of inputs
Section 19 "Business combinations and goodwill"	Partially aligned with IFRS 3; limited guidance on recognition and measurement	Aligned with IFRS 3; acquisition method introduced; improved recognition and measurement of assets, liabilities, and contingent consideration
Section 21 "Provisions and contingencies"	Limited guidance on recognition and disclosure; unclear treatment of certain financial guarantees; restructuring provisions mainly addressed in appendices	Expanded scope to include intragroup financial guarantees issued without consideration; clarified recognition criteria for restructuring provisions; enhanced disclosure requirements and practical examples
Section 23 "Revenue from contracts with customers"	Traditional revenue recognition based on risks and rewards	Introduction of a five-step model aligned with IFRS 15; focus on transfer of control and improved allocation of transaction price
Section 28 "Employee benefits"	Limited clarification of discount rates, simplified measurement approaches and timing of recognition for termination benefits	Clarified assessment of market depth for high quality corporate bonds at the currency level; clarified measurement of defined benefit obligations under the simplified approach; updated timing of recognition of termination benefits in line with Section 21; amended disclosure requirements
Other sections	Less detailed and partially outdated requirements	Further harmonisation with full IFRS; improved requirements for presentation, provisions, taxation, and disclosures

Source: compiled by author based on International Accounting Standards Board (2018), IFRS Foundation (2025), IFRS 3: Business combinations (n.d.)

The updates also require enterprises to revise accounting policies, especially in areas where professional judgment and measurement choices are significant. First, accounting policies should be adjusted to reflect the updated recognition and measurement criteria, the clarified materiality requirements and the expanded disclosure obligations. This means that enterprises need to review internal accounting procedures, update chart-of-accounts logic, revise disclosure templates and document judgments used in preparing financial statements. Changes in the accounting for financial instruments are particularly important. The removal of the IAS 39 option requires enterprises to apply the IFRS for SMEs framework more consistently, instead of choosing between alternative approaches. As a result, accounting policies for loans, receivables, payables and other debt instruments should specify classification criteria, initial measurement rules, subsequent measurement at

amortised cost or fair value, and restrictions on reclassification after initial recognition. In practice, this reduces flexibility but increases comparability between enterprises. The introduction of Section 12 on fair value measurement also changes valuation policy. Enterprises need to define when fair value is applied, which valuation techniques are used, and what hierarchy of inputs supports the measurement. Where observable market prices are available, valuation becomes more objective. Where active markets are absent, SMEs need to use valuation models and assumptions, which increase the importance of documentation and disclosure. Thus, fair value improves the relevance of financial information but may increase volatility and subjectivity of reported indicators. The comparative analysis shows that the update of IFRS for SMEs increases consistency with full IFRS and the modern conceptual framework of financial reporting. The introduced changes clarify accounting

principles, strengthen recognition and measurement requirements, expand disclosure obligations and improve comparability at the international level. At the same time, the simplified nature of the standard has been preserved, which allows the limited resources of small and medium-sized enterprises to be taken into account. Thus, the updated version of IFRS for SMEs forms a more balanced basis for accounting and financial reporting.

Assessing the impact of updates to IFRS for SMEs on the accounting and financial reporting of enterprises

The updates to IFRS for SMEs are not only technical, but also practical, as they affect the way financial results are formed, the quality of financial information and the ability of enterprises to adapt to new requirements. If the previous sections of the study were mainly aimed at characterising the content of the updates, then the subsequent assessment should show what consequences these changes create for enterprises in the process of keeping records and preparing financial statements. One of the most tangible areas of influence is the change in approaches to revenue recognition. The implementation of a model close to IFRS 15 does not aim to artificially transfer revenue between reporting periods or distribute it evenly. Its main purpose is to more accurately reflect the economic substance of transactions, that is, to recognise revenue when control over the goods or services passes to the customer. In this regard, revenue may be recognised earlier or later compared to previous approaches, depending on the terms of the contract, the nature of the performance obligations and the moment of transfer of control (Deloitte, n.d.). A change in the moment of revenue recognition directly affects the financial results of the enterprise in a specific reporting period. The total amount of revenue and profit for the entire term of the contract, as a rule, does not change, but their distribution between period's changes. A separate impact on financial results is associated with the application of fair value measurement. This approach increases the relevance of reporting, since assets and liabilities are reflected taking into account current market conditions. At the same time, it may increase the volatility of financial results, as changes in market prices, exchange rates or interest rates are reflected in profit or other comprehensive income. The effect of fair value can be illustrated by an example. If an investment property is initially recognised at USD 200,000 and its fair value increases to USD 230,000 at the reporting date, the enterprise recognises a gain of USD 30,000 in profit or loss. Conversely, a decrease in fair value to USD 180,000 results in a loss of USD 20,000. Under the historical cost model, such changes would not affect profit, which demonstrates how fair value measurement increases both relevance and volatility of financial results. The impact of updated approaches to revenue recognition can also be demonstrated numerically. For example, consider a contract with a total value of USD 100,000 that includes two performance obligations: delivery of equipment (USD 70,000) and subsequent maintenance services (USD 30,000). Under the previous risk-and-reward

approach, the full amount of USD 100,000 could be recognised at the moment of delivery. Under the five-step model aligned with IFRS 15, revenue is allocated between obligations and recognised separately: USD 70,000 at the point of transfer of control of the equipment and USD 30,000 over the maintenance period (for example, evenly over 12 months at USD 2,500 per month). As a result, profit is redistributed between reporting periods, even though the total contract value remains unchanged. The short-term financial result is also affected by the procedure for accounting for acquisition-related costs. If such costs are recognised as expenses of the period, they directly reduce profit at the time they are incurred, even if the economic benefits from the corresponding transaction will arise in future periods. For example, acquisition-related costs of USD 10,000 reduce current-period profit by the same amount, rather than being capitalised. This may reduce the stability of financial results; as such costs are often irregular and depend on investment and strategic decisions (IFRS 13. Fair value measurement, n.d.).

Adaptation of enterprises to the updated requirements of IFRS for SMEs is accompanied by significant costs associated with their implementation and maintaining compliance with accounting processes. Such costs are complex and cover several key areas, among which the leading place is occupied by costs for personnel training, modernisation of accounting systems and involvement of external consultants. First of all, the costs of personnel training are significant, since updating the standards requires advanced training of accountants and financial specialists. This includes costs for training, seminars, courses and professional certification. Such costs are permanent, since IFRS are regularly updated. In addition, documentary support is required to confirm expenses in tax accounting, in particular training contracts and payment documents. In practice, enterprises may recognise training costs as expenses for the period or, in the case of significant investments, partially reflected as expenses for future periods. The second significant component is the cost of changing accounting systems, which represents one of the most substantial elements of implementation. For a medium-sized enterprise, initial costs can amount to approximately USD 9,500, including software licensing (around USD 5,000), setup (around USD 2,000), data migration (around USD 1,000), and training and support (around USD 1,500). For larger companies, similar costs can reach USD 95,000 due to more complex infrastructure and larger data volumes. In addition, enterprises incur annual system support costs of approximately USD 3,000-4,500 for medium-sized enterprises and over USD 15,000 for large companies. For example, assuming an average annual turnover of a medium-sized enterprise at the level of USD 500,000-1,000,000, initial implementation costs of USD 9,500 represent approximately 0.95-1.9% of annual revenue. In the case of smaller enterprises with turnover around USD 200,000-300,000, the same costs may reach 3-5%, indicating a substantially higher relative burden. Annual maintenance costs of USD 3,000-4,500 correspond to approximately

0.3-0.9% of revenue, forming a persistent cost component. Additional costs include upgrading Information Technology (IT) infrastructure, integration with Enterprise Resource Planning (ERP) systems, server expenses, and migration to cloud solutions. The third area is consulting services, which constitute an integral part of standards implementation. Enterprises engage external experts to interpret IFRS requirements, develop accounting policies and assess financial indicators. Consulting costs include IFRS advisory services, tax consulting, IT support and fair value assessments. Most of these costs are recognised as period expenses; however, expenditures directly related to system configuration or asset creation may be capitalised (Kooldeep, 2025).

Increasing the transparency of financial reporting is associated with updating the requirements for disclosure of information on accounting policies, financial risks, receivables, maturity dates and valuation methods, which provides a more detailed reflection of the financial position of the enterprise for users. Increasing the transparency and quality of financial reporting under IFRS for SMEs is achieved through specific accounting mechanisms that affect the relevance, comparability, reliability and understandability of information. Relevance is enhanced through the application of updated recognition and measurement approaches, particularly the use of fair value and the alignment with the IFRS 15-based revenue recognition model. These mechanisms ensure that financial information reflects current economic conditions and the actual substance of transactions,

including the timing of control transfer and the economic characteristics of contracts. Comparability is improved through the standardisation of accounting policies and the use of a unified framework for recognition, measurement and disclosure across jurisdictions. The requirement to apply consistent approaches to revenue allocation, financial instruments and fair value measurement reduces variability in accounting practices and allows users to compare financial statements across entities and countries. Reliability (faithful representation) is strengthened through more detailed requirements for measurement and disclosure, including the use of observable market inputs where available, structured estimation procedures and expanded disclosure of assumptions. These mechanisms reduce the risk of misstatement and increase the credibility of reported figures, although they may introduce elements of professional judgment. Understandability is improved through enhanced disclosure requirements, including the presentation of accounting policies, risk information, maturity analysis, and disaggregated financial data. These disclosures provide users with clearer insights into the financial position and performance of the enterprise, reducing information asymmetry and facilitating interpretation of financial statements. This reduces information asymmetry between the enterprise and external users and increases confidence in reporting. At the same time, the practical implementation of the updates is accompanied by a number of barriers that are especially noticeable for SMEs, which are listed in Table 3.

Table 3. Barriers to the implementation of updated IFRS for SMEs

Barrier category	Specific barrier	Manifestation in implementation process	Impact on SMEs
Financial	High initial costs	Software upgrades, consulting, audit services, involvement of external experts	Increased financial burden on the enterprise
	Ongoing compliance costs	Regular staff training, IT system maintenance, additional audit procedures	Higher cost of accounting processes
	Limited SME resources	Implementation costs are relatively higher compared to large companies	Slower transition to new requirements
Organisational	Complexity of standards	Need for contract analysis, fair value estimation, financial instruments assessment	Increased risk of errors in applying standards
	Inadequate IT infrastructure	Existing systems do not always support data collection for new disclosures	Need to modernise accounting processes
	Regulatory misalignment	Differences between tax, national, and international requirements	Double burden on accounting and reporting
	Weak management support	Management may underestimate the importance of implementation	Slow adaptation and formal compliance
Personnel	Lack of IFRS specialists	Shortage of accountants familiar with updated requirements	Dependence on external consultants
	Insufficient staff training	Employees lack practical experience in applying new standards	Errors in recognition, measurement, and disclosure
	Resistance to change	Staff rely on familiar national standards	Complicates transition to new accounting model
Methodological	Complexity of IFRS 15-based model	Need to identify contracts, obligations, transaction price, and control transfer	Uneven revenue recognition across periods
	Fair value measurement	Lack of active markets requires models and assumptions	Increased subjectivity and volatility of indicators
	Financial instruments accounting	Requires proper classification, risk assessment, and maturity disclosures	Increased complexity of financial reporting

Source: compiled by author based on D.W. Kamotho & P.K. Kaudo (2023), B. Dermaku (2025), I.H. Shah (2025)

Thus, the barriers to implementing the updated IFRS requirements for SMEs are complex and cover financial, organisational, personnel and methodological aspects. Their interrelationship increases the complexity of adaptation, as limited resources of enterprises make it difficult to invest in personnel training and modernisation of accounting systems, which, in turn, affects the quality of application of the standards. The most critical problems remain related to the complexity of individual standards, in particular, income, financial instruments and fair value, which require a significant level of professional judgment. As a result, the effectiveness of the implementation of the updates largely depends on the ability of SMEs to overcome these barriers and ensure the appropriate level of organisational and methodological preparation.

DISCUSSION

Under these conditions, the development of SMEs depended on the quality of financial information, transparency of reporting, and the ability to adapt to regulatory changes. A comparison with the study of P. Muda *et al.* (2024) showed that coercive and mimetic pressures had a statistically significant positive effect on the adoption of IFRS for SMEs, while normative pressure was not significant on its own but became relevant under the influence of environmental factors. While that study identified institutional pressures as direct drivers of adoption, the present study treated them as background constraints and focused on how changes in recognition, measurement and disclosure affected the quality and structure of financial reporting. A similar shift from conceptual foundations to practical consequences was observed in comparison with G. Gök (2024). That study considered IFRS for SMEs primarily as a tool for global convergence, aimed at reducing fragmentation of accounting systems and improving access to capital. In contrast, this study focused on the practical effects of implementation, including the redistribution of revenue between periods, the impact of fair value measurement and the increase in implementation costs. While both studies confirmed the relevance of a simplified standard for SMEs, G. Gök emphasised its macro-level benefits, whereas this study demonstrated the micro-level implications and associated costs of its application. A shift from conceptual interpretation to practical implications was observed in the study by V.M.C. Delgadillo & L.D.C. Díaz-Peña (2025), where IFRS S1 and S2 were analysed using a Real Options Valuation (ROV) model. Under uncertainty, ROV produced higher project values than Net Present Value (NPV): for example, with an asset value of USD 150 and investment of USD 120, NPV was USD 30, while ROV ranged from USD 36.7 to USD 44.4 depending on volatility. While that study demonstrated increased informativeness through quantitative valuation, the present study focuses on accounting transformations, including changes in recognition, measurement and disclosure, as well as their cost implications. A macro-level perspective was provided by Y.-C. Lin & X. Xu (2025), who, based on 11,056 SME observations (2007-2023), found that

artificial intelligence significantly improves financing efficiency ($\beta = 0.028-0.036$, $p < 0.01$) by reducing information asymmetry (-0.0377) and financing constraints (-0.0021). While both digitalisation and reporting standardisation reduce information asymmetry, Y.-C. Lin & X. Xu emphasise positive effects, whereas the present study highlights a trade-off between improved transparency and increased complexity and costs.

The institutional dimension was further explored by Y. Xia (2025) in the context of China's Accounting Law, where implementation challenges included conflicts between national and international standards, high compliance costs, and shortages of qualified personnel. In contrast, the present study examines IFRS for SMEs as a global framework, showing that updates improve transparency, relevance and comparability through changes in revenue recognition, fair value measurement and disclosure, but also increase accounting complexity and implementation costs. The tax dimension of IFRS implementation was analysed by E.F.V. Barragán *et al.* (2025), who showed that increased transparency was accompanied by a widening gap between accounting and tax rules, complicating tax planning. In contrast, the present study examined this divergence at the enterprise level, where differences in recognition require additional adjustments, parallel records and more complex procedures. While both studies confirmed improvements in information quality, these benefits are associated with higher administrative burden. The key difference lies in the level of analysis: E.F.V. Barragán *et al.* focused on fiscal effects, whereas this study addressed operational impacts such as adaptation costs and changes in accounting practices. The broader context of SME development was examined in the systematic review by M. Zaman *et al.* (2025), which showed that sustainability is shaped by the interaction of environmental, social and economic factors rather than financial performance alone. This highlights the need for reliable information under resource constraints. In this context, the present study considers financial reporting as a mechanism for reducing information asymmetry, where updates to IFRS for SMEs improve the structure of recognition, measurement and disclosure, enhancing data consistency and usefulness. While M. Zaman *et al.* provided a conceptual framework this study focuses on a specific regulatory instrument that operationalises information quality. The practical usefulness of such reporting was further examined by N. Wijekoon *et al.* (2025), who found that although SME reports are mainly used by banks, tax authorities and government agencies, their value is limited by low data reliability, manipulation and tax orientation. This complements the present study: while IFRS for SMEs updates are expected to improve transparency and comparability, the evidence suggests that standards alone do not guarantee reporting usefulness. The difference also lies in methodology – N. Wijekoon *et al.* rely on user interviews, whereas this study provides a theoretical and analytical assessment of regulatory changes. Another important perspective was provided by

M.A. Manzi *et al.* (2025), who conducted a systematic review of 133 studies and showed that financial accounting in family businesses is shaped by the interaction of three levels-families, business and individual-rather than by formal standards alone. The evidence also indicates a predominance of empirical research (130 out of 133 studies) and a strong focus on earnings management (68 studies), highlighting the variability of accounting practices depending on ownership structure and governance characteristics. In contrast, the present study proceeded from the assumption of standardised application of IFRS for SMEs and analysed how changes in recognition, measurement and disclosure affect reporting regardless of ownership type. While M.A. Manzi *et al.* demonstrated the heterogeneity of accounting practices driven by agency conflicts and socio-emotional factors, this study emphasised the role of unified reporting requirements and their practical implications for SMEs.

The study by K. Shatila *et al.* (2025) examined the relationship between information quality and corporate performance through corporate social responsibility, showing a positive impact on financial results directly and through reputation, employee engagement and innovation. In contrast, the present study explains improvements in information quality through updates to accounting standards rather than managerial or reputational factors. While both approaches recognise the role of transparency and intangible resources, K. Shatila *et al.* emphasised predominantly positive effects, whereas this study highlights not only benefits but also implementation costs, complexity and barriers. A related issue was examined by N. Raimo *et al.* (2025), who found a generally low level of compliance with European Sustainability Reporting Standards under the Corporate Sustainability Reporting Directive, with higher alignment in large and environmentally sensitive firms. This indicates uneven adaptation to new standards. Similarly, the present study shows that updates to IFRS for SMEs increase pressure on enterprises and require significant adjustments, improving comparability but also increasing complexity and implementation costs. The analysis showed that the update of IFRS for SMEs had a dual impact on the accounting and financial reporting of enterprises. On the one hand, it contributed to increasing the transparency, relevance, comparability and usefulness of financial information, reduced information asymmetry and created better conditions for making managerial and financial decisions. On the other hand, changes in revenue recognition, fair value measurement and disclosure of information complicated accounting procedures, increased the requirements for professional training of specialists and increased implementation costs.

CONCLUSIONS

Summarising the results of the study, it can be concluded that updates to IFRS for SMEs have a systemic and multi-dimensional impact on accounting and financial reporting, combining methodological improvements with increased resource requirements. The changes affect both conceptual and applied aspects. In particular, the revision of Section

2 in line with the Framework by International Accounting Standards Board clarified definitions of reporting elements, recognition criteria and measurement approaches, forming a more consistent methodological basis, while improvements in Section 3 enhanced transparency by refining the concept of materiality. From an accounting perspective, significant transformations concern financial instruments. The removal of IAS 39 and clearer classification rules in Section 11 improved consistency, while the prohibition of reclassification ensured stability of reporting. The introduction of Section 12 on fair value established a unified valuation framework. Updates to Sections 19 and 21 further improved the reliability of accounting for complex transactions and provisions. In addition, the updates to Section 28 clarified approaches to measuring defined benefit obligations, discount rates and termination benefits, which improved the consistency and transparency of accounting for employee-related liabilities. From a financial perspective, the updates affect the formation and distribution of financial results. The five-step revenue recognition model in Section 23 changes the timing of revenue recognition and redistributes income across reporting periods without altering total amounts. Fair value measurement increases relevance but also introduces volatility. From an informational perspective, the updates enhance the quality, comparability and usefulness of financial reporting. Expanded disclosure requirements and improved measurement approaches reduce information asymmetry and increase transparency for users, which is particularly important given the global significance of SMEs. From the perspective of adaptation risks, implementation is associated with significant financial, organisational, personnel and methodological challenges. Implementation costs remain substantial: approximately USD 9,500 for medium-sized enterprises and up to USD 95,000 for large entities, with annual maintenance costs of USD 3,000-4,500 and over USD 15,000 respectively. These costs, combined with training, system modernisation and consulting needs, create a burden and may slow adaptation. In the long term, however, the updates create conditions for improving reporting credibility, expanding access to finance and integrating SMEs into the international economic environment. Overall effectiveness depends on the ability of enterprises to overcome barriers and ensure sufficient organisational and methodological readiness. Further research should focus on empirical assessment of implementation across countries and industries, taking into account institutional factors, digitalisation and professional competence.

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Оновлення МСФЗ для МСП: теоретична та аналітична оцінка наслідків для бухгалтерського обліку та фінансової звітності

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Анотація. Метою цього дослідження було проведення теоретичної та аналітичної оцінки впливу оновлень міжнародних стандартів фінансової звітності для малих та середніх підприємств на бухгалтерський облік та фінансову звітність. Дослідження включало аналіз нормативних положень та наукових джерел з використанням порівняльного, структурно-логічного, причинно-наслідкового та системного методів. Результати показали, що оновлення спричинило суттєві зміни у підходах до визнання, вимірювання та розкриття інформації. Впровадження п'ятиетапної моделі визнання доходів змінило терміни визнання доходів, що призвело до перерозподілу доходу між періодами без зміни його загальної суми. Аналіз підтвердив глобальне значення цих змін, враховуючи, що малі та середні підприємства становлять понад 95 % усіх підприємств у світі. Поширення міжнародних стандартів фінансової звітності для малих та середніх підприємств розширилося з 63 країн, що прийняли їх, у 2013 році до 87 зі 169 юрисдикцій у 2025 році, де стандарт є обов'язковим або дозволеним, що свідчить про стабільне зростання глобального впровадження. Витрати на впровадження є значними: початкові витрати на модернізацію системи становлять приблизно 9500 дол. для середніх підприємств та до 95 000 дол. для великих організацій, з річними витратами на підтримку у розмірі 3000-4500 дол. та понад 15 000 дол. відповідно. Перешкоди для впровадження були класифіковані як фінансові, організаційні, кадрові та методологічні. Результати показують, що оновлення покращують порівнянність, актуальність та прозорість фінансової звітності, але збільшують складність та витрати. Загальна ефективність залежить від здатності підприємств адаптувати системи бухгалтерського обліку. Результати можуть бути використані керівництвом малих та середніх підприємств, регуляторними органами та аудиторами для вдосконалення облікової політики, механізмів нагляду та якості звітності

Ключові слова: гармонізація; прозорість; впровадження; інформаційна асиметрія; справедлива вартість; бар'єри впровадження



Creative industries as a tool for diversifying resource-dependent economies: A comparative analysis of development models

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Abstract. The aim of this study was to determine the role of creative industries in the diversification of resource-dependent economies based on a comparative analysis of Azerbaijan, Norway, South Korea and Sweden. The research was conducted through a comparative analysis of development models, the synthesis of international statistical data, and a comparison of indicators of resource dependence, innovative capacity, cultural exports, digital presence and institutional support for the creative sector. The results showed that creative industries did not replace the resource-based economy in the short term, but formed an additional channel for non-resource-based growth through employment, service exports, copyright, digital content, national branding and soft power. It was established that in Azerbaijan, the oil and gas sector accounted for over 40% of gross domestic product and over 90% of exports, whereas in Norway this sector accounted for around 22% of GDP, 48% of exports and 32% of government revenue. The comparison showed that Norway utilised resource revenues within a framework of developed institutions and an innovative system, whereas Azerbaijan required strengthening of statistical accounting, copyright, digital hubs and human capital. It was further found that South Korea and Sweden demonstrated models of systematic cultural exports, where digital platforms, state support, intellectual property and international promotion transformed cultural products into economic assets. The practical significance of the findings lies in the fact that economic policy bodies, ministries of culture, business support institutions and developers of diversification programmes in Azerbaijan can use the proposed model to assess the contribution of creative industries, establish digital hubs, improve copyright regulation and support the export of local cultural products

Keywords: cultural exports; intangible assets; copyright; human capital; national branding

INTRODUCTION

Creative industries are one of the avenues for diversifying economies dependent on the export of natural resources. Their development enables the creation of added value outside the raw materials sector and the generation of jobs in the fields of culture, digital services, design, music, audio-visual production and intellectual property. In this context, the creative sector does not replace the resource-based economy, but expands the possibilities for non-resource-based growth. The problem of resource dependence is relevant for countries where oil and gas revenues account for

a significant portion of exports, the budget and macroeconomic dynamics. Azerbaijan needs to strengthen its non-oil sector, innovation base and creative entrepreneurship, whilst Norway demonstrates a model in which resource revenues are combined with developed institutions, investment in human capital and support for innovation. A comparison of these countries highlights the conditions under which creative industries become an effective tool for economic diversification. The relevance of the topic is heightened by the digitalisation of cultural products. Streaming

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services, digital platforms and algorithmic recommendation systems are transforming the ways in which music, film, games, design and other segments of the creative sector are distributed and monetised. For resource-dependent economies, this opens up access to external markets, but at the same time requires copyright protection, digital visibility of local content, the development of human capital and institutional support for creative entrepreneurship.

The development of the creative economy in Central Asian countries was examined by B. Auken *et al.* (2025) through an analysis of the sector's scale, legislative framework, national strategies and digital infrastructure. The authors showed that in Kazakhstan, the creative economy accounted for around 2.7% of gross domestic product (GDP) in 2023, and the number of creative enterprises rose from 17,600 in 2018 to 45,600 in 2024; in Uzbekistan, the sector's share was 1.46% of GDP, and in Kyrgyzstan – around 1% of GDP. This demonstrated that the potential of creative industries depends on cultural resources, statistical accounting, legal frameworks and digital infrastructure. The diversification of Azerbaijan's economy in the context of oil and gas dependence was analysed by A. Jabbarova *et al.* (2026). Based on data from 2014-2024, the authors recorded a decline in the oil sector's share of GDP from 41% to 27.5%, a rise in non-oil exports from 8.0% to 15.3%, and an increase in expenditure on innovation and research from 0.18% to 0.45% of GDP. At the same time, the share of oil revenues in the budget remained high, confirming that diversification was incomplete.

Using data from 42 resource-dependent countries for the period 1981-2014, A.A. Lashitew *et al.* (2021) demonstrated that resource wealth in itself does not determine the weakness of non-resource sectors. Human capital, institutions, the private sector and the state's ability to support new industries were of key importance. The relationship between natural resources and export diversification was investigated by Z.H. Zarach & A. Parteka (2023). Based on data from 160 countries for the period 1996-2018, they found that resource dependence limits the volume and diversity of non-resource exports, particularly in technologically advanced sectors. N.A. Abdelkawy (2024) analysed the problem of diversification and the resource curse using the example of the Gulf Cooperation Council countries. It was shown that oil rents can sustain short-term growth, but without foreign investment, human capital and structural reforms, their long-term effect is weakened. The impact of cultural and creative industries on the well-being of countries, regions and municipalities was investigated by R. Boix-Domènech *et al.* (2022). Based on data from 78 countries, 275 European regions and 518 municipalities in Valencia, it was found that an increase in the share of creative industries is associated with an increase in GDP per capita. D. Kalfas *et al.* (2024) also confirmed the regional impact of this sector: the majority of respondents associated cultural and creative industries with growth in employment, GDP, investment and entrepreneurial activity.

The impact of creative industries on the economic performance of Association of Southeast Asian Nations (ASEAN) countries during the COVID-19 pandemic was investigated by N. Che Arshad & T.T. Irijanto (2022). The authors demonstrated that exports from the creative industries, trade openness, innovation and financial instruments supported economic growth even in the face of an external shock. S.T. Lee (2022) analysed the film "Parasite" as a tool for cultural diplomacy and national branding in South Korea, using a corpus of 8,808 texts. D.Y. Jin (2024) argued that streaming services, social media and fan platforms have become channels of digital soft power through which Korean cultural products have expanded into international markets.

A review of the academic literature revealed that studies on resource dependence primarily focus on macroeconomic diversification, export structure, institutional quality and the role of human capital, whereas creative industries are more often analysed as a factor in regional development, employment, digitalisation, cultural diplomacy and soft power. At the same time, the link between resource-dependent economies and the creative sector as a tool for non-resource-based growth remains insufficiently explored, particularly in a comparative analysis of Azerbaijan, Norway, South Korea and Sweden. Therefore, the aim of the study was to identify the institutional, innovative and digital prerequisites under which creative industries can strengthen non-resource-based sources of growth in resource-dependent economies. To achieve this objective, the following tasks were formulated: to identify the economic and institutional conditions under which creative industries contribute to the diversification of resource-dependent economies, using the examples of Azerbaijan and Norway; to substantiate a multi-level model for assessing the contribution of creative industries through indicators of GDP, employment, exports, digital presence, soft power and national branding; to compare the experience of systematic cultural exports in South Korea and Sweden with the current state (2024-2025) of Azerbaijan's creative sector and to identify institutional directions for its development.

MATERIALS AND METHODS

The study was structured as a comparative economic and institutional analysis of the role of creative industries in the diversification of resource-dependent economies. The analysis covered Azerbaijan, Norway, South Korea and Sweden. Azerbaijan is considered as an example of an economy with high oil and gas dependence and a need to strengthen the non-oil sector; Norway – as a resource-dependent but institutionally developed economy; South Korea and Sweden as reference models for the development of creative industries, cultural exports, digital distribution and national branding. The material basis consisted of international statistical reports, national economic data, innovation development profiles, cultural policy documents, and materials on copyright, digital distribution and the development of creative entrepreneurship.

A comparative method was used to compare Azerbaijan and Norway in terms of resource dependence, the dynamics of the non-oil and gas sector, innovative capacity, creative outcomes, the quality of institutional support, the state of copyright, digital infrastructure and human capital. Data from EBRD (2025), the State Statistical Committee of the Republic of Azerbaijan (2026), OECD (2024), as well as the Global Innovation Index (GII) country profiles prepared by WIPO (2025a; 2025b; 2025c; 2025d). A descriptive and statistical analysis method was applied to record quantitative parameters of resource dependence, innovative development and creative outcomes. The analysis covered the share of the oil and gas sector in the economy, the dynamics of the non-oil and gas sector, countries' positions in global innovation rankings, indicators of creative outcomes, and the role of cultural exports. To determine the macroeconomic weight of the creative economy, data from the UNESCO (2022) and UNCTAD (2024a) were taken into account.

The institutional analysis method was used to identify the conditions under which creative industries transition from cultural activity to an economically measurable sector. The study examined copyright legislation, digital infrastructure, creative hubs, public policy and mechanisms for supporting human capital. To this end, the work of Y. Huseynli (2022) on Azerbaijan's cultural policy, materials from WIPO (2024), the International Trade Administration (2026) and the Connecting Companies (2023) strategy for the development of creative industries were utilised. The analytical modelling method was applied to develop a multi-level system for assessing the contribution of creative industries to the diversification of a resource-dependent economy. The model identified macroeconomic, labour, export, digital, institutional and intangible levels of assessment. Its rationale was based on materials from UNCTAD (2024a), the UNESCO (2022) and WIPO (2025e).

The method of comparison with reference models was used to analyse South Korea and Sweden according to criteria such as state support for creative industries, the sector's integration with the innovation economy, the scale of cultural exports, digital distribution, copyright protection, national branding and strategic programmes for the development of creative entrepreneurship. For this purpose, materials from UNCTAD (2024b), Korea Times (2026), Government Offices of Sweden (2024a; 2024b) and WIPO (2025d) were utilised. The digital distribution analysis method was applied to clarify the role of streaming services, algorithmic recommendation systems, digital content visibility and copyright management. Data from the IFPI (2025) and research by C. Peukert (2019) were used for this purpose. In the final stage, the generalisation method enabled the comparison of the results of comparative, statistical and institutional analysis and the formulation of practical directions for the development of creative industries in a resource-dependent economy: statistical accounting of the sector, strengthening of copyright protection, development of digital creative hubs and investment in human capital.

RESULTS AND DISCUSSION

Creative industries perform various economic functions depending on the level of resource dependence, institutional maturity and a country's ability to transform a cultural product into an exported intangible asset. In resource-dependent economies, the creative sector does not replace oil and gas revenues in the short term, but it creates additional channels for non-resource-based growth through employment, digital services, copyright, tourism appeal, national branding and international cultural presence. At the global level, the creative economy already has a measurable macroeconomic weight: cultural and creative industries account for around 3.1% of global GDP and 6.2% of employment, whilst exports of creative services reached USD 1.4 trillion in 2022, and exports of creative goods reached USD 713 billion (UNESCO, 2022; UNCTAD, 2024a).

To compare the four countries, available quantitative indicators of the creative sector's economic weight were taken into account. In Azerbaijan, according to calculations by the Intellectual Property Agency, the creative industry's share of GDP rose from 5.1% in 2018 to 5.2% as of 1 January 2024; however, these data are not accompanied by comprehensive regular breakdowns on employment, exports, royalty payments and digital monetisation, which limits their analytical use (ABC, 2024). In Norway, the share of the cultural and creative sectors in GDP stood at 2.9% in 2018, whilst the share of employment in these sectors was 3% in 2022 (Norwegian Ministry of Culture and Equality, 2024). In South Korea, the economic weight of the creative sector is most clearly evident in the content industry: its value added is estimated at approximately 2.6-3.7% of GDP, and content exports reached USD 14.08 billion in 2024 (Korea Times, 2026). In Sweden, according to Kreametern estimates, the cultural and creative industries accounted for 3.1% of GDP in 2017, whilst recent government data indicates that around one in ten of the country's enterprises operates in this sector, with nearly 30% of such enterprises exporting products or services, and the sector's total annual turnover is estimated at approximately SEK 650 billion (Government Offices of Sweden, 2024b). For Azerbaijan, the issue of diversification is directly linked to the high share of the oil and gas sector in the economic structure. According to estimates by EBRD (2025), Azerbaijan's oil and gas sector generates over 40% of GDP and over 90% of exports, making economic dynamics dependent on commodity prices, external demand and the volume of energy exports. At the same time, official statistics for 2025 show that the country's GDP stands at AZN 129.1 billion, with value added in the oil and gas sector decreasing by 1.6% and in the non-oil and gas sector increasing by 2.7%. (State Statistical Committee of the Republic of Azerbaijan, 2026).

Norway demonstrates a different type of resource-based economy, in which high oil and gas revenues are combined with developed institutions, investment management and a broader non-resource base. In 2024, Norway's oil and gas sector accounted for around 22% of GDP, 48% of exports

and 32% of government revenue, confirming the continued significant role of the energy sector even in a highly developed economy (EITI, 2025). At the same time, data from OECD (2024) show that Norway's resource-based model has structural limitations: in 2023, mainland GDP growth stood at just 0.7%, and was forecast at 0.8% for 2024. Furthermore, the share of industrial exports in GDP fell to around 4%, whereas in Sweden, Finland, Denmark and Switzerland this figure stood at approximately 20-35% in 2022. This confirms that even with well-developed institutions, Norway remains at risk of resource specialisation and needs to expand its high-productivity non-resource sectors. A comparison of Azerbaijan and Norway shows

that creative industries in resource-dependent countries perform not identical but complementary functions. For Azerbaijan, they are primarily linked to the expansion of the non-oil sector, the creation of new types of employment, the digitalisation of cultural products, and the inclusion of local content on international platforms. For Norway, the creative sector functions as an element of post-resource sustainability, regional development, cultural diplomacy and an innovative economy. This means that an identical resource base does not result in an identical model of diversification: the decisive factor is a country's institutional capacity to transform cultural resources into economically measurable assets (Table 1).

Table 1. Comparative parameters of resource dependence and creative-innovative potential in Azerbaijan and Norway

Parameter	Azerbaijan	Norway	Analytical significance for diversification
Role of the oil and gas sector	Over 40% of GDP and over 90% of exports	22% of GDP, 48% of exports, 32% of government revenue	In both countries, the energy sector remains structurally significant, but Norway has a more developed institutional system for managing resource revenues
Dynamics of the non-oil and gas sector	In 2025, the non-oil and gas sector grew by 2.7%	The non-resource economy is integrated into a broader innovation and social model	For Azerbaijan, the priority is to increase non-resource value added; for Norway, it is to maintain long-term post-resource sustainability
Ranking in the Global Innovation Index 2025	94 th out of 139 economies	20 th out of 139 economies	Differences in innovation capacity determine varying abilities to scale up creative industries
Ranking by creative outcomes in the GII 2025	108 th	22 nd	Azerbaijan's creative potential is not yet being sufficiently transformed into innovative outcomes
Key challenge	The transition from cultural activity to a measurable creative economy	Reducing long-term risks of resource dependence	Creative industries are not a standalone replacement for the resource-based model, but a component of a broader diversification policy

Source: compiled by the author based on OECD (2024), EBRD (2025), EITI (2025), WIPO (2025a; 2025b), State Statistical Committee of the Republic of Azerbaijan (2026)

Cultural policy takes on particular significance in the Norwegian model as an instrument of post-resource sustainability. Unlike Azerbaijan, where the key challenge remains the transition from cultural activity to a measurable creative economy, Norway already has an institutionally established system for supporting the cultural and creative sectors. Norway's report on the implementation of the 2005 UNESCO Convention states that the cultural and creative sectors have a dedicated ministerial department, decentralised participation at regional and local levels, updated support policies, educational programmes in the arts and culture, as well as measures to develop small and medium-sized cultural enterprises. Furthermore, in 2023, a new strategy for the development of the gaming industry was presented, aimed at professionalisation, growth and strengthening the cultural impact of Norwegian computer games (Norwegian Ministry of Culture and Equality, 2024). Thus, in Norway, creative policy functions not as a secondary cultural focus, but as part of a broader model of institutional diversification that combines regional development, digitalisation, employment, cultural participation and post-resource economic sustainability.

The relationship identified between resource dependence and institutional capacity is consistent with the findings of S. Matallah (2020), who, using data from 11 oil-exporting countries in the Middle East and North Africa for the period 1996-2017, demonstrated that the quality of governance influences the ability of resource-based economies to diversify. In this study, a similar relationship is observed through a comparison of Azerbaijan, where the oil and gas sector accounts for over 40% of gross domestic product and over 90% of exports, and Norway, where the oil and gas sector accounts for around 22% of gross domestic product, 48% of exports and 32% of government revenue, but is combined with more developed institutions and an innovation system. The need for Azerbaijan's diversification is also elaborated upon in the study by M. Guliyev & T. Azizov (2022), in which export-oriented production and "green" transformation were considered as avenues for reducing dependence on the oil and gas sector. Within the scope of this article, this approach is expanded to include creative industries, as it is important for Azerbaijan not only to develop manufacturing exports but also to foster intangible exports through cultural products, digital content, copyright and national branding.

A review of international approaches shows that assessing the contribution of creative industries in resource-dependent economies cannot be limited solely to their share of GDP or the number of people employed. Such an approach captures the direct economic impact but does not cover intangible channels of influence, in particular copyright, digital presence, national branding, cultural exports, tourism recognition and international reputation. In its 2024 report, UNCTAD (2024a) highlights the growing role of creative services, digitalisation and artificial intelligence in the development of the creative economy, which is significant for countries where the traditional raw materials model requires new sources of

added value. The study's findings highlight a multi-level assessment model that combines direct economic indicators, labour market indicators, export and digital indicators, and intangible assets. Applying this model to Azerbaijan makes it possible to distinguish existing cultural activity from an economically scalable creative industry. For example, the holding of Baku Creative Week 2025 and cultural events organised by the Organisation of Islamic Cooperation (2025) enhances Azerbaijan's international visibility; however, to translate such activity into economic outcomes, statistics on revenue, export volumes, employment, royalty payments, the number of enterprises and digital content distribution are required (Table 2).

Table 2. A multi-level model for assessing the contribution of creative industries to the diversification of a resource-dependent economy

Assessment level	Key indicators	Economic context	Significance for Azerbaijan
Macroeconomic level	Share of creative industries in GDP, gross value added, share in the non-oil and gas sector	Determines the sector's direct contribution to economic growth	Enables an assessment of whether the creative sector is transitioning from the cultural sphere to the economic sector
Labour market	Number of employees, share of young people, share of self-employed, number of enterprises	Shows the sector's ability to create jobs outside the raw materials economy	Important for the development of new professions in design, music, film, the gaming industry and digital art
Export levels	Exports of creative goods and services, copyright revenues, international sales of digital content	Determines the sector's ability to function as a non-resource-based export	Enables a reduction in dependence on energy exports through intangible goods and services
Digital level	Presence on streaming platforms, digital sales, online audience, algorithmic visibility	Indicates the ability of local content to enter global digital channels	Important for music, film, animation, games and cultural tourism
Institutional level	Copyright status, access to funding, tax support, digital hubs	Determines the rules governing the creative sector	Creates the conditions for the transition from isolated events to a sustainable creative economy
Intangible level	Soft power, international recognition, national branding, creative outcomes GII	Reflects the indirect impact of culture on foreign economic positioning	Enables an assessment of the link between cultural policy, tourism, investment and international reputation

Source: summarised by the author based on UNESCO (2022), UNCTAD (2024a), WIPO (2025a; 2025b), Organisation of Islamic Cooperation (2025)

The proposed results matrix indicates that the main constraint for Azerbaijan is not a lack of cultural resources, but the inadequacy of their economic measurement. Azerbaijan's cultural policy profile states that the Culture Strategy up to 2030 covers support for cultural and creative industries, the international promotion of Azerbaijani culture, and the development of cultural heritage (Huseynli, 2022). At the same time, the existence of strategic priorities requires integration with regular statistical monitoring, as without sectoral data it is impossible to determine which sub-sectors generate added value, which depend on state support, and which have the potential to become export-oriented. The proposed multi-level model corresponds to the approach of J.L. de Figueiredo *et al.* (2019), who developed an index of creative economy development potential for 26 state capitals in Brazil and the Federal District. In this study, a similar principle of quantitative assessment has been adapted to a resource-dependent economy by combining macroeconomic indicators, employment,

exports, digital presence, copyright, soft power and national branding. This approach is also consistent with the findings of A. Koumoutsea *et al.* (2023), who assessed the creative economy through consumers' willingness to pay for participation in a cultural festival. In contrast to this microeconomic approach, in this study the intangible value of the creative sector is assessed more broadly – through digital visibility, international cultural presence, soft power and national branding, which is more relevant for the analysis of Azerbaijan as a resource-dependent economy. The results also correlate with the findings of S. Pavliuk (2023), who noted that cultural and creative industries account for 3.1% of global gross domestic product and provide nearly 50 million jobs. In this study, these global indicators are compared with the Azerbaijani economy, where oil and gas dependence remains significantly higher; therefore, creative industries are viewed not as a complete alternative to the resource-based model, but as an additional channel for non-resource-based growth.

An analysis of Azerbaijan's current situation has shown that the country possesses established cultural resources but is at the stage of institutionally formalising its creative economy. Government policy already includes cultural and creative industries among its strategic development priorities, and international events in Baku are creating channels for cultural presentation. However, Azerbaijan's position in the Global Innovation Index 2025 demonstrates a gap between resources and outcomes: the country ranks 94th overall, whilst it ranks 108th for creative outcomes and 110th for knowledge and technology outcomes (WIPO, 2025a). This finding regarding Azerbaijan's innovation gap is consistent with the study by M. Manioudis & A. Angelakis (2023), in which the creative economy was linked to sustainable regional growth through entrepreneurial prioritisation of development. In this article, this logic is illustrated using Azerbaijan's indicators: 94th place in the overall innovation ranking and 108th place in terms of creative outcomes suggest that cultural activity is not yet sufficiently being transformed into innovative and creative economic outcomes. The need to convert creative potential into measurable economic outcomes also aligns with the findings of D. Štreimikienė & T. Kačerauskas (2020), who, using data from the Baltic states, linked the creative economy to sustainable development, employment and export revenues. For Azerbaijan, this means that the mere existence of cultural resources does not in itself ensure diversification unless accompanied by statistical tracking, an export strategy, copyright protection and digital promotion channels. This gap indicates that institutional, educational, digital and legal prerequisites are not yet being fully transformed into creative products, exports, intangible assets and innovative outcomes. For a resource-dependent economy, this situation is fundamental, as diversification depends not only on the development of non-oil sectors, but also on the ability of these sectors to create a competitive product beyond the domestic market. In this context, Azerbaijan's creative industries should be viewed not as a cultural add-on to the economy, but as one of the segments of non-oil and gas development, linked to copyright, digital infrastructure, human capital and external cultural positioning.

Data from the IFPI (2025) and the findings of C. Peukert (2019) regarding the digitalisation of cultural industries confirm that the distribution of local cultural products is increasingly dependent on streaming platforms, algorithmic visibility, metadata and digital licensing systems. The digital music industry demonstrates that local content is increasingly dependent not only on the quality of the cultural product, but also on algorithmic visibility, metadata, presence on streaming services and the ability of rights holders to manage digital rights. The global music market reached USD 29.6 billion in 2024, with streaming revenues accounting for 69% of total recorded music revenues, confirming the music sector's transition to a digital monetisation model (IFPI, 2025). This finding is consistent with the conclusions of C. Peukert, who noted that digitalisation, internet platforms and automated licensing are changing the

costs of participation in cultural production and content distribution. Observations regarding the music segment also correlate with the work of B. Klement & S. Strambach (2019), which demonstrated the importance of related diversity for innovation in urban music environments. For Azerbaijan, the digitalisation of the creative sector opens up opportunities for music, film, design, fashion, animation and gaming content to enter international markets; however, this process depends not only on the availability of performers and cultural products, but also on digital distribution, copyright, entrepreneurial environments and technological specialists. At the same time, the low visibility of local content, inadequate tracking of copyright revenues and dependence on external platforms highlight the need for tools for digital promotion, legal protection and the accounting of intangible assets.

A comparison with South Korea and Sweden shows that the systematic export of culture is shaped not only by talent or cultural heritage, but through a combination of government policy, private enterprise, digital channels, intellectual property rights protection and foreign economic promotion. In 2025, South Korea ranks 4th in the Global Innovation Index and is among the countries with the highest scores for human capital, research, business sophistication and creative output (WIPO, 2025c). Its cultural exports are based on content industries, in particular music, games, films, TV series, animation and digital entertainment products. The South Korean model demonstrates that the creative sector can function as an export industry when the state provides institutional support and businesses ensure the scaling of content in foreign markets. According to the Ministry of Culture, Sports and Tourism of the Republic of Korea, content industry exports reached USD 14.08 billion in 2024, marking a historic high for the sector (Korea Times, 2026). UNCTAD (2024b) separately analyses Korean content as an example of state policy aimed at developing the content industry as a new source of economic growth. Sweden represents a European model in which the creative industries are integrated with innovation policy, education, design, music, the gaming industry, foreign trade and national branding. In 2024, the Swedish government approved a ten-year strategy for cultural and creative industries for 2024-2033, in which the sector is viewed as a source of growth, employment, exports and a positive image of the country abroad (Government Offices of Sweden, 2024). In the Global Innovation Index 2025, Sweden ranks 2nd overall and 2nd for creative performance, demonstrating alignment between the innovation system and creative production (WIPO, 2025d).

Unlike South Korea and Sweden, Azerbaijan is in the process of transitioning from cultural policy to an economically structured policy for the creative industries. The country already has institutional frameworks, cultural platforms and declared strategic directions in place; however, its lower ranking in the GI's creative output indicates a need to strengthen the links between cultural production, innovation, digital distribution, exports and legal

protection. A comparison of the models shows that what is relevant for Azerbaijan is not the direct replication of the Korean or Swedish model, but the adaptation of their

structural elements: systematic cultural exports, digital presence, statistical accounting, inter-agency coordination and intellectual property protection (Table 3).

Table 3. Comparison of creative industries development models

Country	Dominant model	Key instruments	Impact on the economy	Relevance for Azerbaijan
South Korea	Export-content model	Government support for the content industry, digital platforms, music, games, TV series, films, copyright	Cultural content functions as an export product and a source of international recognition	It is advisable to utilise a model for promoting content via digital channels and external markets
Sweden	Innovation and creativity model	Ten-year strategy, business support, music, design, gaming industry, export positioning	Creative industries are integrated with innovation, employment and the national image	The development of an inter-ministerial policy and a support system for creative entrepreneurship is advisable
Norway	Post-resource institutional model	Well-developed state institutions, cultural policy, regional development, management of resource revenues	Culture and creativity complement the model of sustainable development of a high-income resource-based economy	It is advisable to draw on experience of institutional resilience and regional cultural development
Azerbaijan	Transitional model of creative diversification	Cultural events, strategic documents, digital initiatives, initial formation of creative hubs	The creative sector does not yet have a fully measurable macroeconomic profile	Strengthening of statistics, copyright, digital infrastructure and human capital is required

Source: compiled by the author based on Government Offices of Sweden (2024), UNCTAD (2024b), Organisation of Islamic Cooperation (2025), WIPO (2025a; 2025c; 2025d), Korea Times (2026)

The results of the comparison with South Korea and Sweden are consistent with the findings of P.T. Cong (2019), who, using Vietnam as an example, examined the creative industries as a multi-sectoral system encompassing design, art, education, tourism, the performing arts, fashion, crafts and cultural products. In this study, a similar multi-sectoral approach is applied to Azerbaijan: creative diversification cannot be limited to music or digital content alone, but must encompass a broader range of sectors capable of generating employment, exports and intangible assets. Findings by N. Innocenti & L. Lazzeretti (2019), based on data from Italian provinces for 2006-2015, showed that creative industries support growth when they have links with related sectors of the economy. For Azerbaijan, this finding implies the need to integrate creative industries with tourism, education, digital services, entrepreneurship and intellectual property, rather than treating them as a separate cultural sector. The results of the analysis show that four institutional areas are of primary importance for Azerbaijan: copyright protection, the creation of digital hubs, the development of human capital, and the establishment of a statistical accounting system for the creative economy. In 2024, amendments were made to Azerbaijan's legislation on copyright and related rights, indicating an update to the legal framework in the field of intellectual property (WIPO, 2024). At the same time, international assessments indicate that enforcement in the field of intellectual property remains inadequate, and issues with copyright infringements and the use of unlicensed software continue to affect the investment attractiveness of the digital and creative sectors (International Trade Administration, 2026).

Copyright protection is directly linked to diversification, as the creative sector generates not only physical products but also intangible rights. In music, film, design, software, animation, publishing and the gaming industry, economic value arises from the ability to register, sell, license and distribute rights internationally. Without effective enforcement, a creative product remains a cultural resource but does not fully transform into an asset capable of generating export revenue. Digital hubs represent the second institutional focus. They serve as an environment where entrepreneurship, technology, design, music, audio-visual production, gaming technology, education and investment converge. Materials on the development of Azerbaijan's creative industries already mention creative clusters and spaces, including Creative Azerbaijan, Asmart Creative Hub, Baku Business Factory, YARAT Contemporary Art Space and specialist associations in the fashion sector (Connecting Companies, 2023).

Human capital constitutes the third pillar of creative diversification. In a resource-dependent economy, it determines the ability to transition from income derived from natural resources to income generated by knowledge, skills, cultural production and digital competencies. In the context of international comparisons, it is human capital and the research base that explain South Korea's high ranking in the GII 2025, where the country ranks first in terms of human capital and research (WIPO, 2025c). The fourth area is statistical measurement. Without a national system for measuring the creative economy, it is impossible to determine its share of GDP, employment, exports, tax revenues and digital sales. In 2025, WIPO (2025e) proposed a framework for a new comprehensive study of the contribution

of copyright and creative industries to GDP, employment, international trade and foreign direct investment. This

approach is relevant for Azerbaijan, as it allows cultural policy to be translated into economic indicators (Table 4).

Table 4. Institutional directions for strengthening creative diversification in Azerbaijan

Area	Current challenge	Expected economic outcome	Indicators for further accounting
Copyright and related rights	The legal framework is being updated, but enforcement remains inadequate	Growth in licence revenues, reduction in the informal use of content, increased investor confidence	Number of registered rights, licence fees, court cases, share of legal digital content
Digital creative hubs	Separate hubs exist, but their economic integration needs to be strengthened	Growth in the number of creative enterprises, start-ups, and exported digital products	Number of residents, turnover, exports, investment, number of jobs created
Human capital	A combination of cultural education, digital skills and entrepreneurship is required	Development of professions for the non-oil and gas sector	Number of educational programmes, graduates, employment, youth participation
Creative economy statistics	Insufficient visibility of the sector in macroeconomic data	Ability to assess the sector's actual contribution to GDP, employment and exports	Cultural satellite account, sectoral surveys, business register, digital revenues
International promotion	Cultural events generate visibility but require a link to exports	Transition from event-based diplomacy to sustainable exports of cultural products	Contracts, international sales, participation in exhibitions, digital platform audiences

Source: compiled by the author based on Connecting Companies (2023), WIPO (2024; 2025e), International Trade Administration (2026)

The need to establish digital creative hubs is consistent with the findings of J. Tao *et al.* (2019), who, using data on Chinese creative industry enterprises from 2012-2014, found that the elasticity of productivity with respect to agglomeration density was 0.31. In this study, this indicator is applied to the Azerbaijani context, where digital hubs are viewed as a tool for concentrating entrepreneurs, authors, technology specialists, rights holders and distribution channels for local cultural products. The significance of human capital is further substantiated by the findings of R. Comunian & L. England (2020), who examined the vulnerability of cultural and creative work during the pandemic. Within the scope of this article, human capital is defined as one of the conditions for the transition from cultural activity to an economically measurable sector; however, a comparison with the scholars' work shows that the development of creative employment must be accompanied by more stable forms of work, professional support and social protection. The findings of V. Chandna & M.S. Salimath (2020), based on an analysis of 732 virtual entrepreneurial firms, revealed a positive correlation between a sense of virtual community, support from other enterprises, social capital and performance outcomes in the cultural and craft industries. The study's findings showed that creative industries serve as a tool for diversification only if they transition from cultural activity to an economically measurable system of production, rights, employment, exports and digital distribution. In the case of Azerbaijan, the creative sector is linked to non-oil and gas development, but does not yet demonstrate sufficient statistical transparency or high rankings in terms of creative output. In the case of Norway, the creative economy is part of a broader institutional model that combines resource revenues, social stability, regional development and innovation policy.

A comparison with South Korea and Sweden confirms that systematic cultural exports arise when three

conditions are met: institutional coordination, intellectual property protection and digital infrastructure. South Korea demonstrates a model of scaling content across global markets, whilst Sweden demonstrates a model of integrating creative industries into national innovation and export policy. For Azerbaijan, a combined approach is effective, in which cultural heritage, music, design, film, digital content, tourism and creative entrepreneurship are combined with legal reform, statistical monitoring, skills development and digital promotion channels. Thus, in resource-dependent economies, the creative industries do not constitute an alternative to the energy sector in the short term, but rather a structural mechanism for the gradual expansion of non-oil value added. For Azerbaijan, the priority outcome is not merely an increase in the number of cultural events, but the transformation of cultural products into a measurable economic asset. Such a transition requires regular statistics on the creative economy, the strengthening of copyright, the development of digital creative hubs, support for human capital, and the integration of local content into international digital platforms.

CONCLUSIONS

The study found that creative industries can serve as an additional tool for diversifying resource-dependent economies; however, their impact depends on the level of institutional maturity, the quality of legal regulation, digital infrastructure, the development of human capital, and the state's ability to transform cultural products into economic assets. It was confirmed that the creative sector does not replace the oil and gas development model in the short term, but expands the structure of non-resource-based growth through employment, exports of cultural and digital products, copyright, national branding and international cultural presence. A comparison of Azerbaijan and Norway showed that the effectiveness of creative diversification

depends not only on the extent of resource dependence, but also on the quality of institutions, the innovation system and the ability to transform resource revenues into long-term non-resource assets. While Norway demonstrates a model of an institutionally balanced resource-based economy, the key task for Azerbaijan remains the development of the creative sector as a measurable component of non-oil growth. This provided grounds for concluding that creative diversification is more effective when a stable institutional framework is in place.

It was established that the experience of South Korea and Sweden demonstrates the importance of systematic cultural exports. In these models, cultural products function not only as an element of domestic cultural policy, but also as a component of foreign economic positioning, digital presence and the formation of intangible assets. For Azerbaijan, this implies the need to transition from isolated cultural initiatives to a coherent policy for the development of creative industries with clear economic indicators. The limitations of the study are linked to the inconsistency

of statistical data on creative industries across different countries, particularly the lack of comprehensive and regular indicators for Azerbaijan's creative sector. In particular, there is limited data on the sector's share of GDP, employment, the number of creative enterprises, the volume of exports of creative goods and services, royalties, and the digital monetisation of local content. Further research should focus on quantifying the contribution of individual segments of the creative sector – notably music, film, design, the gaming industry and digital art – to the structure of non-oil economic growth.

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Креативні індустрії як інструмент диверсифікації ресурсозалежних економік: порівняльний аналіз моделей розвитку

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Анотація. Метою даного дослідження було визначення ролі креативних індустрій у диверсифікації ресурсозалежних економік на основі порівняльного аналізу Азербайджану, Норвегії, Південної Кореї та Швеції. Дослідження проводилося шляхом порівняльного аналізу моделей розвитку, узагальнення міжнародних статистичних даних та порівняння показників ресурсної залежності, інноваційного потенціалу, культурного експорту, цифрової присутності та інституційної підтримки креативного сектору. Результати показали, що креативні індустрії не замінили ресурсно-орієнтовану економіку в короткостроковій перспективі, але сформували додатковий канал для нересурсного зростання через зайнятість, експорт послуг, авторські права, цифровий контент, національний брендинг та м'яку силу. Було встановлено, що в Азербайджані на нафтогазовий сектор припадало понад 40 % валового внутрішнього продукту та понад 90 % експорту, тоді як у Норвегії цей сектор становив близько 22 % ВВП, 48 % експорту та 32 % доходів державного бюджету. Порівняння показало, що Норвегія використовувала доходи від природних ресурсів у рамках розвинених інституцій та інноваційної системи, тоді як Азербайджану необхідно було посилити статистичний облік, захист авторських прав, розвиток цифрових хабів та людський капітал. Крім того, було встановлено, що Південна Корея та Швеція продемонстрували моделі систематичного експорту культурних продуктів, де цифрові платформи, державна підтримка, захист інтелектуальної власності та міжнародне просування перетворили культурні продукти на економічні активи. Практичне значення отриманих результатів полягає в тому, що органи економічної політики, міністерства культури, інститути підтримки бізнесу та розробники програм диверсифікації в Азербайджані можуть використовувати запропоновану модель для оцінки внеску креативних індустрій, створення цифрових хабів, вдосконалення регулювання авторського права та підтримки експорту місцевих культурних продуктів.

Ключові слова: культурний експорт; нематеріальні активи; авторське право; людський капітал; національний брендинг



Cascade strategic analysis of growing product categories in the online food retail sector

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Abstract. The relevance of this study stems from the accelerated digitalisation of the food retail sector, the growing share of e-commerce channels, and the need for strategic management of product category development amid shifting consumer demand. The aim of the study was to develop and justify a cascading approach to the strategic analysis of growing product categories in online food retail, based on the integration of portfolio models and SWOT analysis to enhance the soundness of strategic management decisions. A cascade approach was used for the strategic assessment, combining the BCG and GE/McKinsey portfolio models with SWOT analysis, as well as methods of structural analysis, analysis of online sales dynamics, calculation of compound annual growth rates (CAGR) and the share of product categories in the e-commerce structure. The research was based on statistical data from the international platform Statista for the period 2018-2024. The results of the study indicate uneven development across product segments in the food e-commerce sector and allow for the identification of categories with the most stable growth dynamics and structural strengthening of their positions in the digital channel. In particular, it has been established that the highest average annual growth rates are demonstrated by the categories “bread and cereal products” (24.07%), “confectionery and snacks” (21.01%), “semi-prepared foods” (21.08%) and “meat” (over 20%), confirming the emergence of high-demand segments in online trade. It was shown that the effectiveness of e-commerce development in the food sector depends on a combination of demand factors, logistics infrastructure, digital services and the specific storage and transport requirements of different product groups. Portfolio analysis using the BCG model revealed the presence of “stars”, “question marks” and “cash cows”, whilst the GE/McKinsey matrix confirmed varying levels of market attractiveness and competitive position across individual product segments. A SWOT analysis identified key drivers of growth (rising online demand, digitalisation of services) and constraints (logistics costs, price volatility, regulatory barriers). The proposed approach enables a shift from quantitative diagnosis of product category dynamics to the formulation of differentiated strategic directions for their development and can be used to justify business strategies and government policies supporting the digital transformation of the food market

Keywords: digital commerce; food market; portfolio evaluation; competitive advantages; digital sales channels; management decisions; strategic planning

INTRODUCTION

In the current climate, e-commerce in food products is becoming a key channel for ensuring product availability and adapting the market to crisis situations. The use of a cascading strategic approach combining the Boston Consulting Group (BCG), GE/McKinsey and SWOT analysis matrices allows for a differentiated assessment of product

categories and the development of practice-oriented development strategies to improve the effectiveness of online sales. The development of e-commerce for food products in Ukraine is hampered by a number of structural and market constraints: underdeveloped delivery and cold chain infrastructure, limited digital literacy among certain population

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groups, low levels of trust in online services, and the specific nature of products requiring special storage and transport conditions. The lack of comprehensive tools for forecasting and strategic management of the sector hinders its scaling and effective functioning in the face of fluctuating demand and external shocks.

In the academic literature, the issue of e-commerce development in the food sector is examined from various methodological perspectives, notably through the prism of the digital transformation of retail, consumer behaviour, logistics innovations, and strategic management of product categories. In particular, E. Pantano *et al.* (2020) noted that digitalisation is changing the structure of food markets and transforming traditional sales channels through the development of omnichannel retail models and the personalisation of consumer interactions. According to the authors, the introduction of digital technologies in retail enhances the competitiveness of businesses and facilitates the adaptation of business models to new consumer practices. A separate area of research focuses on analysing the behavioural aspects of food consumption in the digital environment. In particular, authors A. Kuikka *et al.* (2024) investigated the factors shaping consumer loyalty in the online food retail environment and demonstrated that trust in the digital platform, service quality and effective communication with customers are of key importance. The researchers emphasised that a positive consumer experience and personalised interaction contribute to increased repeat purchases and the strengthening of online retailers' competitive positions. In turn, S. Nakano (2023) analyses the characteristics of consumer demand concentration in online food retail and notes that the structure of the online shopping basket differs significantly from traditional purchases in physical stores. The author highlights the growing role of recommendation algorithms, digital personalisation and consumer behaviour models in shaping demand for food products in the digital environment. Meanwhile, R. Bharati *et al.* (2025), in their study of consumer feedback on online food purchases during the pandemic, found that customer satisfaction is significantly influenced by delivery speed, product availability, the quality of logistics services and the transparency of digital communication.

Logistical and infrastructural factors play a significant role in the development of e-commerce in food products. In particular, M. Olumekor *et al.* (2024) found in their study that internet access, transport infrastructure and household expenditure patterns are key determinants of the uptake of online food shopping. The authors emphasise that infrastructure constraints directly hinder the development of e-commerce in the food sector, particularly in regions with lower levels of digital and logistical accessibility. In parallel, a research area is emerging dedicated to the strategic management of product portfolios in retail and e-commerce. J. Bieńkowska & C. Sikorski (2024) demonstrated that combining quantitative and qualitative methods of strategic analysis enhances the soundness of managerial decisions, as it allows formalised assessments to be

supplemented by an interpretation of contextual factors and strategic constraints. At the same time, T. Musikavanhu & S. Kabanda (2023), having conducted a systematic review of research in the field of e-commerce in food products, found that academic studies predominantly focus on individual functional aspects (logistics, order fulfilment, consumer behaviour), whilst integrated strategic approaches remain underdeveloped. The authors emphasise that such fragmentation limits the ability to formulate comprehensive management decisions for digital food markets. Thus, the academic literature has produced a significant body of theoretical and methodological work on the study of e-commerce in food products; however, the issue of integrating various strategic analysis tools into a single analytical system remains under-explored. This necessitates the development of comprehensive approaches that allow for the integration of market dynamics, the competitive positions of product categories, and strategic development factors.

The aim of this study was to develop an innovative cascade model for the strategic analysis of growing product categories in the online food retail sector, combining portfolio models (BCG, GE/McKinsey) and SWOT analysis to formulate differentiated strategic decisions. To achieve this aim, the following tasks were identified: to identify key growing product categories in the online channel and assess their competitive positions and market attractiveness; to conduct a portfolio analysis of product categories using the BCG and GE/McKinsey matrices; to integrate the results of the SWOT analysis to formulate strategic development directions for each category. The scientific novelty lies in the development of a cascading model for the strategic analysis of growing product categories in the online food retail sector, which integrates the results of portfolio analysis (BCG, GE/McKinsey) and SWOT analysis into a single, coherent system of strategic assessment.

MATERIALS AND METHODS

The methodological basis for the study of the development of e-commerce in food products is a combination of general scientific and specialised methods of scientific inquiry, which has enabled a comprehensive analysis of market trends, structural changes and the strategic characteristics of product categories. A systematic approach was applied, along with methods of structural-logical analysis, comparative analysis, and economic-statistical methods, as well as tools for strategic and portfolio analysis. The choice of methods was dictated by the need to study both the dynamic quantitative changes in the market and the qualitative characteristics of its development. The study involved an analysis of academic publications on e-commerce in the food sector, consumer behaviour, and the logistical aspects of online retail operations. In particular, the work by E. Pantano *et al.* (2020) was utilised, as well as systematic reviews. These sources enabled the formation of the theoretical framework of the study and the identification of key drivers of e-commerce development. The empirical basis of the study consisted of statistical data from official sources,

in particular analytical reports by McKinsey & Company (2022; 2023; 2024; 2025) on the development of food retail in Europe, as well as market forecasts by Statista (n.d.) regarding the online food retail segment in Ukraine.

The period of empirical analysis covered 2018-2024, due to the use of comparable and fully verified statistical data from international analytical databases, which ensure consistency in measurement methodology across years and the validity of intertemporal comparisons. Data for 2025, at the time of collection and initial processing, were preliminary or forecast in nature, which limits their use for forming consistent time series within the scope of portfolio analysis. The use of partial or forecast values for 2025 in portfolio analysis may distort the dynamics of indicators due to differences in the methodology used to derive them. Analytical processing, interpretation of results and model building were carried out in 2025 based on the most up-to-date complete annual data available. The first and second stages of the study are aimed at identifying product categories with the most pronounced growth potential in the online food retail sector. Their implementation is methodologically necessary, as the BCG matrix is used not as a primary screening tool, but as a means of portfolio diagnosis for an already established analytical sample. The selection of the top three categories was based on formalised criteria of dynamics, structural significance and demand stability, ensuring the validity of the subsequent application of portfolio models in a digital context.

The study involved the systematisation of product categories and their classification by growth rate and market share. To this end, a structural-dynamic analysis method was applied, along with the calculation of the compound annual growth rate (CAGR), which enabled an assessment of the long-term development dynamics of individual segments of the food e-commerce market. The analysis was conducted at the product category level rather than for individual brands or companies, which aligns with the logic of portfolio models of strategic analysis (BCG, GE/McKinsey) and helps to avoid the distortions characteristic of fragmented digital markets.

The methodology for calculating growth indicators for product categories takes into account that, for each product category in the online food retail sector, the following data were used: annual online sales volumes for 2018-2024, in million USD; and the total volume of online food retail for the corresponding years. The analysis period covers 7 years. To assess the long-term dynamics of online sales for each product category, the CAGR indicator was applied, which allows for the smoothing of year-on-year fluctuations and the consideration of crisis shocks (in particular, the downturn in 2022):

$$CAGR_i = \left(\frac{V_{i,2024}}{V_{i,2018}} \right)^{\frac{1}{n}} - 1, \quad (1)$$

where $V_{i,2018}$, $V_{i,2024}$ – the volume of online sales of the i -th product category in 2018 and 2024 respectively; n – the number of years in the analysis period. To assess the structural

significance of each category, its share in the total volume of e-commerce in food products was determined:

$$Share_{i,t} = \frac{V_{i,t}}{V_{total,t}} \cdot 100, \quad (2)$$

where $V_{i,t}$ – the volume of online sales of the i -th category in year t ; $V_{total,t}$ – the total volume of e-commerce in food products in year t . The calculation was carried out separately for 2018 and 2024. To identify changes in the structure of the digital market, the share growth rate was used, which characterises the strengthening or weakening of a category's position in e-commerce:

$$\Delta Share_i = Share_{i,2024} - Share_{i,2018}. \quad (3)$$

Interpretation: $\Delta Share_i > 0$ – the category is strengthening its position within the e-commerce structure; $\Delta Share_i < 0$ – the category is losing relative significance, even in the context of absolute growth. Based on the calculated indicators, the selection of the top three growing categories was carried out according to a set of criteria: high average annual growth rate; positive growth in structural share; sustained recovery in volumes in 2023-2024; economic and logistical suitability for scaling in the digital channel.

The limitation of the analysis to three product categories is due to the need to combine analytical depth with methodological integrity of the study. It is precisely these top three categories that provide a representative reflection of the core growth of e-commerce in food products, whilst allowing for a comprehensive cascade analysis using BCG and GE/McKinsey matrices and SWOT analysis without compromising the substantive quality of strategic conclusions. Increasing the number of categories does not alter the typology of strategic positions, but significantly reduces the depth of interpretation, which contradicts the objectives of strategic analysis within the scope of a single academic article.

In the third stage, portfolio methods of strategic analysis were employed, enabling the classification of product categories by market growth rate and relative market share. Additionally, SWOT analysis was applied to assess internal and external factors influencing the development of e-commerce, thereby providing a comprehensive strategic overview of the market under study. The application of the BCG matrix for the initial classification of product categories by online market growth rates and relative market share enabled the identification of strategic category groups and their overall development potential in the e-commerce channel. The use of the GE/McKinsey matrix, which serves as a tool for the internal differentiation of categories previously identified as strategically significant (in particular, "stars" according to the BCG matrix), enabled a transition from an aggregated classification to a multidimensional strategic assessment that takes into account the market's economic attractiveness, the competitive position of categories, consumer behavioural characteristics, logistical constraints and the level of digital maturity.

The assessment of the criteria for the attractiveness of the e-commerce market and the competitive position of product categories was carried out using an expert-based approach as part of the study conducted in 2025. Eight specialists in the field of e-commerce and food retail, including e-commerce market analysts and representatives of online retailers, were involved in the expert assessment. Experts were selected based on criteria including at least three years' professional experience and practical involvement in relevant market or analytical projects. The expert assessment was conducted on a five-point scale (1-5), where 1 represents the minimum level of a criterion and 5 the maximum level. The composite indicators of market attractiveness and competitive position were determined using a weighted sum formula:

$$I_j = \sum_{k=1}^m w_k \cdot s_{jk}, \quad (4)$$

where I_j is the integrated indicator for the j -th product category; w_k is the weight of the k -th criterion; s_{jk} is the expert assessment of the j -th category according to the k -th criterion. SWOT analysis in the fourth stage of the study is applied as a tool for the strategic integration of portfolio analysis results, rather than as an independent descriptive method. Its use is methodologically appropriate only after constructing the GE/McKinsey matrix, as it is this matrix that allows for the quantitative identification of the strengths and weaknesses of the competitive position, as well as the key factors of market attractiveness in the context of the digital transformation of trade. The final stage involved summarising the results obtained and formulating strategic recommendations for the development of e-commerce in food products in Ukraine. The combination of quantitative methods (CAGR, structural analysis) and qualitative tools (SWOT, portfolio analysis) ensured the validity of the conclusions and their practical applicability for strategic market management.

RESULTS AND DISCUSSION

The development of food trade in Ukraine during 2018-2024 took place against a backdrop of profound structural changes caused by crisis and war-related factors, which significantly transformed sales formats, logistics chains

and consumer behaviour. The dynamics of retail sales in the pre-war period (2018-2022), during a phase of sharp contraction and a stage of gradual recovery, created the conditions for rethinking the role of digital sales channels and the infrastructural mechanisms underpinning the food market (Ilchuk *et al.*, 2025a; 2025b). The innovative aspect of this study lies in the application of a cascading approach to strategic analysis, which combines portfolio methods (BCG, GE/McKinsey) and SWOT analysis for various product categories, enabling the formalisation of complex interrelationships between market parameters and the forecasting of market development under conditions of external shocks and internal transformations.

An analysis of academic research in the field of e-commerce in general, and in the grocery sector in particular, shows that most studies focus on specific aspects – technological innovations, logistics solutions, consumer behaviour or the impact of crises. Research by M. Groh (2014) indicates a growing importance of integrated approaches to the strategic management of product categories, the integration of digital technologies, service personalisation, and the adaptation of logistics models to different types of goods. At the same time, most existing studies apply portfolio or matrix tools in isolation, without establishing a coherent logic for transitioning from quantitative growth assessment to strategic management decisions. Therefore, to ensure the methodological integrity of the study, the results of the portfolio and SWOT analyses were integrated into a single cascading model for the strategic assessment of the development of e-commerce in food products (Fig. 1). Figure 1 illustrates the sequence of stages in the study of e-commerce in food products, from problem formulation to the development of strategic recommendations. This structure allows the research logic to be clearly traced, ensures transparency regarding the methods used and their connection to the practical value of the results obtained. In particular, it shows how quantitative (CAGR, market share, sales dynamics) and qualitative methods (SWOT, portfolio analysis) are combined for a comprehensive assessment of growing product categories. The analysis was conducted at the product category level rather than the brand level, ensuring the correct application of portfolio models (BCG, GE/McKinsey) in the context of e-commerce (Table 1).

Table 1. Trends and selection criteria for growing product categories in the online food retail sector in 2018-2024

Category	Year, million USD							CAGR 2018- 2024, %	Share 2018, %	Share 2024, %	Share growth, percentage points
	2018	2019	2020	2021	2022	2023	2024				
Bread and cereal products	22.09	29.36	54.95	88.74	12.86	38.44	80.56	24.07	7.02	10.18	3.16
Semi-prepared foods	8.80	11.70	19.37	28.85	4.57	13.14	27.73	21.08	2.8	3.44	0.64
Confectionery and snacks	39.62	52.83	89.06	134.70	19.96	59.31	124.40	21.01	12.58	15.4	2.82
Meat	41.84	56.52	89.87	133.30	20.02	60.21	129.00	20.64	13.28	15.92	2.64
Dairy products and eggs	24.31	32.13	47.99	68.81	12.01	32.24	67.02	18.41	7.72	8.13	0.41
Vegetables	24.86	32.13	48.67	70.05	13.93	33.79	67.72	18.18	7.89	8.19	0.3
Fish and seafood	11.51	14.74	22.09	31.67	6.65	15.58	30.91	17.9	3.65	3.73	0.08
Fruit and nuts	20.90	26.88	40.46	57.99	11.87	28.17	56.00	17.85	6.64	6.76	0.12
Sauces and spices	5.78	7.07	9.19	12.65	3.96	7.38	13.78	15.58	1.84	1.63	-0.21

Table 1. Continued

Category	Year, million USD							CAGR 2018- 2024, %	Share 2018, %	Share 2024, %	Share growth, percentage points
	2018	2019	2020	2021	2022	2023	2024				
Oils and fats	7.57	9.13	12.27	16.43	5.20	9.23	16.21	13.53	2.4	1.86	-0.54
Spreads and sweeteners	10.32	11.87	14.45	18.23	8.07	11.66	17.88	9.59	3.28	1.95	-1.33
Pet food	44.49	52.80	66.30	87.35	8.58	31.93	67.35	7.16	14.12	6.99	-7.12
Baby food	4.45	4.59	4.89	5.12	4.11	4.45	4.99	1.93	1.41	0.45	-0.96

Source: calculated using formulas 1-3 and compiled by the author based on data from Statista (n.d.)

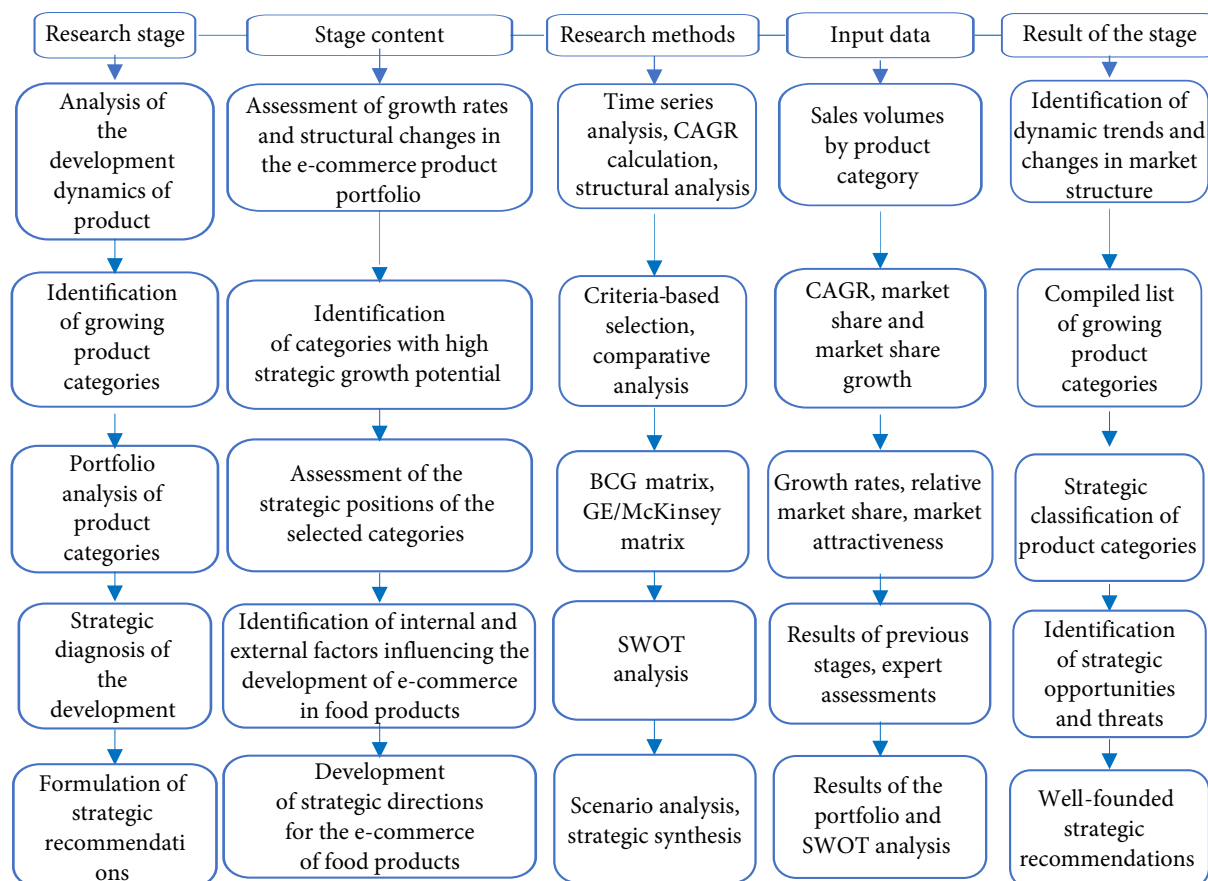


Figure 1. Cascade model of strategic analysis of the development of e-commerce in food products

Source: developed by the author based on X. Pan (2023), C.-Y. Hung & C.-C. Wang (2024), O.Ye. Mazur (2024), V.Z. Enríquez *et al.* (2025)

Analysis of the data in Table 1 shows that the highest average annual growth rates in 2018-2024 are demonstrated by the categories “bread and cereal products” (24.07%), “confectionery and snacks” (21.01%), “semi-prepared foods” (21.08%) and “meat” (20.64%). At the same time, it is “confectionery and snacks” (+2.82 p.p.) and “meat” (+2.64 p.p.) that are characterised by the largest increase in structural share. In contrast, the categories “pet food” (7.16%) and “baby food” (1.93%) have the lowest growth rates and negative or minimal dynamics in structural changes, indicating their relative stagnation. Thus, it is the categories of “bread and cereal products”, “confectionery and snacks”, and “meat” that combine the highest average annual growth rates with a positive increase in structural share, justifying their inclusion in the subsequent portfolio

analysis. The selected product categories are characterised not only by high growth rates but also by a steady increase in market share within the structure of e-commerce in food products, which indicates their strategic attractiveness and the relevance of further portfolio analysis. In the first and second stages of the study, growing product categories in e-commerce for food products were identified based on the average annual growth rate of online sales, their share in the total volume of e-commerce for food products, and the increase in their share within the overall e-commerce structure. The results of the calculations showed that the most dynamic categories are “meat”, “bread and cereal products”, as well as “confectionery and snacks”. These categories are characterised not only by high growth rates but also by a significant strengthening of market positions in

the digital channel, which justifies their further analysis using portfolio and matrix methods of strategic management.

The third stage of the study was aimed at conducting an initial portfolio diagnosis of the selected growing product categories in the e-commerce food sector using the BCG and GE/McKinsey matrices. Unlike the second stage, which was of a selection nature, the BCG matrix is used for the strategic interpretation of the categories' positions in the digital channel and to determine their role in the e-commerce portfolio. The BCG matrix is widely used in classical strategic management research, particularly in international studies devoted to modelling portfolio analysis and forecasting the development of business units (Pan, 2023; Enríquez *et al.*, 2025). At the same time, contemporary research shows its adaptation to the conditions of the digital economy and e-commerce, with an emphasis on modifying classical approaches in the context of online markets (Hung & Wang, 2024). A separate strand consists of academic works by Ukrainian researchers, which focus on the challenges of adapting the BCG matrix to the analysis of product ranges and the specifics of national markets, particularly in the context of the transformation of retail systems (Mazur, 2024). However, overall, the application of the BCG matrix in empirical studies of e-commerce in food products remains underdeveloped, which necessitates its further adaptation to the specifics of digital platforms and its use as a basic tool for multi-criteria strategic analysis.

The application of the BCG matrix at the product category level, rather than at the level of companies or brands, is methodologically sound in the context of e-commerce in food products, as the digital market is characterised by a high level of demand aggregation, multi-brand competition, and the dominance of platform-based sales models. This prevents distortions associated with the competitive

structure of individual companies, thereby facilitating a focus on the strategic dynamics of demand. The classic BCG matrix has been adapted to the specifics of online food retail by transforming its basic variables. Within the scope of the study: the growth rate reflects the dynamics of online sales of the product category in 2018–2024; market share is interpreted as the share of the relevant category in the total volume of online food retail, rather than as the competitive share of an individual entity. This approach allows the BCG matrix to be used not as a tool for competitive analysis, but as a portfolio model for assessing structural changes in digital demand.

In the context of e-commerce in food products, the quadrants of the BCG matrix are interpreted as follows: “stars” – product categories with high growth rates in online sales and a significant share in the structure of e-commerce in food products; they act as key drivers of digital development and require priority investment; “question marks” – categories with high growth dynamics but a relatively small share; they require a strategic choice between scaling up or gradual withdrawal; “cash cows” – stable categories with a high share but moderate growth rates; can serve as a source of funding for digital innovation; dogs – categories with low growth rates and a limited structural role in e-commerce (Pan, 2023; Hung & Wang, 2024; Enríquez *et al.*, 2025). The BCG matrix was constructed for the three categories selected in the first stage: “bread and cereal products”, “confectionery and snacks”, and “meat”. The positioning coordinates were: the compound annual growth rate (CAGR, %) of online sales; and the share of the product category in the total volume of online food trade in 2024. The positioning results are presented in tabular form (Table 2), taking into account the calculations set out in Table 1, and visualised as a schematic BCG matrix.

Table 2. Positioning of growing product categories in the BCG matrix

Product category	Growth rate of online sales	Share of e-commerce in food products	Position in the BCG matrix
Bread and cereal products	High	High	Stars
Confectionery and snacks	High	Medium-high	Stars
Meat	High	High	Stars

Source: author's own work

To construct the BCG matrix, the growth rates of online sales and the share of product categories in the structure of e-commerce in food products were first normalised and transformed into relative qualitative levels to ensure comparability and strategic interpretation of the data. Normalisation was carried out using an interval approach, taking into account the mean values of the sample under study. Specifically, the mean values of the indicators were determined and the limits of deviation from them were established. On this basis, the indicators of online sales growth rates (CAGR) and the share of product categories in the total volume of e-commerce were interpreted according to the following levels: low level – values below the sample average; medium level – values within an interval close to the mean ($\pm 20\%$);

medium-high level – values between the medium and high levels; high level – values exceeding the upper threshold of the interval distribution. This approach ensures consistency between quantitative data and their strategic interpretation within the BCG matrix and helps avoid distortions associated with the direct use of absolute values in portfolio analysis (Fig. 2). It should be noted that, according to the results of the BCG matrix, all analysed product categories fall into the star quadrant. This is not a methodological limitation of the study, but reflects the logic of the phased selection carried out in the first stage, where only categories with high growth potential and positive dynamics in market share were included for further analysis. Thus, the BCG matrix in this study serves as a tool for initial portfolio diagnosis rather

than a comprehensive market analysis. At the same time, despite belonging to the same quadrant, these categories differ in terms of the nature of demand, logistical

complexity and sensitivity to digital services, which justifies a more in-depth analysis in the next stage of the study using the GE/McKinsey matrix and SWOT analysis.

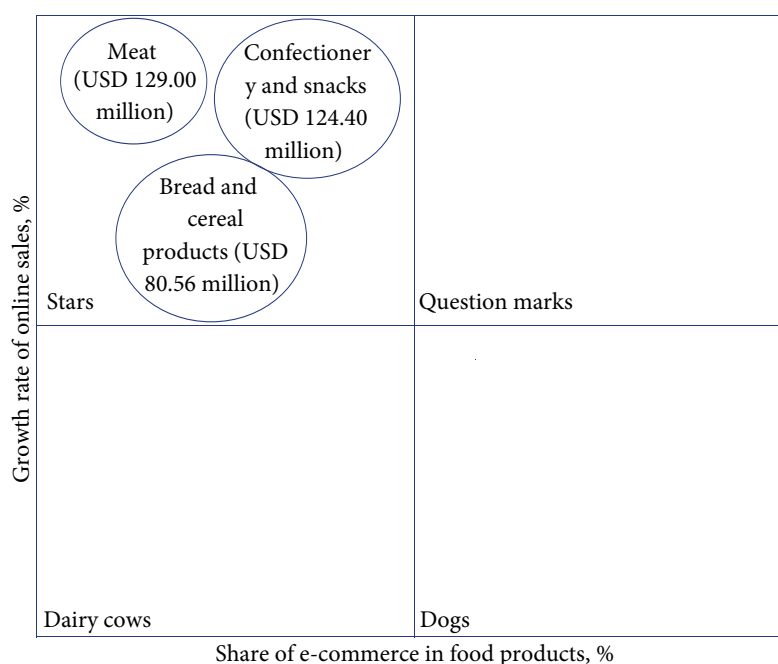


Figure 2. Adapted BCG matrix for portfolio analysis of growing product categories in food e-commerce

Source: author's own work

The analytical rationale for using portfolio models in research into e-commerce in the food sector is consistent with the empirical findings of McKinsey & Company (2022; 2023; 2024; 2025), which point to a growing differentiation among food e-commerce product categories in terms of growth rates, profit margins and investment attractiveness. According to McKinsey's sector studies, following the COVID-19 pandemic, a stable core of star categories in online food sales has emerged, requiring active strategic support, whilst certain categories are showing signs of stagnation despite overall market growth. The application of the GE/McKinsey matrix in the third stage of the study is driven by the need to overcome the methodological limitations of the BCG matrix. Although the BCG matrix allows for an initial portfolio diagnosis and the identification of key drivers of digital growth, its two-factor nature (growth rate and market share) does not account for the multi-factor nature of product category competitiveness in the context of the digital transformation of retail.

Unlike the BCG matrix, the GE/McKinsey matrix provides a multidimensional strategic assessment, allowing for the simultaneous consideration of: economic parameters of market development; behavioural characteristics of online consumers; logistical and operational constraints of e-commerce; and the level of digital maturity of categories. Thus, the GE/McKinsey matrix is used not for reclassification, but for the internal differentiation of categories that in the BCG matrix belong to the same quadrant ("stars"). To construct the GE/McKinsey matrix, two integrated groups of indicators were formed: the attractiveness of the e-commerce market for the product category; and the competitive position of the product category in the digital channel (Table 3). The assessment was carried out on the basis of expert weighting of the criteria, followed by the calculation of integrated scores for each category. The GE/McKinsey matrix scores for the growth product categories – "bread and cereal products", "confectionery and snacks", and "meat" – are shown in Table 4.

Table 3. Criteria for assessing the attractiveness of the e-commerce market for food products and the competitive position of the product category in e-commerce

Criteria for assessing the attractiveness of the e-commerce market for food products	Economic interpretation	Weight
Growth rate of the e-commerce segment	Long-term potential for scaling online sales	0.25
Category margins	Ability to generate added value in the digital channel	0.20
Price sensitivity	Stability of demand under conditions of price fluctuations	0.15
Repeat purchases	Frequency and regularity of online orders	0.20
Logistical complexity	Costs of storage, delivery and order fulfilment	0.20
Total		1.00

Table 3. Continued

Criteria for assessing the competitive position of a product category in e-commerce	Strategic interpretation	Weight
Level of digital presence	Presence on marketplaces and in omnichannel networks	0.20
Share of online sales	Degree of category integration into the digital channel	0.20
Level of brand loyalty	Stability of consumer choice online	0.20
Availability of own-brand products	Control over product range and pricing	0.15
Demand analytics and personalisation	Ability to use data to drive sales	0.25
Total		1.00

Source: calculated by the author based on formula 4

Table 4. GE/McKinsey matrix integrated indicators for growing product categories

Indicator	Product category		
	Bread and cereal products	Confectionery and snacks	Meat
Criteria for assessing the attractiveness of the e-commerce market for food products			
Market attractiveness	High	High	Medium-high
Growth rate of the e-commerce segment	5	5	4
Category margin	4	4	5
Price sensitivity	4	3	4
Repeat purchases	5	4	3
Logistical complexity	3	3	5
Overall score	4.35	3.90	3.90
Criteria for assessing the competitive position of a product category in e-commerce			
Competitive position	High	Medium-high	High
Level of digital presence	5	4	5
Share of online sales	4	3	5
Level of brand loyalty	4	3	4
Availability of own-brand products	4	3	3
Demand analytics and personalisation	4	4	4
Overall score	4.20	3.50	4.40
Strategic zone	Invest and scale	Selective growth	Invest with a focus on efficiency

Source: calculated by the author

The results of an in-depth strategic assessment show (Fig. 3) that, although all three categories belong to the Star quadrant in the BCG matrix, their strategic positions differ significantly. The “bread and cereal products” category is characterised by a combination of high market attractiveness and a strong competitive position, which justifies an aggressive investment strategy aimed at scaling up and technologically upgrading digital sales channels. “Confectionery and snacks” demonstrate high market potential, but are somewhat weaker in terms of competitive position, which justifies a strategy of selective growth with an emphasis on brand loyalty, personalisation and the development of own-brand products. The “meat” category is characterised by a strong competitive position within a market of medium-to-high attractiveness, which is linked to logistical complexity and high operational costs. This makes it advisable to focus investments primarily on improving operational efficiency and optimising digital delivery services. The results obtained from the GE/McKinsey matrix form the analytical basis for the next stage of the study – a SWOT analysis, which allows for a detailed examination of the internal strengths and weaknesses of each product category, as well as the identification of external opportunities and threats to their further development in the digital environment. In

contemporary research on e-commerce in food products, SWOT analysis is predominantly used as a standalone tool for the qualitative interpretation of market conditions or as a supplementary method for strategic assessment without a clear formalisation of its link to the results of quantitative analysis. The academic publications by M.M. Helms & J. Nixon (2010), E. Gürel & M. Tat (2017), and B. Phadermrod *et al.* (2019) focus primarily on describing the strengths and weaknesses of digital retail formats, as well as the opportunities and threats of the external environment, without ensuring the systematic integration of SWOT analysis with the results of portfolio or multi-criteria diagnostics. In this context, the question of integrating the results of the BCG and GE/McKinsey matrices into the structure of SWOT analysis based on a cascading approach – whereby qualitative strategic conclusions are formed on the basis of previously identified quantitative strategic positions of product categories – remains methodologically unresolved. It is precisely the elimination of this methodological gap that justifies the application of SWOT analysis at the fourth stage of the study as an integrative tool for summarising the results of portfolio analysis, taking into account the specific nature of e-commerce in food products under conditions of heightened market instability.

Market attractiveness (overall score)	Selective investments	Confectionery and snacks (USD 124.40 million)	Bread and cereal products (USD 80.56 million)
	Maintain / minimal investment	Retention / selective growth	Meat (USD 129.00 million)
	Reduce investment	Reduce investment	Reduce investment
Competitive position (composite score)			

Figure 3. In-depth portfolio differentiation of growing product categories in food e-commerce based on the GE/McKinsey matrix

Source: author's own work

Within the scope of the study, the elements of SWOT analysis are interpreted as follows: strengths (S) are formed on the basis of high integrated assessments of the competitive position of product categories in the GE/McKinsey matrix; weaknesses (W) reflect the parameters for which the relevant product categories received lower expert scores according to the criteria of competitive position; opportunities (O) are based on factors of the attractiveness of the e-commerce market for food

products; Threats (T) cover external risks to the operation of e-commerce in food products in Ukraine, in particular logistical, regulatory, macroeconomic and military factors. This approach enables a transition from an aggregated strategic position of categories to the identification of the internal and external factors shaping their development within the food e-commerce sector. Table 5 presents a SWOT analysis of the product category “bread and cereal products”.

Table 5. SWOT analysis of the product category “bread and cereal products”

S	W
Strong competitive position in e-commerce (GE/McKinsey)	Low margins in certain sub-categories
High frequency of online purchases	Limited opportunities for premiumisation
Low logistical complexity of delivery	High price sensitivity among consumers
O	T
Growing demand for basic products in the online channel	Inflationary pressure on raw materials
Development of own brands	Disruptions in supply chains
Scaling up ultra-fast e-commerce models	State regulation of prices for essential goods

Source: author's own analysis

An analysis of the “bread and cereal products” category shows that even under conditions of low margins and high consumer price sensitivity, staple foods retain significant strategic potential in e-commerce thanks to stable demand, low logistical complexity and opportunities for scaling through private labels. In contrast to this category,

the next product group – “confectionery and snacks” – is characterised by a higher level of emotional consumption, active use of digital marketing and significantly broader opportunities for personalising the offering, which results in a different configuration of strengths and weaknesses, as well as strategic risks (Table 6).

Table 6. SWOT analysis of the “confectionery and snacks” product category

S	W
High attractiveness of the e-commerce market	Medium-high competitive position
High potential for personalisation	Dependence on imported raw materials
Strong brand loyalty	Price volatility

Table 6. Continued

O	T
Growth in impulse online shopping	Inflationary fluctuations in household income
Active use of digital marketing	Increasing competition from private-label products
Expansion of the range of functional snacks	Tighter regulations on product composition

Source: author's own analysis

Further analysis of the “meat” category allows the study to be expanded by including products with fundamentally different operational characteristics, primarily

high logistical complexity, the need for a cold supply chain, and heightened regulatory requirements regarding product quality and safety (Table 7).

Table 7. SWOT analysis of the “meat” product category

S	W
Strong competitive position in the digital channel	High logistical complexity
High proportion of online sales	High costs for the cold chain
Stable underlying demand	Limited opportunities for rapid scaling
O	T
Development of guaranteed delivery services	Military risks of supply disruption
Integration of traceability and quality control systems.	Tighter veterinary regulations
Rising demand for ready-to-eat products	Rising energy costs

Source: author's own analysis

The SWOT analysis confirms that the selected growth product categories, despite belonging to the same portfolio segment in the BCG matrix, are characterised by significantly different strategic profiles. This indicates the limitations of relying solely on portfolio models for management decision-making and justifies the advisability of combining them with an analytical and integrative SWOT analysis.

The fifth stage of the cascading strategic analysis involves formulating differentiated strategic recommendations for the development of growing product categories in the e-commerce food sector, based on a synthesis of the results of the BCG, GE/McKinsey matrices and SWOT analysis. At this stage, there is a transition from analytical interpretation to practice-oriented strategic management, which ensures the applied value of the research. Unlike classical approaches, where strategic recommendations are formulated separately for each analytical model, within the scope of this study they are integrative in nature and based on cascade logic.

An analysis of the results indicates that for product categories which fall within the “stars” quadrant of the BCG

matrix but occupy different strategic zones in the GE/McKinsey matrix, it is not advisable to apply a one-size-fits-all digital development strategy. In particular, “bread and cereal products” – an aggressive scaling strategy focused on expanding omnichannel sales models, developing own-brand products and optimising operational costs through low logistical complexity; “confectionery and snacks” – a selective growth strategy focused on personalisation, digital marketing, consumer behaviour analytics and expanding the range of high-value-added products; “meat” – an investment strategy focused on efficiency, involving logistics optimisation, the development of guaranteed delivery services, digital quality control and the minimisation of operational risks. Thus, the final stage of the cascade analysis transforms the results of the portfolio and SWOT models into practical strategic decisions tailored to the specific characteristics of individual product categories within the online food retail sector. Each row of Table 8 integrates the results of BCG → GE/McKinsey → SWOT, ensuring a cascading logic for strategic decision-making and emphasising a differentiated approach to the development of each product category.

Table 8. Integration table of strategic development directions for growing product categories in the online food retail sector (synthesis of BCG, GE/McKinsey and SWOT analysis)

Category	BCG position	GE/McKinsey zone	SWOT: Key factors	Dominant strategy	Management priorities
Bread and cereal products	Star	High appeal/strong position	S: high repeatability of online purchases, low logistical complexity W: low margins O: growing demand for staple foods T: inflationary pressure	Invest and scale	Own brands, fast delivery, price optimisation
Confectionery and snacks	Star	High appeal/medium-strong position	S: strong brand loyalty, high potential for personalisation W: dependence on imports O: growth in impulse buying T: increasing regulatory requirements	Selective growth	Personalisation, digital marketing, product range expansion

Table 8. Continued

Category	BCG position	GE/McKinsey zone	SWOT: Key factors	Dominant strategy	Management priorities
Meat	Star	Medium-high attractiveness/ strong position	S: high base demand, strong online position W: logistical complexity, cold chain O: guaranteed delivery services; T: military and energy risks	Invest with a focus	Cold chain, micro-fulfilment centres, quality control

Source: author's own analysis

The results of this study are consistent with the findings of contemporary scientific and applied research published in peer-reviewed journals, and confirm the relevance of the applied cascading approach to the strategic analysis of growing product categories in the food e-commerce sector. The proposed approach provides a consistent combination of portfolio tools (the BCG and GE/McKinsey matrices) with an assessment of the logistical, resource and digital determinants of product segment development. The bibliometric analysis by M. Monoarfa *et al.* (2024) confirms the growing academic interest in issues relating to e-commerce in food products, particularly in the context of logistics systems, digital platforms and consumer behaviour. The authors highlight the concentration of research on issues of supply chain efficiency and the digital transformation of retail. This confirms the relevance and scientific validity of the chosen research direction.

Researchers F. Ellis-Chadwick *et al.* (2007) have demonstrated, within the framework of the resource-based view, that the competitiveness of retail companies is shaped by the effective use of information, organisational and logistical resources. The authors emphasise that it is not only the availability of resources that is key, but their ability to be integrated into a single strategic management system. This is directly confirmed by the results of the cascade analysis presented, which takes into account the interrelationship between companies' resource base and the effectiveness of product category development. In the work by A. Hübner *et al.* (2016a), it was established that the effectiveness of e-commerce in food retail depends to a large extent on the level of integration of sales channels and the flexibility of the distribution system. The authors emphasise that an omnichannel environment requires adaptive inventory management and coordination of flows between online and offline channels. This correlates directly with the results of the current study, according to which different product categories (in particular the meat and grocery groups) demonstrate varying sensitivity to the logistics infrastructure and require differentiated strategic decisions within the BCG matrix. In the study by A. Hübner *et al.* (2016b), it is shown that the choice of delivery model is a critical factor in the competitiveness of online food retail. The authors argue that decisions regarding the organisation of the last mile of supply should be based on product category characteristics, demand density and service speed requirements. The results of this study confirm the need to differentiate logistics strategies for perishable and non-perishable goods, which is

consistent with the logic of category management within the proposed cascade approach.

M. Mkansi & A.L. Nsakanda (2019) demonstrate that integrating a physical network of stores into an e-commerce system creates additional advantages for order fulfilment and improves the efficiency of the last mile of delivery. The authors emphasise that using stores as logistics hubs allows for reduced costs and faster customer service. This is fully consistent with the findings of this study regarding the need to combine online and offline infrastructure when formulating product category development strategies. The study by A. Grewal *et al.* (2017) focuses on the role of digital presence, personalisation and omnichannel integration in shaping effective retail strategies. The authors note that digital technologies are changing consumer behaviour and increasing the importance of product category segmentation. This is consistent with the findings of this study, which found that product groups respond differently to digital sales channels and marketing tools. The work by A. Alrashied *et al.* (2024) demonstrates that companies' level of digital maturity, the use of data analytics and process automation significantly influence the effectiveness of e-commerce in the food sector. The authors emphasise that technological factors are becoming decisive in shaping competitive advantages. This correlates with the findings of this study, according to which the growth rates of product categories depend not only on market conditions but also on the level of digital transformation of business models. The study by E. Pantano *et al.* (2020) demonstrates that crises significantly alter the structure of consumer demand and exacerbate the uneven development of product categories in the retail sector. The authors note that during crises, demand shifts towards basic essential goods. This is consistent with the findings of this study regarding the asymmetric development of categories during various periods of economic instability. Thus, the results of the author's cascading strategic analysis are consistent with a wide range of contemporary research, confirming the importance of category differentiation, logistical adaptation, a resource-based approach and digital transformation in the development of e-commerce in food products. The proposed model demonstrates its versatility and suitability for application in the context of dynamic changes in consumer markets and growing competition.

CONCLUSIONS

The application of a cascading strategic analysis using BCG, GE/McKinsey and SWOT matrices in the study of e-commerce in food products allows for a comprehensive

assessment of the competitive positions and market attractiveness of individual product categories, as well as the formulation of differentiated strategic development directions. The five-stage approach, which involves identifying growth categories, portfolio diagnosis, strategic differentiation, integration of internal and external factors, and the formulation of target strategies, provides a logical transition from analytical description to practice-oriented strategic management. The research findings indicate that different product categories, even when belonging to the same quadrant of the BCG matrix, have distinct strategic profiles in the GE/McKinsey matrix and different strengths, weaknesses, opportunities and threats in the SWOT analysis. Furthermore, the combination of portfolio models and SWOT analysis forms a coherent, cascading logic of strategic management, enabling decisions to be adapted to the specific characteristics of each product category and digital sales channel. In particular, the analysis found that the average annual growth rates of individual food e-commerce categories in 2018-2024 ranged from approximately 20% to over 24%, with the highest growth rates recorded in the categories of “bread and cereal products” (around 24.07%), “confectionery and snacks” (21.01%), “semi-prepared foods” (21.08%) and “meat” (over 20%). This indicates the emergence of segments with increased demand in online sales channels.

The BCG matrix revealed that some of these categories fall into the “stars” and “question marks” categories, characterised by high market growth rates and an uneven share of online sales, whilst other categories remain in the “cash cows” segment, with stable but lower growth rates. In the GE/McKinsey matrix, these same categories demonstrate varying levels of market attractiveness (from medium to

high) and differing competitive strength, confirming the uneven development of e-commerce within a single product sector. A SWOT analysis has identified the sector's key strengths, including the growing share of online channels in total retail turnover, the development of digital infrastructure, and changes in consumer behaviour. At the same time, key threats have been identified, including logistical constraints, price volatility and regulatory barriers, which may hold back the potential of certain categories. Throughout the period under review, e-commerce in food products demonstrated strong growth dynamics and resilience to external shocks; however, strategic planning must take into account logistical, pricing and regulatory constraints. The findings enable businesses and government bodies to develop practical development strategies, enhance the efficiency of digital channels and ensure market competitiveness. Further research could focus on forecasting the impact of strategic decisions on the long-term dynamics of e-commerce, particularly in high-value-added segments. Thus, cascading strategic analysis demonstrates high potential both for scientific justification and for the practical implementation of e-commerce development strategies for food products, ensuring a combination of analytical accuracy and managerial utility.

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Каскадний стратегічний аналіз зростаючих товарних категорій електронної торгівлі харчовими товарами

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Анотація. Актуальність дослідження зумовлена прискореною цифровізацією роздрібною торгівлі харчовими товарами, зростанням частки електронних каналів збуту та необхідністю стратегічного управління розвитком товарних категорій в умовах трансформації споживчого попиту. Метою дослідження було розроблення та обґрунтування каскадного підходу до стратегічного аналізу зростаючих товарних категорій електронної торгівлі харчовими товарами, що базується на інтеграції портфельних моделей та SWOT-аналізу для підвищення обґрунтованості стратегічних управлінських рішень. Для стратегічної оцінки використано каскадний підхід, що поєднує портфельні моделі BCG та GE/McKinsey із SWOT-аналізом, а також методи структурного аналізу, аналізу динаміки онлайн-продажів, розрахунку середньорічних темпів зростання (CAGR) і частки товарних категорій у структурі електронної торгівлі. Інформаційну базу дослідження становили статистичні дані міжнародної платформи Statista за 2018-2024 роки. Результати дослідження свідчать про нерівномірність розвитку товарних сегментів електронної торгівлі харчовими товарами та дозволяють виокремити категорії з найбільш стійкою динамікою зростання та структурним посиленням позицій у цифровому каналі. Зокрема, встановлено, що найвищі середньорічні темпи зростання демонструють категорії «хліб і круп'яні вироби» (24,07 %), «кондитерські вироби та снеки» (21,01 %), «напівфабрикати» (21,08 %) та «м'ясні продукти» (понад 20 %), що підтверджує формування сегментів підвищеного попиту в онлайн-торгівлі. Показано, що ефективність розвитку електронної торгівлі харчовими товарами залежить від поєднання факторів попиту, логістичної інфраструктури, цифрових сервісів та специфіки зберігання і транспортування різних груп продуктів. Портфельний аналіз за моделлю BCG засвідчив наявність категорій типу «зірки», «знаки питання» та «дійні корови», тоді як матриця GE/McKinsey підтвердила різний рівень ринкової привабливості та конкурентної позиції окремих товарних сегментів. SWOT-аналіз дозволив ідентифікувати ключові драйвери розвитку (зростання онлайн-попиту, цифровізація сервісів) та обмеження (логістичні витрати, цінова волатильність, регуляторні бар'єри). Запропонований підхід дозволяє перейти від кількісної діагностики динаміки товарних категорій до формування диференційованих стратегічних напрямів їх розвитку та може бути використаний для обґрунтування бізнес-стратегій і державної політики підтримки цифрової трансформації продовольчого ринку.

Ключові слова: цифрова комерція; продовольчий ринок; портфельне оцінювання; конкурентні переваги; цифрові канали реалізації; управлінські рішення; стратегічне планування



Transformation of the institution of banking secrecy amid digitalisation and strengthened financial monitoring

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Abstract. This article aimed to provide a detailed theoretical and methodological foundation and evaluation of the institutional development of banking secrecy in response to the introduction of artificial intelligence technology, the rules of the Automatic Exchange of Information, the Common Reporting Standard, and the creation of central bank digital currencies. The methodological foundations were a dialectical method, methods of system-structure analysis of the financial markets, as well as the qualitative methods of case study on the history of the implementation of regulations on banking secrecy in Switzerland, as the main model for the development of banking confidentiality, as well as the experience of their implementation in Germany, Singapore, the United Kingdom and Ukraine. In order to make a comparative analysis of the process of intensification of the disclosure of transaction data by the subjects of the primary level of financial monitoring, objective systematisation of empirical data was conducted with the use of methods of graphical and table modelling. In the course of research, the established trend has been identified to transform the banking sector from the position of complete capital anonymity to the principles of the “glass client”, under which the banking secrecy of the client turns from a means of legal secrecy to the technological protocol of regulated control of access to data. A stable trend was identified towards annual growth in the volume of automatic tax data exchange, amounting to 10-12% per year in Switzerland. This confirmed the erosion of offshore secrecy under the requirements of the Financial Action Task Force and the Organisation for Economic Co-operation and Development. The study substantiated the specific features of Ukrainian compliance under martial law, where the implementation of Resolution No. 65 of the National Bank of Ukraine and instant verification through the Diia ecosystem automatically discloses data to financial intelligence bodies without judicial authorisation. It was established that the launch of central bank digital currencies, such as the e-hryvnia and the digital franc, together with algorithms for continuous AI-based transactional scoring, de facto removes banking intermediation, turns privacy into a programmable option, and shifts legal protection towards cyber resilience and concepts of decentralised identity. The practical value of the findings lies in their possible use by the National Bank of Ukraine and commercial banks to optimise risk-based supervision algorithms, develop regulatory legal acts on the protection of a client's financial profile against cyberattacks, and build a balanced model of “digital trust”

Keywords: automatic exchange of information; Switzerland; risk-based approach; artificial intelligence; scoring

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INTRODUCTION

In the contemporary global financial architecture, the institution of banking secrecy is undergoing its most extensive transformation in centuries. The traditional approach to the definition of banking secrecy as an absolute and uncontrollable guarantee of confidentiality of private banks is gradually fading under the influence of two global processes: the digitalisation of all spheres of life and a sharp increase in the intensity of financial monitoring. Currently, the bank itself is transforming from a “safe for secrets” to an institution of the state’s control, which is required to adhere to the Know Your Customer (KYC) principle and verify the source of a customer’s wealth to a greater extent than any other authority. Digitalisation not only provides greater opportunities to use banking services, but also creates new possibilities for using artificial intelligence of financial intelligence units to analyse financial flows, making it totally transparent. In the course of the worldwide struggle against money laundering, terrorist financing, and tax evasion, the privacy of clients is being replaced by financial security at the international level. For Ukraine, this issue is sharpened by the need to adapt national regulatory standards to the requirements of the European Union (EU) under martial law. This requires maximum transparency in capital movement without capitulating to the risks of a complete loss of trust among market participants. Analysis of recent studies and publications. The transformation of the legal and economic boundaries of financial confidentiality in the era of digitalisation is actively discussed in contemporary scholarship. A study by F.A. Siena (2022) analysed the paradigm shift in banking supervision in EU countries. The author demonstrated that the concept of absolute financial privacy has definitively lost its legitimacy, giving way to the principle of “managed transparency” in the interests of public law. Anderson emphasises that law enforcement bodies obtain unhindered access to accounts without the traditionally complex judicial procedures.

The issue of introducing regulatory technologies into anti-money laundering processes was examined by P. Tertychnyi *et al.* (2022). The scholars assessed the effectiveness of automated customer verification systems and noted that new digital compliance tools minimise the human factor, while at the same time turning commercial banks into direct instruments of state monitoring. According to their findings, banking secrecy is, in effect, transformed into an internal algorithm for data authorisation. The case of the transformation of the Swiss financial sector and the final dismantling of the system of anonymous accounts under the influence of the global standards of the Organisation for Economic Co-operation and Development (OECD) was analysed by S.S. Yeh (2023). The researcher focuses on the risks of capital outflow from Switzerland to jurisdictions with less stringent regulation following the introduction of the Common Reporting Standard (CRS) for the automatic exchange of information. S.S. Yeh argued that Swiss institutions were compelled to build new competitive advantages based not on secrecy, but on the technological security of assets.

The influence of artificial intelligence technologies on the detection of anomalous financial transactions was examined by M. Bakhshi *et al.* (2020). The authors described mechanisms of behavioural scoring that enable neural networks to monitor users’ transactional activity continuously. It was substantiated that such comprehensive preventive control fully erodes the classical meaning of the confidentiality of a bank account. The specific features of implementing the concept of open banking, as well as the legal conflicts that arise when customer data is transferred to third parties through application programming interfaces (APIs), were studied by C. Amalia *et al.* (2022). The authors demonstrated that the integration of financial institutions with fintech companies blurs the traditional legal boundaries of responsibility for preserving secrecy. They proposed shifting the regulatory focus from restricting access to protecting personal data against cyber threats. The risks to individual privacy associated with the design and future launch of central bank digital currencies (CBDCs) were analysed by A. Jabbar *et al.* (2023). The authors critically assessed the architecture of distributed ledgers for digital money and argued that the issuer’s direct control over each wallet *de facto* abolishes the institution of banking intermediation in relation to the preservation of confidentiality. A. Jabbar *et al.* also considered the prospect of new forms of “digital surveillance” by the state.

Despite the existence of substantial studies addressing the general issues of financial digitalisation and the legal aspects of financial monitoring, researchers have not yet given sufficient attention to a comprehensive assessment of the transformation of banking secrecy as a transition from a legal instrument of protection to a purely technological protocol for access management. The synergistic effect of the simultaneous introduction of artificial intelligence systems, CRS standards, and the integration of banks with state digital platforms under the legal restrictions of martial law remains insufficiently studied. This necessitates a rethinking of the very concept of financial privacy. This study aimed to analyse the transformation of the institution of banking secrecy under the influence of digitalisation, artificial intelligence, CBDCs, and strengthened financial monitoring.

MATERIALS AND METHODS

This study used a qualitative design, theoretical and methodological analysis, and institutional modelling of the legal and economic transformation of the financial sector. The research type was combined, consisting of a theoretical foundation and an in-depth analysis of the concept of confidentiality, as well as an applied assessment of the implementation of technological and regulatory mechanisms. The object of the study was the process of transformation of the institution of banking secrecy under the influence of total digitalisation and stricter financial monitoring requirements. The research covered all legal and economic aspects of relations between commercial banks, their clients and the state’s supervisory institutions for issues of

disclosure and protection of information about transactions. The source base was formed through purposive sampling of official reports and standards issued by international organisations, in particular the Financial Action Task Force (FATF, 2025) and the Swiss Financial Market Supervisory Authority (FINMA, 2025). Among Ukrainian legal acts, the study considered Resolution of the Board of the National Bank of Ukraine No. 65 (2020), as well as specialised academic periodicals published between 2019 and 2025, including studies by Z.M. Dovhan & Y.M. Halitseika (2021) and V. Krasovskyi (2024). The study applied a qualitative case-study method to examine the experience of Switzerland and Ukraine. The choice of Switzerland is justified by its status as a historical benchmark of banking confidentiality, whose forced transition to the Automatic Exchange of Information (AEOI) (2020) and the Common Reporting Standard (CRS) (2025) reflects the global dismantling of offshore anonymity. The choice of Ukraine is determined by the exceptional pace of digitalisation in its banking system, its unique experience of instant customer verification through the Diia (n.d.) ecosystem, and the specific features of implementing a risk-based approach under martial law. The research tasks were carried out in stages using a set of mutually complementary methods. In particular, historical-legal and dialectical methods were used to identify patterns in the evolution of banking secrecy from the classical paperbased model to the digital model. Comparative analysis was applied to compare international regulatory practices, as well as the level of privacy in traditional bank accounts and central bank digital currency (CBDC) wallets. Systemic and structural analysis served as a tool for examining the influence of artificial intelligence (AI) technologies and Open Application Programming Interfaces (APIs) on the formation of the “glass client” model and for assessing the degree of integration between banks and state registers. At the final stage of the study, theoretical generalisation and the abstract-logical method were used to formulate the authors’ conclusions on the contours of the future architecture of “digital trust”.

RESULTS AND DISCUSSION

Historically, banking secrecy emerged as an instrument for protecting private property and commercial information. However, in the 21st century, a paradigm shift can be observed: from absolute anonymity to “justified transparency”. The experience of Switzerland is particularly illustrative in this context. The country, which made banking secrecy part of its national code as early as 1934, was forced, under pressure from the Organisation for Economic Co-operation and Development and the United States of America (USA), to dismantle the system of numbered accounts and move towards the CRS (Meier *et al.*, 2023). This indicates that the digital era leaves no room for “grey zones”. Banking secrecy now protects the client from unauthorised access by third parties, such as hackers and competitors, but it is fully open to tax and law enforcement authorities within the limits of the law. The transformation of conceptual

approaches to the essence of banking secrecy is clearly visible when its classical and digital models are compared. Under the 20th-century classical paradigm, the main priorities were absolute anonymity for the client and preventing outside interference in clients’ capital. Today, the digital model has moved in the other direction, to transparency and a relentless anti-money-laundering fight. Accordingly, the access to the information has changed: the information was revealed by criminal cases under the court decision before, while today in banking, it is disclosed under CRS and on request (Meier *et al.*, 2023). The technological basis of control has evolved from paper-based documentation and the subjective human factor to the introduction of AI algorithms, Big Data tools, and end-to-end blockchain monitoring (FINMA, 2025). This has led to a fundamental change in the role of the financial institution itself: the bank has been transformed from a custodian of secrecy and a trusted representative of the client into a primary financial monitoring entity that *de facto* performs the functions of a state agent. This evolution is most clearly reflected in the change in the Swiss standard, where legendary anonymous numbered accounts and strict criminal liability for data disclosure have been replaced by full reporting by financial institutions to the Swiss Federal Tax Administration. For a deeper understanding of these processes, it is worth analysing precisely how digitalisation has changed the technical possibility of preserving secrecy. In the past, information was stored in paper archives, access to which required a physical visit and lengthy legal procedures. Today, however, every transaction generates a digital footprint that is available to the regulator in real time. The introduction of Big Data systems enables banks to score clients not once a year, but continuously, by analysing behavioural anomalies that automatically trigger the disclosure of information within the framework of financial monitoring.

When considering the case of Switzerland, it should be noted that the transformation of the institution of confidentiality began not because of technical failures, but as a result of strong external political pressure. For a long time, the Swiss Confederation uncompromisingly defended Article 47 of the Federal Act on Banks and Savings Banks, which provided for criminal liability and actual imprisonment for the disclosure of client data (Mahdi *et al.*, 2024). However, by 2024-2025, the situation had changed, and the country had become one of the leaders in implementing the standard of automatic exchange of information. According to official data from the Swiss Federal Tax Administration, the number of financial accounts covered by AEOI procedures has been growing steadily by 10-12% annually, covering data on more than 3.6 million accounts held in partner states. This has, in effect, eliminated classical offshore anonymity (Exchange of information with 104 countries..., 2023). Analysis of the Swiss experience demonstrates that the removal of banking secrecy has led to massive restructuring of the redistribution of cross-border capital. During the period of sharp change, the outflow of “undeclared” offshore funds of the small and medium

private Swiss banks from the total of 15-18% of assets was observed. At the same time, the market underwent forced consolidation. The largest conglomerates, such as UBS, were able to offset this outflow by reorienting themselves towards the lawful onshore segment and capital management in Asia. According to regulatory reports, the assets under management (AuM) of the merged UBS giant after the acquisition of Credit Suisse exceeded USD 5.7 trillion. This confirms the shift from a strategy of “asset concealment” to a strategy of “technological management and transparent security” (FINMA, 2025).

An important quantitative indicator of the uncompromising nature of the new compliance era has been the unprecedented financial sanctions imposed on financial institutions for violations of financial monitoring rules and tax agreements. A striking example is the long-running investigations by the US Department of Justice and the Swiss regulator FINMA into Credit Suisse, which resulted in total penalties of more than USD 2.5 billion for assisting in the concealment of assets from taxation. Even UBS, the market leader, was compelled, in similar international cases, including claims brought by the French tax authorities, to pay final penalties and compensation amounting to 1.8 billion EUR (FINMA, 2025). This particular amount of financial losses shows that the preservation of clients’ “grey” secrets is no longer profitable for banks. To maintain a high degree of objectivity of the research, the Swiss experience should also be supplemented by a review of other global regulatory models, for example, of different approaches to the narrowing of banking secrecy. The United States has built a unique model in which banking confidentiality is fully subordinated to national security interests through the mechanisms of the Financial Crimes Enforcement Network (FinCEN). Under the Anti-Money Laundering Act of 2020 (n.d.) and the Corporate Transparency Act of 2019 (2019), FinCEN obtained unhindered digital access to companies’ beneficial ownership information and banks’ transactional activity. The US model has transformed banks into direct intelligence informants: where transactions exceeding USD 10,000 or any suspicious activity are detected, a bank is required to submit a Suspicious Activity Report automatically. Any attempt to conceal client data is punishable by multi-billion-dollar fines and exclusion from dollar clearing, which makes the US model the most aggressive form of capital deanonymisation in the world. While the US model focuses on state financial control, the experience of the EU demonstrates the dismantling of banking secrecy under the influence of market digitalisation and consumer rights protection. The implementation of Directive (EU) 2015/2366 (2015) established the mandatory nature of the concept of open banking. According to a study by M. Polasik *et al.* (2024), European legislation compelled traditional banks to open up access, free of charge, to their clients’ accounts and transaction histories for third parties, namely technology-based fintech companies, through application programming interfaces (Open APIs). Thus, the monopoly of banks over financial secrecy in the EU was

eliminated by law in favour of market competition and the creation of “transparent client” ecosystems.

The analysis of empirical data on the practical implementation of the AEOI standard (2020) in Switzerland made it possible to identify stable trends towards the globalisation of financial control and to reveal the hidden mechanisms of capital de-shadowing. The data presented by E. Baselgia (2023) demonstrate stable exponential growth across all three key descriptors: geographical coverage, the volume of transactional data and the number of institutions involved. The results of the analysis of automatic financial information exchange indicators show the consistent strengthening of international tax transparency and the expansion of the institutional scope of the AEOI mechanism. Between 2019 and 2025, the number of Switzerland’s partner states involved in automatic data exchange increased from 75 to 110, representing a total growth of 46.7%. The most intensive expansion of the cooperation network was observed in 2019-2021, when the indicator increased by 28%. This points to the active adaptation of the international regulatory architecture to transparency standards after the completion of the transitional stages of CRS implementation. At the same time, there is a general increase of 22.6% from 3.1 million to 3.8 million for the total of transferred financial records related to non-resident bank accounts (Exchange of information with 75 countries..., 2019; Exchange of information with 110 states..., 2025).

The trend mentioned above testifies to a deeper integration of different jurisdictions’ financial systems and to a more efficient use of tools for controlling cross-border capital flows. Moreover, the number of financial institutions covered by reporting requirements has increased from ~7,500 to 9,500, or 26.7%, during the same period (Exchange of information with 110 states..., 2025). This suggests that banking reporting requirements are expanding not only to banking institutions, but also to investment funds, trusts, insurance companies, and so on, which significantly limits opportunities to use alternative financial intermediaries to evade monitoring and information exchange. It needs to be noted that the identified trends have direct macroeconomic and legal consequences. First of all, the increase in automatic exchange of information resulted in a cumulative growth of the national tax receipts of the partner countries, according to the report of the State Secretariat of International Finance (SIF, 2025). The receipt of financial intelligence on foreign assets enabled fiscal authorities to use voluntary disclosure mechanisms, including capital amnesties, and to carry out additional assessments of tax liabilities. Second, the shift from a request-based system to the CRS has fundamentally increased the effectiveness of detecting and preventing financial crime. Regulatory AI algorithms are now able to conduct end-to-end retrospective analysis of transactions, identifying complex schemes of capital splitting, cross-border money laundering and the financing of illegal activities as early as the transaction-structuring stage. Changes in AEOI indicators in Swiss practice are shown in Table 1.

Table 1. Dynamics of Switzerland's AEOI indicators

Year	Number of partner countries for exchange	Growth rate of geographical coverage compared with 2019 (%)	Number of account records transmitted (million)	Growth rate of data volume compared with 2019 (%)	Number of participating financial institutions
2019	75	-	3.1	-	~7,500
2021	96	+28.0	3.3	+6.4	~8,200
2024	104	+38.7	3.7	+19.3	~9,000
2025	110	+46.7	3.8	+22.6	~9,500

Source: developed by the authors based on Exchange of information with 75 countries... (2019), E. Baselgia (2023), SIF (2025), Exchange of information with 110 states... (2025)

The indicators presented demonstrate the transition from a model focused on banking confidentiality to a model of systematic international information exchange, in which the key priorities are tax transparency, interstate cooperation and digital control over cross-border financial flows. In Ukraine, this process is being synchronised with European standards. The accession of the State Tax Service of Ukraine to the Multilateral Competent Authority Agreement on Automatic Exchange of Financial Account Information of the OECD (2014) means that the banking secrecy of Ukrainian residents abroad and non-residents in Ukraine has ceased to be an obstacle to tax control. Digitalisation has introduced open banking into banking practice. The use of open APIs allows clients to transfer their data to third-party services in order to obtain better financial offers. However, this creates a paradox: on the one hand, clients voluntarily “dismantle” their own secrecy for the sake of convenience; on the other hand, the bank remains responsible for the security of this data. Thus, the contemporary transformation of the institution of banking secrecy shifts the emphasis from nondisclosure to access management. A separate aspect is the strengthening of financial monitoring in Ukraine under martial law and digitalisation. The risk-based approach introduced by the National Bank of Ukraine (NBU, n.d.b) requires banks to block automatically any transactions that do not correspond to a client's financial profile. In this case, banking secrecy is automatically disclosed to the State Financial Monitoring Service without judicial involvement. According to data from the Structured Financial Messaging System (SFMS, 2024), analytical processing of large volumes of suspicious transactions made it possible to identify and block financial flows of illegal origin amounting to more than UAH 7.3 billion in equivalent value. This was accompanied by the transfer of more than 1,100 summarised case materials to law enforcement agencies. Quantitative analysis of these data indicates a shift in the compliance system from retrospective recording to preventive blocking, where the bank de facto becomes the first censor by implementing a model of “presumption of transparency”.

In the academic literature, the concept of the “glass client” is used as a metaphor for the increased digital transparency of financial behaviour under conditions of open banking, AEOI and expanded compliance. However, it should be borne in mind that the term is more of an analytical construct than a unified regulatory definition. As

D. Lyon (2018) and S. Zuboff (2019) noted, its meaning fits logically into the broader discussion of the datafication of financial services and the reduction of information asymmetry between the client, the bank and the regulator. In this context, R. Alt *et al.* (2018) distinguish between two interpretative approaches. The optimistic viewpoint considers full transparency, which is being achieved via digital means, to be a tool for lowering the costs of financial transactions, raising the efficiency of scoring and reducing information asymmetries in financial markets. Conversely, the critical approach points to the dangers of the emergence of a “digital panopticon” in the sphere of banking activity, where there is a constant control over the actions and patterns of movement of clients' money, which eventually threatens the loss of privacy and the possibility of influencing client behaviour via risk-assessment systems using algorithms (Lyon, 2018). In this regard, the concept of the “glass client” falls within the framework of the broader theory of surveillance capitalism and algorithmic control, and is not an independent category within the theory of banking law. Within the framework of Big Data technologies and predictive analytics, a financial institution is able to identify previously imperceptible connections between counterparties that were previously inaccessible to human observation. This changes the very nature of monitoring: banking secrecy ceases to be a protective shield and is transformed into a tool to select transactions that meet certain standards of legitimacy. Of particular note is the role of AI, which is implemented in compliance systems of large banks. In the Ukrainian market, more than 85% of first- and second-tier banking institutions have optimised their processes through leading technology platforms, such as SAS Anti-Money Laundering (AML) and NICE Actimize (FINMA, 2025). Algorithms are programmed not only to analyse the transaction amount, but also the place of its occurrence, the time of its occurrence, the device used by the client, the time of logging in from a specific device and even user habits (e.g. data-entry speed, usual money transfer paths). As S. Zuboff (2019) claims, the use of such platforms as SAS AML allows the financial institutions to cut down the number of false positives by 35-40%, while improving the accuracy of identification of complex schemes of shadow capital splitting by 22%. Such a level of control renders the classical banking secrecy practically inapplicable in the internal systems of the bank and, therefore, in the regulatory bodies that have the right to view such aggregated data.

Within the scope of tightened financial monitoring in Ukraine, attention should also be drawn to banking systems integration with the state registers and Diia (n.d.) ecosystem. This makes it possible to conduct remote identification and verification (e-KYC) within minutes. However, the downside of this convenience is the concentration of vast amounts of confidential information in digital clouds. The transformation of the institution of banking secrecy is manifested here in the fact that legal protection shifts from the very fact of “having an account” to the “protection of personal data against leakage” (Mahdi *et al.*, 2024). In other words, in this case, the state no longer promises the client that it will not analyse their accounts; instead, it promises that third parties will not be able to use this data because of technical weaknesses in the system. The introduction of advanced digital tools into banking practice has not merely automated operational processes, but has fundamentally changed the physical and legal nature of data confidentiality. The evolution of technology creates specific challenges for the classical institution of banking secrecy, forcing regulators to balance financial transparency with cybersecurity (FINMA, 2025).

The study results suggest that the influence of digital technologies has brought about structural changes in banking secrecy and monitoring systems. Distributed ledger changes the traditional pattern of a closed banking system to an open one by ensuring full transaction visibility and real-time transaction traceability, especially concerning crypto assets connected with illegal transactions. The use of cloud infrastructure for the storage and maintenance of banking databases blurs the traditional approach to the division of banking secret protection and maintenance between financial institutions and technology providers. The spread of biometric authentication reduces the possibility of anonymous account management and strengthens the personalisation of financial transactions (Jain *et al.*, 2011). At the same time, the development of open banking and API integrations deepens interaction between banks and fintech services, thereby improving the efficiency of financial services while complicating the determination of the boundaries of responsibility for data protection (Alt *et al.*, 2018). The role of technologies in the development and transformation of the concept of banking secrecy is summarised in Table 2.

Table 2. The impact of digital technologies on components of banking secrecy

Technological solution	Impact on confidentiality	Result for financial monitoring	Practical examples and implementation tools
Blockchain & distributed ledger technology	Transparency of transactions in public networks	Possibility of tracking “dirty” crypto-assets up to the point at which they are converted into fiat currency	Use of Chainalysis KYT and Elliptic analytical platforms to label and block tokens with a criminal history
Cloud computing	Storage of data on third-party servers operated by providers	Need to delimit access between the bank and major IT companies	Migration of banking Big Data to Amazon Web Services clouds; risks of data compromise through vulnerabilities in third-party software
Biometric ID	Replacement of passwords with fingerprints and Face ID	Impossibility of anonymous account management through nominees	Remote identification systems such as Apple Face ID and Android Biometric, as well as state e-KYC algorithms within the Diia ecosystem
Open API	Third-party applications' access to account balances	Blurring of responsibility for preserving the secrecy of transactions	Integration of bank accounts with fintech services through PSD2 API protocols; data leaks at the processing stage by third-party personal finance management applications

Source: developed by the authors based on Directive (EU) 2015/2366 (2015), FINMA (2025), Diia (n.d.)

As Table 2 shows, the digital technologies have systematically modified classical components of banking secrecy and gradually shifted it from the field of the protective function to the control through transparency and algorithmic monitoring. As for the impact on financial monitoring, the situation is ambiguous: on the one hand, the ability to identify and track risky transactions has been upgraded; on the other hand, the boundaries between liability have become less clear and new cyber and compliance risks have increased. It is also worth considering in greater detail the issue of combating tax evasion, which became the main driver of reforms in Switzerland. Forced to accept the fact that the US Department of Justice, as well as the European Commission, had to charge Swiss banks with multi-billion-dollar fines for the fact that they helped foreigners hide their assets. This led to a radical overhaul of national legislation and the adoption of the government's White Money Strategy. This was confirmed through tighter requirements

set out in the Federal Act on Combating Money Laundering and Terrorist Financing in the Financial Sector and the corresponding regulations of the State Secretariat for International Finance (SIF, 2025). According to this strategy, Swiss banks should accept only such funds for which there is an undisputable confirmation of tax payment in the client's home country. This differs radically from the situation 20 years ago, when the origin of funds was rarely checked unless the amount was linked to obvious criminal activity. In the current regulations of the FINMA (2025), there is a provision that financial organisations shall carry out tax control for each of the foreign client's assets from origin to destination. Thus, the burden to justify the fiscal security of the funds falls on the account holder, under the threat of immediate blocking of the account and reporting a suspicious transaction to relevant authorities.

In the Ukrainian context, the strengthening of financial monitoring has its own specific features, linked to

adaptation to FATF standards and the requirements of the International Monetary Fund. The introduction of the institution of politically exposed persons (PEPs) and the establishment of lifelong status for them constitute a direct limitation of banking secrecy for a specific category of citizens, as regulated by the SFMS (2024) and Law of Ukraine No. 361-IX (2025). For such persons, the idea of confidentiality of transactions is not relevant: for them, the bank is required to carry out additional checks for each of their transactions, regardless of amounts. This sets a precedent for the segmentation of banking secrecy, as in this case, the secrecy will be “selective”, depending on the person’s social and political status. In this way, the implementation of the risk-oriented approach has resulted in radical changes to the classical banking secrecy, as the absolute and uniform legal norm turned into a flexible control tool. In the modern regulatory framework of compliance control, the concept of deepening the client base segregation has been implemented; the level of secrecy of information

and the level of the provision of information depend directly on the risk group of the client. The differentiation of the level of banking secrecy in contemporary financial monitoring practice is based on the risk-based approach. For low-risk clients, who are characterised by transparent sources of income and standard financial behaviour, basic identification procedures and periodic data updates are applied, while transaction monitoring is largely limited to detecting atypical transactions that exceed established thresholds. For medium-risk clients, KYC requirements are strengthened, involving regular verification of information and selective checks on the origin of funds when non-standard financial activity is detected. For high-risk clients, including PEPs and citizens from countries with high money laundering and terrorist financing risk, an increased level of due diligence is provided, which implies constant monitoring of clients, an expanded list of documents that confirm the source of funds, and an expanded scope of transaction control (Table 3).

Table 3. Levels of client verification intensity within financial monitoring

Client category	Level of secrecy disclosure	Frequency of data updates	Need to confirm the source of wealth
Low risk	Basic level: Identification	Once every 3-5 years	Only when limits are exceeded
Medium risk	Standard level: KYC	Once every 2 years	Selectively, at the bank’s request
High risk: PEPs	Enhanced level: Enhanced Due Diligence	Annually and lifelong	Mandatory for all transactions

Source: developed by the authors based on SFMS (2024), Law of Ukraine No. 361-IX (2025)

According to Table 3, the financial monitoring practice is based on the risk-oriented approach for the segregation of levels of confidentiality of information. For the clients that are low risk, the following approach is applied: simplified identification, periodic update of data, and selective control of anomalous transactions. For medium-risk clients, the enhanced KYC procedure is applied, which includes the periodic updating of the client’s information, as well as selective checking of the origin of funds in the case of anomalous activities. The next important aspect is the digitalisation of the process of reporting suspicious transactions. In Ukraine, due to the automation of data exchange between banks and the State Financial Monitoring Service on the basis of updated electronic protocols, the average time required to process and transmit information on critical financial risks has been reduced from several days to real-time or a few hours (SFMS, 2024). This enabled the regulator to respond preventively to suspicious financial flows before capital was fully split and moved into the shadow economy. A special place in the contemporary transformation of banking secrecy is occupied by the so-called “Travel Rule” developed by FATF (2025). This rule requires financial institutions, including virtual asset service providers, to collect and transmit the personal data of both the sender and the recipient when transactions are carried out. For the banking sector, this means the complete dismantling of the remaining elements of anonymity, even in cross-border transfers, which were previously regarded as one of the most protected areas of confidentiality. Digitalisation makes it possible to automate this process:

each transaction is accompanied by a “digital passport”, which makes banking secrecy transparent to the network of correspondent banks and state regulators worldwide.

Under martial law in Ukraine, the institution of banking secrecy has been subject to additional restrictions arising from national security needs. The NBU significantly expanded its powers to monitor the accounts of persons associated with the aggressor state and introduced mechanisms for the immediate blocking of assets. A comparative analysis of the dynamics of sanctions compliance demonstrates a radical shift in the paradigm. Before 2022, asset-blocking mechanisms based on decisions of the National Security and Defence Council were used as an exceptional instrument, while the legal regime of banking secrecy protected the accounts of most foreign residents until a court judgment was issued. The number of blocked entities was limited to isolated cases, and the volume of frozen funds had no systemic effect on the liquidity of the sector. After 2022, while the country is under martial law, banking secrecy has turned into an instrument of sanctions policy. Banks must not only store information, but also proactively search for a match in the sanctions lists. That is why the continuous accounting of all client assets by law enforcement and security bodies can be considered. Compared to the pre-war figure, in 2022-2025, according to regulatory data, the number of subjects with blocked accounts according to codes relating to terrorism financing and connections with the aggressor state has grown 15 times, and the amount of preventively frozen assets and associated funds amounted to billions of the national currency (SFMS, 2024).

Another important aspect is the development of systems for the automated exchange of tax information under the CRS standard, following Ukraine's official accession in August 2022 to the Multilateral Competent Authority Agreement on Automatic Exchange of Financial Account Information (Ukraine joined the Multilateral Competent..., 2022). The Ukrainian tax authorities receive data on the account balances of Ukrainian residents in more than 100 countries worldwide, including Switzerland, Luxembourg and Cyprus. This means that "external" banking secrecy has effectively ceased to exist for Ukrainians as a means of concealing income. The digital platforms of the tax service automatically compare the data received with citizens' declarations, making any discrepancies grounds for initiating proceedings (Ukraine joined the Multilateral Competent..., 2022). In analysing Switzerland's experience during this period, attention should be paid to the activities of FINMA (2025). This authority has received unprecedented powers to inspect banks' internal compliance systems. Whereas in the past a Swiss banker could refuse to provide information to law enforcement bodies by referring to the criminal provision on the disclosure of secrecy, today refusal to provide data to the regulator is itself a criminal offence. Digitalisation has also created new challenges related to cybersecurity. Since banking secrecy is no longer a "secret" from the state, the main risk has shifted towards unauthorised access by hacker groups. The transformation of the institution in this direction lies in the fact that banks now report not only suspicious client transactions, but also any attempts to compromise their databases. Thus, client confidentiality is no longer determined by the "silence" of a bank employee, but by the reliability of the encryption and the response speed to cyber attacks. Today, the notion of banking secrecy is partially replaced by the broader term "financial privacy in the digital environment", encompassing not only balance data but also the metadata, digital signatures, and interaction history with financial software.

The issue of "open banking" and its influence on the erasure of secrecy also deserves special consideration. Under Directive (EU) 2015/2366 (2015), Ukraine is actively implementing, and banks provide third-party service providers with the opportunity to access clients' accounts with consent from such a client. That is why, in the case of open banking, the banking secrecy has an attribute of "shared use". Upon agreeing with the financial aggregator or payment service provider, the client removes data from the sphere of banking secrecy and places it in the context of commercial processing of personal data. Digitalisation is therefore an agent of the process of destruction of the bank monopoly over information on clients. To comprehend the scale of these changes in Ukraine, it is necessary to analyse the Regulation of the Board of the National Bank of Ukraine No. 65 (2020). This document essentially became the "manifesto of digital transparency", defining the transition from formal control to a risk-based approach. The regulation provides for the continuous monitoring of not only the content of the transaction, but also the purpose

of the operation and its conformity to the client's financial profile. Owing to the introduction of automated analytical algorithms, any transaction that appears illogical to the system or lacks documentary confirmation of the origin of funds automatically causes banking secrecy to give way to the bank's obligation to notify the State Financial Monitoring Service. A specific feature of the current stage is that the right to confidentiality now directly depends on the client's ability to explain promptly every step taken in the digital space and to provide electronic evidence of the legitimacy of transactions. Thus, Resolution of the Board of the National Bank of Ukraine No. 65 (2020) has transformed banking secrecy from a "legal veil" into an "intelligent filter", where the client's level of privacy is directly proportional to their level of financial transparency.

One of the most radical challenges to the institution of banking secrecy in the coming decade is the introduction of CBDCs, such as the e-hryvnia in Ukraine, the digital euro in the EU and the digital franc in Switzerland. Unlike traditional non-cash money held on the balance sheets of commercial banks, CBDCs constitute a direct liability of the monetary regulator (About e-hryvnia, the digital currency..., n.d.; ECB, n.d.; Will the Swiss franc..., n.d.). However, the state's level of access to transactional data is not universal and varies flexibly depending on the architectural model and the technological principle on which the platform is built (BIS, 2023). Different models may involve direct access by the central bank to information, access through financial intermediaries within a two-tier architecture, or limited access based on the principle of privacy by design. In its analytical materials, the BIS (2023) notes three main models of CBDC confidentiality as mechanisms of implementation of the financial privacy transformation process:

- 1) Account-based model: this involves full user identification, where each transaction is strictly linked to a digital profile;
- 2) Token-based model: this focuses on verifying the authenticity of the digital token itself rather than the identity of the person, making it possible to ensure a higher level of pseudonymity for retail payments;
- 3) Tiered anonymity: this is the most balanced option and is being actively tested in the digital euro project. It provides full confidentiality and no monitoring for small everyday offline payments, while large transactions remain subject to standard KYC/AML procedures.

The scale of the global trend is confirmed by the fact that more than 130 countries, representing over 98% of global GDP, are currently researching, testing or have already launched their own CBDCs (ECB, n.d.). The largest retail pilot in the world is China's e-CNY, with transactions under its testing already exceeding hundreds of billions of yuan. This demonstrates the technical capacity of the state to exercise centralised real-time oversight of capital flows (Tan *et al.*, 2025). In turn, the NBU became one of the first regulators in the world to begin practical testing, having implemented the e-hryvnia pilot project

as early as 2018 by issuing a limited volume of tokens to test retail payments (NBU, n.d.a). The current concept for the introduction of the e-hryvnia defines it as a payment instrument, the functioning of which will be realised within a two-tier scheme with commercial banks as identification agents. Consequently, CBDCs do not necessarily mean that financial privacy is completely abolished; it only means a different character of financial privacy: instead of classical banking secrecy that is provided by commercial financial institutions as a protection tool, there is a regulated, techno-logically configured regime of transaction data

access where anonymity can be controlled by an adjustable parameter in the software code. The transformation of the institution of financial confidentiality becomes most evident when the traditional banking system is compared with different architectural configurations of central bank digital currencies. Where in traditional banking, access to confidential information is always subject to certain legal procedures, in a CBDC regime, the level of transparency of transactions is solely determined by the technical parameters of the platform. A comparison of CBDC models is presented in Table 4.

Table 4. Comparative analysis of access to data in traditional banking and different CBDC models

Characteristic	Traditional accounts	Direct CBDC model, based on elements of e-CNY	Intermediated/hybrid CBDC model, based on the e-hryvnia concept	Limited access/privacy by design model, based on the digital euro
Data custodian	Commercial bank	Central bank as a monetary regulator	Distributed architecture: commercial bank and central bank	Decentralised local devices/protected central bank register
Data request procedure	Official request or court decision	Direct monitoring in the central ledger	Request through an intermediary bank; automated AML screening	Automatic disclosure only when limits are exceeded or investigations are initiated
Level of anonymity	Relative, protected by banking law	Minimal, with full transparency for the issuer	Controlled, with identification through financial agents	Tiered anonymity: full anonymity for small offline amounts
Role of the state	External observer and supervisory authority	Direct operator and verifier of transactions	Co-operator and architect of monitoring rules	Technological guarantor of compliance and confidentiality protection

Source: developed by the authors based on BIS (2023), H. Tan *et al.* (2025), ECB (n.d.), NBU (n.d.a)

The findings on models of access to financial data make it possible to identify several basic approaches. In the traditional regime, the data is stored separately in commercial banks; the state is a third party that wants to get to the information and can only obtain it within the procedures established by the law. In the CBDC model, data are concentrated in the centralised register of the central bank, which turns it into the direct operator of transactions and substantially reduces the level of transactional anonymity. In the hybrid regime, commercial banks continue to be the main providers of information about clients and providers of KYC, while the central bank takes care of the issuance of the cryptocurrency and provides the final clearing procedure. With the limited-access mode, the client is given the opportunity to make pseudonymous transactions within a limited amount (for offline transactions), and the regulatory mechanism starts functioning only if the threshold is crossed. This is how modern approaches to the design of central bank digital currencies look. The transformation of banking secrecy under strengthened financial monitoring is also reflected in a change in the philosophy of interaction with the client. There is also a noticeable gradual move from “presumption of confidentiality”: if, before, the bank had to prove that it was lawful to provide confidential data, the client now must prove the legitimacy of his funds to remain within the circle of clients who are granted the right to service. The globalisation of supervision has meant that, through FATF and CRS standards, an individual’s financial profile becomes part of the global information domain of

tax and intelligence authorities. The algorithmisation of compliance means that decisions on information disclosure are increasingly made not by a human being, but by a neural network. This excludes the subjective factor, but creates risks for certain categories of clients.

The transition to preventive algorithmic risk analysis in banking law and the neutralisation of the human factor were examined by T. Gatla (2024). At the same time, the emphasis shifts towards cyber protection: banking secrecy is transformed into a technical standard of encryption. Switzerland’s experience in 2024-2025 demonstrates an interesting trend: despite full transparency for tax authorities, the country remains attractive to capital because of its legal stability. In Ukraine, however, the transformation of this institution should be accompanied not only by stronger control, but also by greater responsibility on the part of state bodies for the use of the information obtained. An important element of the analysis is the role of cryptocurrencies and decentralised finance. The introduction of new anti-monopoly and anti-money-laundering directives has, in effect, equated crypto exchanges with banks in matters of reporting. Digitalisation has made it possible to create specialised blockchain analytics tools, such as Chainalysis, Elliptic and Crystal Blockchain, which deanonymise transactions much more effectively than classical banking requests (FATF, 2025; FINMA, 2025). Through heuristic analysis algorithms, address clustering and artificial intelligence technologies, these analytical platforms enable state regulators and compliance officers to track the full chain of

movement of digital assets, label “dirty” wallets and identify the ultimate beneficial owners of transactions in decentralised networks, even where mixers or privacy-enhancing protocols are used (Zuboff, 2019). This leads to the emergence of the phenomenon of “absolute transactional transparency”, in which traditional legal barriers of banking confidentiality are neutralised by the directly open architecture of the distributed ledger.

Stronger financial monitoring contributes to bringing the economy out of the shadows; however, excessive control may force part of the capital into unregulated segments. The legal specificity of Ukraine lies in the expansion of the list of entities, including the National Anti-Corruption Bureau of Ukraine and the Bureau of Economic Security of Ukraine, that have the right to obtain data without a court decision. The digitalisation of the procedure for providing such responses minimises time costs, but requires strict access auditing. The final stage of the transformation is the transition to the concept of self-sovereign identity (SSI), whereby the client owns their own data in a digital wallet and grants the state temporary access for verification purposes (Scharadong & Custódio, 2022).

A separate aspect of the transformation of banking secrecy is the introduction of AI systems into the architecture of automated sanctions and penalty imposition. In conditions where financial information becomes fully digital, state bodies are able to integrate the databases of the tax service and court decision registers directly with banking systems. The analysis shows that in the USA and the EU, commercial banks are required to carry out automated screening of transactions against sanctions lists, including those of the US Office of Foreign Assets Control and the consolidated EU sanctions regimes (Kim & Yang, 2024). For this purpose, fuzzy matching algorithms are integrated, making it possible to identify hidden links despite deliberate changes in the spelling of names or company titles. However, such mechanisms operate exclusively through internal bank compliance systems as filtering barriers, rather than in the form of direct automatic blocking of transactions by state structures.

In the Ukrainian context, the NBU and the State Financial Monitoring Service have built a centralised system of automated financial monitoring. Modern banking systems implement algorithmic mechanisms for the automatic generation and transmission of suspicious transaction reports (STRs), which are integrated with state registers and compliance systems. This enables rapid response, including the automatic blocking or temporary restriction of transactions when deviations from the client's financial profile are detected. In this context, digitalisation transforms banking secrecy from a classical legal institution for protecting information into a technically regulated access mechanism, where the priority is the speed of data exchange between participants in financial monitoring. At the same time, banks are moving away from a reactive model of confidentiality protection towards proactive analysis of client behaviour, in which artificial intelligence

algorithms play a key role in identifying risky transactions. As a result, within open banking ecosystems, the client's control over their own financial secrecy is substantially reduced because data is transmitted automatically between participants in the financial infrastructure.

The transformation of banking secrecy is also closely linked to the ethical dilemma of “digital surveillance”. In contemporary legal scholarship, several approaches have emerged regarding the relationship between financial security and privacy. As S. Karakushi (2025) noted, this dilemma intensifies the theoretical debate on the limits of legal intervention in the digital rights of market participants. The first approach, the securitisation approach, dominates regulatory practice and asserts the unconditional priority of transparency in combating criminalisation. The second, the libertarian-legal approach, emphasises that privacy is a fundamental human right, and that its violation undermines market trust. The third, integrative approach argues that a direct opposition between “privacy and security” is an oversimplification, since in practice this involves a multi-level system of risks in which the technical security of data transmission channels is a prerequisite for preserving the legal privacy of the subject. When a bank's algorithms classify a transaction as a deviation from the norm, banking secrecy becomes an obstacle for the client themselves, as institutions often refuse to disclose the logic behind the decision, referring to the confidentiality of their internal methodologies. This creates a need to revise legislation towards stronger consumer protection, so that digitalisation does not lead to arbitrariness by automated systems (Karakushi, 2025).

In the Ukrainian context, where trust in state institutions is still being formed, the transformation of banking secrecy must be accompanied by reciprocal transparency on the part of state bodies. The model of the “transparent client” will be viable only if strict liability is introduced for data leaks or the misuse of data. The Swiss experience shows that, even with full transparency for tax authorities, banking secrecy remains as a form of protection against commercial espionage and private interference. This defines a new standard: the banking secrecy of the future is not about concealing income, but about protecting a digital identity against unauthorised access by third parties. Finally, attention should be paid to the development of cybersecurity systems as the new protective layer of banking secrecy. In a world where data is transmitted instantly, secrecy no longer means that nobody knows something; it means that nobody can break into it. The regulatory basis for this transformation in the EU has been provided by the Digital Operational Resilience Act (DORA) (2025) and the Cyber Resilience Act (CRA) (2024), which establish strict requirements for the reliability of software code and the protection of channels for exchanging financial information. The need for such regulation is confirmed by the rapid increase in cyberattacks on banking institutions in Ukraine and EU countries during 2022-2025, which has turned cyber incidents into the main threat of unauthorised disclosure of

confidential data. The legal concept of secrecy is gradually being absorbed by the technical concept of cyber resilience. This requires the legislator to move towards regulating not only the “right of access”, but also the “quality of protection” of that access at the level of software code and encryption. The technological resilience of issuers’ infrastructure is becoming a basic legal criterion for the functioning of new payment architectures (Parashchenko & Dosuzha, 2025).

The final stage in the transformation of the institution of banking secrecy is the transition to the concept of “digital trust”, which is replacing classical banking anonymity. This transition is made concrete through the architectural mechanisms of open banking and API access technologies. The legal framework of Directive (EU) 2015/2366 (2015) clearly establishes the principles of mandatory client consent and data access minimisation, whereby the user receives tools for role-based management of their own financial profile. In a world where financial transactions are becoming part of the global Internet of Things, banking secrecy is effectively turning into a service for managing access to data. This gives rise to new legal constructs in which the bank’s responsibility lies not in concealing information from the state, but in ensuring the integrity and immutability of the client’s financial profile. Thus, digitalisation has substantially changed the meaning of banking secrecy: automated data exchange and the development of financial monitoring have significantly increased the transparency of financial transactions and narrowed the boundary between banking confidentiality and tax reporting. At the same time, control is increasingly exercised through algorithmic data analysis systems, which improves the effectiveness of detecting risky transactions. Under such conditions, the value of banking secrecy is gradually shifting from the concealment of information to the provision of an appropriate level of cyber protection, personal data protection and legal guarantees for data processing. The results of the comparative analysis, therefore, indicate the transformation of banking secrecy from a model of absolute confidentiality to a model of regulated access to financial information. Despite a common development trajectory, these changes in Switzerland are taking place on the basis of established legal traditions and a developed financial infrastructure, whereas in Ukraine, they are largely driven by the needs of financial monitoring and national security under martial law.

The transformation of the institution of banking secrecy amid large-scale digitalisation and strengthened financial monitoring is a subject of intense debate in contemporary legal and economic scholarship. The findings of this research correspond with, and in some respects substantially complement, the studies of other specialists. The issue of the technological transformation of compliance and the neutralisation of traditional confidentiality through automatic data exchange systems was examined in detail by V. Krasovskyi (2024). In his study, the author demonstrated that the full automation of tax control and the integration of unified reporting standards effectively eliminate classical banking anonymity, turning financial institutions into

direct agents of fiscal services. The present study confirms these conclusions, but extends the analysis by emphasising that, in the Ukrainian context, this process is further accelerated by security challenges, which create a specific balance between fiscal pressure and national security. The development trajectory of artificial intelligence systems in the architecture of financial supervision was analysed in detail in the study by U. Turksen *et al.* (2024). The authors focused on the risks of algorithmic errors, where neural networks independently classify transactions as suspicious and restrict clients’ access to assets without adequate human oversight. When these findings are compared, it should be noted that the present study also identified the problem of “invisible” monitoring and the arbitrariness of automated systems. However, this study proposes a specific legal response to this dilemma through a transition to the concept of SSI, under which the client retains the right to temporary and role-based management of access to their own data. Finally, the concept of “digital trust” and the implementation of the open banking architecture were examined by Z.M. Dovhan & Y.M. Halitseiska (2021). Open APIs were considered exclusively as a technological tool for intensifying the financial services market. By contrast, the findings of the present study demonstrate the deeper legal nature of this phenomenon, showing that the framework of Directive (EU) 2015/2366 (2015) transforms the right to secrecy into a technical protocol for the dynamic management of user consent, where the bank’s responsibility lies in ensuring the immutability of the client’s digital profile. The study of open banking by D.A. Zetzsche & L. Anker-Sørensen (2022) also confirmed the need to maintain a balance between user data sovereignty and the efficiency of the financial system. Thus, the comparison carried out in this study confirms its scholarly novelty, which lies in the integrated consideration of the legal, technological and ethical factors shaping the transformation of banking secrecy.

CONCLUSIONS

The study confirmed that the contemporary transformation of the institution of banking secrecy is an irreversible process driven by the shift towards global digital transparency. In the new reality, banking secrecy has definitively lost its original status as the client’s absolute right to anonymity and has become a complex regime of restricted access to personal data. The global trend towards deoffshorisation and the active implementation of automatic information exchange standards have made financial assets transparent to regulators. The Swiss experience shows that even the most closed jurisdictions have had to yield to the requirements of international financial security. The transformation of the regimes of the classical confidentiality regime in the European space demonstrates the gradual transition of banking secrecy to the service of the interests of collective fiscal transparency without the destruction of the legal framework for combating commercial espionage. The results of the comparative analysis demonstrate a historical shift from the “right to secrecy” to the “right to protected

and regulated access". Digitalisation, the introduction of AI technologies and fuzzy matching, Big Data analytics and open banking models have enabled supervisory authorities and compliance services to analyse a client's financial profile in real time. It was found that, in the Ukrainian context, this process is reinforced by the integration of banking systems with state registers and the Diia ecosystem, which ensures unprecedented speed in verification and the automatic generation of STRs for the State Financial Monitoring Service. At the same time, this requires the implementation of strict standards of liability for data leaks. The strengthening of financial monitoring has led to a fundamental change in the role of banking institutions, which have been transformed from trusted representatives of the client into active participants in compliance control. Against the background of the spread of EU regulatory frameworks, this paradigm shift creates new ethical dilemmas related to the risks of "digital exclusion", arbitrariness by automated systems and the opacity of banks' internal scoring methodologies. For the stability of Ukraine's financial system, it is important to maintain a multi-level balancing of the national security of interest, which has been significantly strengthened by the challenges of martial law, with the fundamental right of citizens to privacy. In the future, banking secrecy will

most likely be absorbed in the techno-legal concept of cyber resilience and transition to standards DORA and CRA in the context of a growing number of cyberattacks against the financial sector. With the development of the architectural models of the CBDCs, such as the e-hryvnia and the digital euro, the traditional banking secrecy will develop in the direction of the concept of SSI and in the direction of the service of dynamic control over the provision of API-access for the customer within the framework of the principles of GDPR and PSD2. Further research in this area should focus on developing optimal legal mechanisms to protect consumers of financial services from errors in AI algorithms used in banking compliance, as well as on harmonising Ukrainian cyber resilience legislation with the criteria of the DORA Regulation.

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Трансформація інституту банківської таємниці в умовах цифровізації та посилення фінансового моніторингу

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Анотація. Метою статті було комплексне теоретико-методологічне обґрунтування та оцінка еволюції інституту банківської таємниці під впливом інтеграції систем штучного інтелекту, норм Automatic Exchange of Information, Common Reporting Standard та проектування цифрових валют центральних банків. Методологічну основу дослідження становило поєднання методів діалектичного пізнання, системно-структурного аналізу фінансових ринків та якісного кейс-стаді регуляторних практик Швейцарії як історичного еталона конфіденційності, а також адаптаційних процесів у банківських системах Німеччини, Сінгапуру, Великої Британії та України. Застосування компаративного підходу та методів графічно-табличного моделювання дозволило об'єктивно систематизувати емпіричні дані щодо інтенсифікації розкриття транзакційної інформації суб'єктами первинного моніторингу. У результаті дослідження доведено незворотний перехід банківського сектору від концепції абсолютної анонімності капіталу до моделі «скляного клієнта», де банківська таємниця трансформується з юридичного інструменту приховування інформації на технологічний протокол управління авторизованим доступом до даних. Виявлено стійку тенденцію щорічного зростання обсягів автоматичного обміну податковими даними (у Швейцарії на 10-12 % щороку), що підтвердило нівелювання офшорної таємниці під впливом вимог Financial Action Task Force та Organisation for Economic Co-operation and Development. Обґрунтовано особливості українського комплаєнсу в умовах воєнного стану, де реалізація Постанови Національного Банку України № 65 та миттєва верифікація через екосистему «Дія» автоматично розкривають дані перед фінансовою розвідкою без судових санкцій. Доведено, що запуск Central Bank Digital Currency (е-гривні, цифрового франка) та алгоритмів безперервного транзакційного скорингу штучним інтелектом де-факто усуває банківське посередництво, перетворюючи приватність на програмовану опцію та зміщуючи правовий захист у площину кіберстійкості та концепцій децентралізованої ідентичності. Практична цінність отриманих результатів полягає у можливості їх використання Нацбанком України та комерційними банками для оптимізації алгоритмів ризик-орієнтованого нагляду, розробки нормативно-правових актів щодо захисту фінансового профілю клієнта від кібератак та побудови збалансованої моделі «цифрової довіри»

Ключові слова: автоматичний обмін інформацією; Швейцарія; ризик-орієнтований підхід; штучний інтелект; скоринг



Fiscal incentives for the development of small businesses in the European Union countries

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Abstract. The purpose of this study was to assess the effectiveness of fiscal incentives supporting small businesses in the European Union using the example of Germany, France and Ireland. The methodology was based on the analysis of regulatory and statistical sources, comparative analysis of tax policy and assessment of innovation indicators of small and medium-sized enterprises in 2022-2025. The results showed that the most effective models combined tax incentives for innovation, digitalisation of tax administration and mechanisms for attracting private capital. German figures, where 41% of small and medium-sized enterprises implemented at least one innovation during 2022-2024 and innovation spending reached EUR 35.4 billion in 2024, demonstrated a relatively high level of innovation activity supported by fiscal and investment incentives, although the gap between large enterprises (73%) and microenterprises (37%) reflected unequal access to innovation resources. France's innovation efficiency level of 108.6% of the European Union average demonstrated the important role of tax credits and state financing in supporting Research and Development. Ireland's indicators, including small and medium-sized enterprises introducing product innovations at 120.5% of the European Union average and labour productivity at 256.2%, reflected the effectiveness of combining low corporate taxation with investment incentives. The study found that the effectiveness of fiscal incentives depended not only on tax benefits but also on administrative simplification and integration of tax and financial support mechanisms. The practical significance of the study lies in the possibility of using its results to improve fiscal support instruments and innovation-oriented tax policy for small businesses in the European Union countries

Keywords: tax policy; corporate taxation; value-added tax; economic growth; innovation support

INTRODUCTION

Small businesses play an important role in ensuring economic growth, creating jobs, developing innovations and

forming a competitive market environment in the countries of the European Union (EU). In the context of modern

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economic challenges associated with global instability, digital transformation, inflationary pressure and the consequences of geopolitical crises, the issue of effective state support for entrepreneurship is of particular importance. Fiscal stimulation of small businesses in the EU is becoming increasingly important in the context of economic instability, digital transformation and sustainable economic development. A. Monaienko *et al.* (2024) analysed fiscal support measures for small and medium-sized enterprises (SMEs) in Germany, Poland and Ireland, as well as the role of the NextGenerationEU fund, under which up to EUR 806.9 billion is planned to be raised during 2021-2025, including EUR 250 billion through green bonds, with innovation, digitalisation and “green” technologies identified as priority areas of support. The impact of fiscal instruments on enterprise investment activity was investigated by M. Funke & R. Terasa (2026), who analysed accelerated depreciation and the gradual reduction of the corporate tax rate in Germany using a Dynamic Stochastic General Equilibrium (DSGE) model. The authors examined a EUR 45.8 billion tax reform package that introduced depreciation allowances of up to 30% for equipment investments during 2025-2027 and a phased reduction of the corporate tax rate from 15% to 10% during 2028-2032. The study showed that accelerated depreciation stimulated short-term investment activity, while lower corporate taxation supported long-term growth in investment and gross domestic product. The impact of the fiscal burden on investment activity and entrepreneurship development in the EU is becoming increasingly important under conditions of economic instability and inflationary pressure. P. Cizkowicz *et al.* (2025) analysed the impact of the fiscal burden on gross fixed capital formation in EU countries during 2010-2023 using a panel model with fixed effects. The authors found that taxes on consumption and labour could stimulate investment under effective redistribution of budget resources, while taxes on corporate income, self-employment and energy resources mainly restrained investment activity.

The financial environment of small businesses and entrepreneurship support instruments were investigated by A. Botsari *et al.* (2024), who found that SMEs account for 99.8% of all non-financial enterprises in the EU, provide more than 65% of employment and generate over half of the added value in the EU economy. The effectiveness of state fiscal and tax incentives for supporting innovative enterprise activity is becoming increasingly important in the context of environmental challenges, digital transformation and the transition to a low-carbon economy. Y. Fan & L. Shi (2025) analysed the influence of government subsidies and tax incentives on green technology development and new energy enterprises based on data from Chinese companies for 2018-2023. The authors found that government subsidies and tax incentives positively affect enterprise innovation activity, promote green technologies, and increase investment activity and business competitiveness. The historical evolution of tax incentives and their role in shaping corporate strategies and organisational changes

were investigated by S. Calado *et al.* (2025), who conducted a systematic review of scientific literature on corporate tax incentives for 2004-2024 and analysed their impact on innovation activity, investment attraction, green technology development, enterprise efficiency and corporate governance. The study showed that tax incentives function not only as fiscal policy instruments but also as factors of organisational transformation affecting management decisions and innovation strategies. The effectiveness of tax incentives for supporting small and medium-sized businesses is becoming increasingly important under conditions of economic instability and growing administrative burden. P. Sugiartini (2025), using a mixed quantitative and qualitative approach, found that Indonesian SMEs aware of available tax incentives demonstrated higher tax discipline and investment activity, particularly in the manufacturing sector. Similar conclusions were reached by C.D. Nyimbo & O.B. Salimu (2025), who analysed SME tax discipline in Moshi District (Tanzania) using a logistic regression model based on a sample of 100 SMEs. The authors found that taxpayer education (coefficient = 0.5965; $p = 0.000$), tax allowances (coefficient = 0.4576; $p = 0.008$) and communication on incentives (coefficient = 0.4034; $p = 0.022$) positively influenced tax compliance. At the same time, 76% of respondents identified lack of awareness of tax incentives as a major barrier, while 85% pointed to corruption and political favouritism in obtaining tax support.

At the same time, insufficient attention has been paid to the comparative effectiveness of fiscal instruments supporting small businesses in different EU countries and the identification of the most effective support mechanisms under modern economic conditions. The purpose of this study was to evaluate the effectiveness of fiscal policy instruments supporting small businesses in the EU through a comparative analysis of Germany, France and Ireland. To achieve the goal, the following tasks were identified: to analyse the main tax and financial incentives supporting small businesses in the EU countries; to conduct a comparative assessment of the impact and effectiveness of fiscal support instruments for small businesses in Germany, France and Ireland.

MATERIALS AND METHODS

The study was analytical in nature and focused on the analysis of tax policies supporting small businesses in Germany, France and Ireland during 2022-2025, a period characterised by active changes in fiscal incentives and the digitalisation of tax administration in the EU countries. The research methodology was based on the analysis of regulatory, analytical and statistical sources related to fiscal incentives, value added tax (VAT) regulation, corporate taxation and innovation support mechanisms. Comparative analysis was used to examine VAT regimes for SMEs, corporate taxation, administrative simplification instruments and mechanisms for reducing compliance costs in EU countries. The methods of systematisation and generalisation were applied to analyse tax incentives for Research and Development

(R&D), depreciation allowances and innovation support instruments in France and Ireland based on the materials of R&D tax allowance in Europe (n.d.). The theoretical and analytical basis of the study also included EU financial support instruments for SMEs, start-ups and innovative enterprises, including Horizon Europe (n.d.), Competitiveness of Enterprises and SMEs (n.d.) and EU cohesion policy... (n.d.). In addition, EU finance for innovators (n.d.), the EIC Accelerator (n.d.) and the European Association for Social Innovation (n.d.) were analysed as instruments supporting innovative enterprises and micro-businesses in the EU. Germany, France and Ireland were selected to conduct a comparative analysis of tax policies to support small businesses in the EU countries, as these countries use different models of fiscal incentives for entrepreneurship. Germany was chosen as an example of a country with a developed system of investment and innovation incentives, France as a country with extensive use of tax credits to support R&D and innovation, and Ireland as an example of a country with a low level of corporate taxation and a focus on attracting investment and supporting start-ups. The comparison between countries was conducted through the analysis of corporate taxation, VAT regimes, R&D tax incentives, investment support mechanisms and administrative simplification instruments. The effectiveness of fiscal incentives for small businesses was assessed through indicators reflecting innovation activity, digital transformation, investment support and commercialisation of innovations in SMEs, such as innovation expenditure, SMEs implementing innovations, government support for business R&D, cloud computing adoption, labour productivity and sales of new-to-market innovations.

The analysis of regulatory and analytical sources was used to study the features of tax policy to support small businesses in Germany, in particular the small business regulation regime in accordance with Section 5: Taxation. § 19 Taxation of small enterprises (2026) and the mechanisms of corporate and trade taxation of small businesses based on *Kleinunternehmer: What taxes do I...* (2025). The *Growth booster to strengthen Germany...* (2025) and The *KMU-innovativ funding program* (n.d.) were separately investigated to determine the features of supporting innovation activity and digital modernisation of SMEs. The *Forschungszulage* (n.d.) tax benefit was also analysed to study the mechanisms for supporting R&D of small businesses. To study the tax policy of France, an analysis of regulatory and analytical sources was used regarding the mechanisms of functioning of the Research Tax Credit (CIR) (2025), Innovation Tax Credit (CII) (2026) and the status of Young Innovative Company (JEI) status (n.d.). The features of corporate taxation, VAT and local tax Territorial Economic Contribution (CET) (n.d.) were also analysed. Special attention was paid to the study of mechanisms for simplifying VAT administration in 2023-2030 *Exploring France's corporate tax rates...* (n.d.). The analysis of regulatory and analytical sources was also used to examine Ireland's tax policy in support of small businesses,

in particular the mechanisms of low corporate taxation, Pillar Two (n.d.) rules and the features of the application of the 12.5% corporate tax rate for most small businesses (Minister McGrath notes Ireland's..., 2025). The study analysed the mechanisms of the Section 486C tax relief under the Taxes Consolidation Act (1997), the Pay Related Social Insurance (PRSI) (n.d.) system, the cash method of VAT accounting, and measures designed to support small business liquidity. It also examined instruments for stimulating innovative activity of small businesses, in particular the Knowledge Development Box (KDB) (n.d.) and mechanisms for supporting start-ups and venture financing.

The comparative analysis method was used to compare tax policies supporting small businesses in Germany, France and Ireland according to the following criteria: standard corporate tax rate, preferential corporate tax rate, standard VAT rate, preferential VAT regimes, VAT exemption threshold, R&D tax incentives, innovation support programmes, investment incentives, administrative simplification and main focus of support. The analysis of statistical and analytical data was used to study the impact of fiscal incentives on innovation activity, digitalisation, investment attractiveness and competitiveness of small businesses in the studied countries. Based on data from KfW Research: *German SMEs...* (2026) and European innovation scoreboard 2025 (n.d.), the study analysed indicators of innovation expenditure, SME innovation activity, government support for business R&D, venture capital investment, cloud computing adoption, the Digital Intensity Index, labour productivity, and sales of new-to-market innovations. These indicators were selected because they reflect the practical results of fiscal support for small businesses, including the intensity of innovation activity, the level of digital transformation, the effectiveness of commercialisation of innovations, enterprise productivity and the availability of financial support for start-ups and SMEs.

RESULTS AND DISCUSSION

Fiscal incentives for small businesses in the EU countries

Fiscal incentives in the system of state support for small businesses are aimed at reducing the financial burden on enterprises in order to stimulate investment activity, innovation and business sustainability. In the EU, the main instruments of fiscal support include reduced income tax rates, VAT benefits, tax credits, depreciation allowances and simplified tax administration procedures. Such measures contribute to reducing compliance costs and improving conditions for entrepreneurial activity. Fiscal incentives in the EU are implemented both at the national level and within the framework of common regulatory mechanisms, in particular in accordance with the Value Added Tax (VAT) Directive (n.d.) and EU state aid rules (Bergner, 2017). A special VAT regime (SME scheme), introduced from 1 January 2025, allows small businesses with annual turnover up to EUR 100,000 within the EU or EUR 85,000 at national level to operate without charging VAT, which simplifies tax administration and facilitates cross-border activities of

SMEs within the EU single market (VAT rules for small enterprises, n.d.). EU countries also use R&D tax credits, depreciation allowances and patent box regimes to support innovation activity and technological modernisation of enterprises. In particular, France applies a 30% tax credit for R&D expenditures, while Ireland uses a 25% R&D tax credit combined with additional corporate tax incentives. Such instruments support the implementation of digital technologies, automation and Enterprise Resource Planning (ERP) systems in SMEs (R&D tax allowance in Europe, n.d.). Combined with Horizon Europe (n.d.), Competitiveness of Enterprises and SMEs (n.d.) (COSME) and European Structural and Investment (ESI) Funds (EU cohesion policy..., 2023), fiscal incentives contribute to the development of start-ups, innovative projects and small business financing. These programmes are particularly important because SMEs account for around 99% of enterprises in Europe. COSME provides loan guarantees for SMEs, while InnovFin (EU finance for innovators, n.d.), the European Innovation Council (EIC) Accelerator (n.d.) and the European Association for Social Innovation (n.d.) (EaSI) support innovation projects, start-ups and micro-enterprises through financing and microloan instruments (European funding for small businesses..., 2021). The effectiveness of fiscal incentives for small businesses largely depends on the design of tax instruments, the level of administrative simplicity and the performance monitoring system. The most effective are incentives aimed at sectors with high growth potential, in particular the digital economy, innovation and green technologies. At the same time, simplified administrative procedures, online reporting and minimisation of compliance costs ensure a wider coverage of small businesses by support programmes. Regular monitoring of the effectiveness of fiscal incentives in EU countries allows tax policy to be adapted to changes in the economic environment, increasing its effectiveness in supporting small businesses (VAT rules for small enterprises, n.d.).

The tax policy of the EU countries is characterised by differentiation in corporate taxation, VAT rates and social contributions, which reflects the peculiarities of national economic models and fiscal priorities. In Germany, the standard VAT rate is 19%, while in France it reaches 20%. At the same time, the standard corporate tax rate in France is 25%, whereas in Germany the corporate tax rate of 15%, combined with the solidarity surcharge and municipal trade tax, increases the effective tax burden on corporate profits to around 30%. In both countries, fiscal incentives and simplified taxation mechanisms are used to support entrepreneurial activity, stimulate innovation and reduce the administrative burden on small businesses (Azizova, 2024). Thus, fiscal incentives in the EU are an important instrument for supporting small businesses, stimulating innovation activity, technological modernisation and entrepreneurial development. The effectiveness of fiscal support depends not only on the scale of tax incentives, but also on the level of administrative simplification and the integration of tax and financial support mechanisms. The analysis

showed that EU countries apply different models of fiscal regulation depending on national economic priorities and the structure of tax systems. At the same time, the most effective support instruments are those aimed at innovation activity, digital transformation and improving SMEs' access to financing and investment resources.

Comparative analysis of tax policy for small businesses in the EU countries

The tax policy supporting small businesses in Germany combines simplified taxation mechanisms, investment incentives and support for innovation activity. One of the main support instruments is the Kleinunternehmerregelung regime provided for Section 5: Taxation. § 19 taxation of small enterprises (2026), which exempts small businesses from VAT obligations if turnover does not exceed established thresholds. Since 2025, the regime applies to enterprises with annual turnover up to EUR 25,000 in the previous year and up to EUR 100,000 in the current year, reducing administrative costs and simplifying accounting procedures (Standard taxation: How small..., 2026). However, enterprises using this regime are not entitled to deduct input VAT. Germany also applies tax allowances for sole proprietors and small enterprises, including a tax-free trade income threshold of around EUR 24,500 for activities classified as Gewerbebetrieb (Kleinunternehmer: What taxes do I..., 2025). The standard corporate tax rate for companies registered as Gesellschaft mit beschränkter Haftung (GmbH) is 15%, while the total effective tax burden may reach 30-33% after including the solidarity surcharge and municipal trade tax (Germany: Corporate taxes..., 2026). Investment incentives include accelerated depreciation mechanisms under the Growth-Booster/Investment-Booster programme, which allows depreciation of up to 30% annually for movable fixed assets and up to 75% of electric vehicle costs in the first year of use (Growth booster to strengthen..., 2025). An important component of German fiscal policy is support for R&D and technological modernisation. The Central Innovation Programme for SMEs (Zentrales Innovationsprogramm Mittelstand) (Central Innovation Program..., n.d.), the Forschungszulage (n.d.) tax incentive and the KMU-innovativ programme support innovation projects and high-tech research activities. From 2026, compensation for R&D expenditures for SMEs may reach 35% with a maximum eligible base of EUR 12 million per year (Global R&D tax incentives..., 2025). Germany also applies digital tax administration instruments, including the ELSTER (n.d.) system and the Einnahmen-Überschuss-Rechnung (EÜR) simplified accounting form used for enterprises with annual turnover below EUR 600 thousand or profit below EUR 60 thousand (Profit and loss statement in Germany..., n.d.). The German model of fiscal support is primarily investment- and technology-oriented. Its strengths include the combination of R&D incentives, accelerated depreciation and administrative simplification mechanisms. At the same time, the relatively high effective corporate tax burden and uneven access of

microenterprises to innovation resources may reduce the accessibility of support instruments for smaller businesses.

France's tax policy to support small businesses combines tax incentives for innovation activity, simplified taxation regimes and support for start-ups. One of the main support instruments is the system of tax credits CIR (2025) and CII (2026). The CIR tax credit provides compensation of 30% of R&D costs up to EUR 100 million and 5% above this threshold. The eligible costs include research personnel expenses, equipment depreciation, subcontracted research, patent costs and technological monitoring. The CII tax credit is aimed at supporting prototype development and technological modernisation of products in SMEs. The CII rate amounts to 30% of eligible innovation expenditures with a maximum eligible amount of EUR 400,000 per year. Companies with up to 250 employees, annual turnover up to EUR 50 million or a balance sheet up to EUR 43 million are eligible for the CII (Everything about the French Innovation..., n.d.). A separate support mechanism is the status of Young Innovative Company (JEI) (n.d.), which provides tax and social contribution benefits for innovative start-ups in the early stages of development. The standard corporate tax rate (*Impôt sur les Sociétés* (2016), IS) is 25%; however, enterprises with annual turnover up to EUR 10 million and at least 75% individual ownership may apply a reduced 15% rate to the first EUR 42.5 thousand of taxable profit. Simplified accounting and VAT administration regimes are also applied to micro-enterprises. The standard VAT rate in France is 20%, while reduced rates of 10%, 5.5% and 2.1% apply to selected categories of goods and services (Rauniyar, 2025). France also applies VAT exemption thresholds for micro-enterprises to reduce the administrative burden on small businesses. In addition, enterprises are subject to the Territorial Economic Contribution (CET) (n.d.), which includes the Business Property Contribution (n.d.) and the Business Value Added Contribution (CVAE) (What is the contribution on the added..., 2026). The French government is gradually phasing out the CVAE between 2023 and 2030 to simplify the corporate tax system and reduce the tax burden on enterprises (Exploring France's corporate tax rates..., 2025). Ireland's tax policy supporting small businesses is based on low corporate taxation, tax incentives for innovation and investment support mechanisms. The standard corporate tax rate on trading income is 12.5%, while under Pillar Two (n.d.) a minimum effective rate of 15% applies from 2023 to companies with global annual turnover exceeding EUR 750 million. At the same time, the 12.5% rate remains applicable to more than 99% of businesses not covered by these rules (Minister McGrath notes Ireland's application of..., 2025).

For newly established enterprises, Ireland applies Section 486C tax relief (Taxes Consolidation Act, 1997..., 1997), which provides corporation tax reductions during the first five years of operation. Full exemption is possible if annual tax liabilities do not exceed EUR 40 thousand, while partial exemption applies to liabilities between EUR 40 thousand and EUR 60 thousand. The amount of relief also depends

on Pay Related Social Insurance (PRSI) (n.d.) contributions paid by employers, with the maximum benefit limited to EUR 5,000 PRSI per employee or director and a total limit of EUR 40,000 of qualified PRSI contributions (Tax relief for new start-up companies, n.d.). The French support model is characterised by strong state participation through tax credits and innovation-oriented subsidies. Its main advantage lies in the large-scale support for R&D and start-up activity. However, the complexity of the tax system and comparatively lower commercialisation performance of innovations indicate that generous fiscal incentives do not always ensure high market efficiency of innovative activity. Ireland's tax policy is also aimed at supporting the innovative activities of small businesses and start-ups. For enterprises that make R&D expenditures, a tax credit for R&D is applied, the rate of which has been increased from 25% to 30% to stimulate investment in the future productivity of enterprises. The tax credit allows to compensate for part of the costs of innovation activities and supports the development of high-tech sectors of the economy. In addition, Ireland operates the Knowledge Development Box (KDB) regime (n.d.), which provides for preferential taxation of profits received from the use of intellectual property and R&D results. Such instruments stimulate the development of high-tech enterprises, digital services and innovative start-ups. To support investment activity in Ireland, tax incentives are used for private investors, in particular the Employment and Investment Incentive (EII) programme, which provides tax benefits for individuals investing in small and medium-sized enterprises (Relief for investment in corporate..., n.d.). In addition, preferential capital gains tax regimes and tax incentives for entrepreneurs and business angels are applied, which promotes the attraction of venture capital and financing of start-ups. Citizens Information (n.d.) also expanded the Employment Investment Incentive, Start-up Capital Incentive and Start-Up Relief for Entrepreneurs mechanisms, and introduced a lower capital gains tax rate for angel investors. In addition, Ireland applies preferential capital gains tax regimes for entrepreneurs, in particular a rate of 10% for certain categories of entrepreneur relief, which is used to stimulate the development and scaling of enterprises. At the same time, a high level of taxation of income and dividends can discourage the reinvestment of profits and long-term preservation of business ownership by the founders of enterprises (Empowering Ireland's SME..., 2026). The Irish model is based primarily on maintaining a favourable tax environment and attracting private investment. Its strengths include relatively low corporate taxation and close integration between fiscal incentives and venture financing mechanisms. Compared to Germany and France, Ireland demonstrates a stronger orientation toward commercialisation and scaling of innovative SMEs, although this model may increase dependence on external investment and multinational business activity. To summarise the features of tax support for small businesses in the EU, a comparative analysis of the main fiscal stimulus instruments used in Germany, France and Ireland was carried out (Table 1).

Table 1. Comparative characteristics of fiscal stimulation mechanisms for small businesses in Germany, France, and Ireland

Indicator	Germany	France	Ireland
Standard corporate tax rate	15% + solidarity surcharge; total burden including Gewerbesteuer may reach around 30%	25%	12.5% for most businesses
Preferential corporate tax rate	Tax allowances for small businesses and R&D incentives	15% on the first EUR 42.5 thousand of taxable profit for SMEs	Section 486C tax relief for new companies during the first 5 years of operation
Standard VAT rate	19%	20%	23%
Preferential VAT regimes	Kleinunternehmerregelung for enterprises with low turnover	VAT exemption thresholds for micro-enterprises	Simplified administration regimes and cash-basis VAT accounting
VAT exemption threshold	Up to EUR 25 thousand in the previous year and up to EUR 100 thousand in the current year	Depends on the category of enterprise activity	EUR 42.5 thousand for services and EUR 85 thousand for goods
R&D tax incentives	Forschungszulage and ZIM programme	CIR – 30% of R&D expenditures; CII – 30% of innovation expenditures	30% R&D tax credit
Innovation support programmes	KMU-innovativ, ZIM	CIR, CII, JEI	KDB, EII, Start-up Relief
Investment incentives	Accelerated depreciation and investment allowances	Gradual abolition of CVAE and support for innovative enterprises	Tax incentives for business angels and venture investors
Administrative simplification	ELSTER, EÜR form, simplified digital tax administration	Simplified accounting and TVA administration regimes	Simplified reporting and deferred tax payments
Main focus of support	Technological modernisation and industrial innovation	Research, innovation activity and startup support	Investment attraction and scaling of innovative SMEs

Source: compiled by the authors based on Kleinunternehmer: What taxes do I... (2025), Exploring France's corporate tax rates... (2025), and Standard taxation: How small... (2026), Everything about the French Innovation... (n.d.), Tax relief for new start-up companies (n.d.), Research and Development (R&D)... (n.d.), Forschungszulage – up to EUR 3.5 million in R&D... (n.d.)

A comparative analysis showed that the tax policy of supporting small businesses in Germany, France and Ireland is based on a combination of tax breaks, simplified administration and incentives for innovative activities, however, the mechanisms for implementing such incentives differ significantly. Germany focuses mainly on investment incentives, digitalisation of tax administration and support for technological modernisation of enterprises. France uses the CIR and CII tax credit system to stimulate R&D and support innovative start-ups, while Ireland focuses on low corporate tax rates, attracting investments and tax incentives for newly created enterprises. In general, the effectiveness of fiscal incentives for small businesses in EU countries largely depends on the level of administrative simplicity, availability of tax breaks and integration of tax and financial mechanisms for supporting entrepreneurship. The research of F. Campos *et al.* (2023) and the results of this work coincided in the understanding that tax policy directly affected the development of small businesses, their competitiveness and ability to invest in growth. Both works emphasised that excessive tax burden, administrative complexity and high costs of tax compliance restrained the development of entrepreneurship and increased the risks of business transition to the shadow sector. At the same time, the emphases of the research differed. F. Campos *et al.* analysed the impact of effective tax rates, informality, VAT structure and public services on the development of small businesses in emerging markets, using regression analysis and panel data for Pakistan, Nigeria, Kenya and

Bangladesh. In the same study, attention was focused on mechanisms for supporting small businesses in EU countries, including special VAT regimes, tax credits for R&D, depreciation allowances and financial programmes to support innovation activities. If F. Campos *et al.* (2023) considered tax policy primarily as a tool for overcoming informality and strengthening tax discipline, in this work tax incentives were analysed more broadly – as a factor in digitalisation, technological modernisation and innovative development of small businesses in the context of European economic integration. A more macroeconomic dimension of tax policy was presented in the study by M. Melisya (2025). The author considered different taxation models – progressive, regressive and corporate taxation – through their impact on fiscal sustainability, foreign direct investment (FDI) and economic growth in different countries of the world. In contrast to such a broad approach, in this study tax policy was analysed mainly through practical mechanisms for supporting small businesses in the EU. It was about special VAT regimes, tax credits for R&D, support for start-ups and instruments for stimulating innovation in Germany, France and Ireland. Despite differences in the scale of analysis, both studies agreed that the effectiveness of fiscal incentives depended on the balance of tax mechanisms, administrative efficiency, and the level of digitalisation of tax administration.

A similar emphasis on digitalisation was also observed in the work of K. Safitri (2025), but there it was closely related to the issues of tax compliance and economic

resilience of small businesses in developing countries. The author used systematic literature review, bibliometric analysis and VOSviewer to investigate the relationships between tax policy, digital tools and entrepreneurial activity. In this study, digitalisation was also considered as an important element of tax support, but the main focus was shifted to fiscal incentives for innovation, tax credits and small business support mechanisms within the EU. In addition, K. Safitri paid significant attention to the role of e-filing, e-payment and the impact of the COVID-19 pandemic on the tax behaviour of MSMEs, while in this work the issues of competitiveness, digital modernisation and integration of financial and tax support instruments were prioritised. Behavioural aspects of tax compliance were studied in more detail in the work of A. Padi *et al.* (2025), devoted to VAT compliance among SMEs in Ghana. Using Partial Least Squares Structural Equation Modelling (PLS-SEM) and survey data from 520 enterprises, the authors analysed the impact of VAT knowledge, tax audits, penalties and fines, religiosity and trust in government on the tax behaviour of enterprises. In contrast to this approach, this study did not focus on socio-cultural or behavioural factors, but on the mechanisms of fiscal stimulation of small businesses in EU countries. At the same time, both works converged in the conclusion that the simplification of administrative procedures, the digitalisation of reporting and the availability of information had a positive impact on the efficiency of small business operations. The issue of simplifying tax systems and supporting MSMEs in developing countries also became central in the study of G. Widjaja (2024). The author analysed the tax regimes of Indonesia, India, Kenya and Brazil, paying attention to business formalisation mechanisms and preferential tax regimes. However, while G. Widjaja mainly focused on tax fairness and administrative simplification, in this study tax policy was considered as a tool for stimulating innovation, digital modernisation and the development of high-tech small businesses within the framework of European integration. Another perspective of analysis was presented by F. Jesus *et al.* (2024), who studied corporate income taxation in Portugal, Germany, Belgium, the Netherlands and Luxembourg. Their focus was on tax rates, international tax competition and the impact of corporate taxation on companies' investment decisions. In the same study, tax policy was considered not only through the prism of fiscal competitiveness, but also as a tool to support small businesses through special VAT regimes, R&D tax credits, depreciation allowances and financial programmes to support innovation activities. The issues of administrative burden and compliance costs were also key in the study by L. Judijanto (2024), devoted to taxation policy and compliance burden on MSMEs in Indonesia. The author analysed the legal aspects of tax regulation, taxpayer education and mechanisms to support voluntary tax discipline. At the same time, this study combined the issue of reducing compliance burden with the broader context of stimulating innovation, digitalisation and increasing the competitiveness of small businesses in EU countries. A more historical

and macroeconomic approach was presented in the work of S. Gobile *et al.* (2024), which examined the evolution of tax laws in African countries and their impact on the business environment. The authors analysed the development of VAT systems, corporate tax rates, Special Economic Zones (SEZs) and international tax trends, focusing on the relationship between fiscal policy, investment activity and economic development. In contrast, this study focused on practical tools to support small businesses in the EU – tax credits, R&D incentives, special VAT regimes and innovation incentive programmes.

A comparison of the results of this study with the work of S. Yang *et al.* (2025) showed a common understanding of fiscal policy as a tool for stimulating economic development, investment activity and technological change. In both studies, the effectiveness of tax incentives was associated not only with the volume of state support, but also with the design features of fiscal instruments and the coherence of economic policy. At the same time, the emphases of the studies differed significantly. While S. Yang *et al.* focused on the development of green hydrogen energy and spatial spill over effects between regions of China, using Geographic Information System (GIS) analysis, panel data and spatial econometric models, in this study the main focus was shifted to supporting small businesses in EU countries through mechanisms of tax breaks, special VAT regime, financial programmes and simplification of tax administration. Unlike the work of S. Yang *et al.* (2025), where energy transition and regional cooperation issues played a role, in this study the priority areas were reducing compliance costs and increasing the competitiveness of small businesses. A similar logic was observed when comparing the results with the study by W. He *et al.* (2025), in which fiscal policy was viewed through the prism of digital business transformation. The authors studied the impact of tax incentives and special subsidies on the digitalisation of Chinese enterprises, paying special attention to synergistic effects between different state support instruments. In this study, digitalisation was also considered as one of the areas of stimulating entrepreneurial activity, but the emphasis was mainly on small business support instruments within the framework of EU tax policy. Unlike, W. He *et al.* (2025), where the differences between state-owned and non-state-owned enterprises were analysed, in this study the focus was on simplifying administrative procedures, tax credits and financial programmes to support small businesses. Another aspect of the impact of fiscal policy was highlighted in the study by Y. Fan & L. Shi (2025), where state support was analysed in the context of the development of green technological innovation in China. The authors established an inverted U-shaped relationship between the scale of fiscal support and innovation activity, which indicated the possibility of a decrease in the effectiveness of incentives in the event of excessive state intervention. In this study, tax incentives were also considered as a factor supporting innovation activity, but without focusing on nonlinear effects or regional heterogeneity. Instead, attention was paid

to practical mechanisms for supporting small businesses in the EU, including tax credits, patent box regimes, Horizon Europe (n.d.) and COSME programmes, as well as measures to simplify tax administration. Thus, fiscal incentives are one of the instruments for supporting small businesses in the EU countries, as they contribute to reducing the tax burden, activating investment activity and developing innovations. In the EU countries, various forms of tax support for small businesses are used, including income tax benefits, special value-added tax regimes, R&D tax credits, depreciation allowances, and programmes for financial support for innovative projects. It has been established that the effectiveness of fiscal incentives largely depends on the administrative simplicity of tax procedures, the targeting of incentives and the level of integration of financial and tax mechanisms for supporting small businesses. At the same time, significant differentiation of tax policies between the countries of the EU necessitates further improvement of mechanisms for fiscal support for small businesses, taking into account modern economic and innovation challenges.

Summarising the results of the analysis, it can be concluded that the tax policy of supporting small businesses in the EU countries is based on a combination of tax benefits, simplified administration regimes, incentives for innovative activity and mechanisms for attracting investments. A comparative analysis of Germany, France and Ireland showed that EU countries use different models of fiscal stimulation of small businesses depending on the characteristics of economic policy, the structure of the national economy and the priorities of state support. It was found that the most common instruments of supporting small businesses are preferential regimes of taxation by VAT, reduced corporate tax rates, tax credits for R&D, investment incentives and simplified tax administration procedures. In general, the effectiveness of fiscal support of small businesses in EU countries largely depends on the level of administrative simplicity, availability of tax incentives, stability of tax policy and integration of tax and financial mechanisms of supporting entrepreneurship.

The impact and effectiveness of fiscal incentives for the development of small businesses in the EU countries

Fiscal incentives in the EU countries significantly affect the level of innovation activity of small businesses, the investment attractiveness of the business environment and the long-term competitiveness of the economy. An analysis of Germany, France and Ireland showed that the most effective are mechanisms aimed at supporting R&D, digitalisation and innovative modernisation of enterprises. In Germany, the positive impact of fiscal incentives is manifested in the gradual increase in the innovation activity of small businesses. According to KfW Research: German SMEs... (2026), in 2022-2024, 41% of German small and medium-sized enterprises implemented at least one innovation, which is 2 percentage points more than in the previous period. The volume of small business spending on

innovation in 2024 reached EUR 35.4 billion, and after adjusting for inflation, the real growth was about 3%. At the same time, the study showed a significant concentration of innovation activity among large enterprises: among companies with more than 50 employees, 73% of enterprises implemented innovations, while among micro-enterprises with up to 5 employees, only 37%. This indicates that even with the availability of tax incentives and support programmes, small businesses' access to innovation resources remains uneven (KfW Research: German SMEs..., 2026). The positive impact of tax incentives in Germany is also confirmed by the expansion of the R&D tax incentives system in 2024-2025. Increasing the Forschungszulage rate to 35% for small and medium-sized enterprises, increasing the maximum cost base to EUR 12 million, and simplifying the mechanisms for obtaining compensation have improved enterprises' access to financing for innovation projects. Of particular importance was the expansion of the list of eligible costs, including contract research, equipment depreciation and operating costs (Germany R&D tax relief regime..., n.d.). In France, the impact of fiscal incentives is most noticeable in the field of innovation and the development of high-tech entrepreneurship. According to the European innovation scoreboard 2025 (n.d.), France belongs to the Strong Innovators group and demonstrates a level of innovation efficiency of 108.6% of the EU average. The indicators of state support for business R&D are particularly high, where France ranks first among EU countries, as well as the volume of venture financing, in which the country ranks second in the EU.

The positive effect of fiscal support in France is largely ensured by the CIR (2025) and CII (2026) systems, which compensate for part of the costs of enterprises for research, development of prototypes and technological renewal. The European Commission notes that the main tax scheme had a significant positive impact on SMEs, stimulating their R&D activity and economic performance, while the effect for large companies was less pronounced. In addition, France demonstrates a high level of cooperation between innovative SMEs: the indicator of innovative SMEs collaborating with others is 131.3% of the EU average. This indicates a positive impact of state support not only on individual enterprises, but also on the development of innovation networks and partnerships. At the same time, the French experience has shown that significant amounts of tax incentives do not guarantee an automatic increase in the efficiency of commercialisation of innovations. Despite high levels of government support, France lags behind in terms of sales of new-to-market and new-to-firm innovations, which are only 52.1% of the EU average. In addition, the country shows low results in terms of cloud computing adoption and non-R&D innovation expenditures. This shows that the effectiveness of fiscal support depends on the ability of enterprises to integrate innovations into business processes, digital infrastructure and market activities (European innovation scoreboard 2025 country..., 2025a). In Ireland, the positive impact of fiscal

incentives on entrepreneurial activity was manifested through the development of innovative entrepreneurship, digital transformation and high-tech sectors of the economy. According to the European innovation scoreboard 2025 country... (2025a), Ireland belongs to the Strong Innovators group and ranks 5th among EU countries in terms of overall innovation efficiency. The country demonstrates high rates of SMEs introducing product innovations – 120.5% of the EU average, as well as one of the highest rates of cooperation between innovative SMEs – 178.1% of the EU average. One of the elements of this model is the system of indirect government support for business R&D through tax incentives. Direct and indirect government support of business R&D in Ireland is 144.3% of the EU average, with about 80% of all government support for innovative businesses provided through R&D tax credits. This mechanism has allowed for the formation of a stable environment for the development of high-tech SMEs, start-ups and knowledge-intensive services. At the same time, the low corporate tax rate and the Employment Investment Incentive, Start-Up Relief for Entrepreneurs and Knowledge Development Box programmes have contributed to attracting private capital and scaling innovative enterprises. Ireland also demonstrates a high level of business

digitalisation, which is largely due to a combination of fiscal incentives and government digital programmes. The cloud computing adoption rate in 2025 was 146% of the EU average, and the Digital Intensity Index exceeded the European average and reached 41.1 against 34.2 in the EU (European innovation scoreboard 2025 country..., 2025b).

The effectiveness of the Irish model is also confirmed by the high economic indicators of the innovation sector. Sales of new-to-market and new-to-firm innovations in Ireland are 195.4% of the EU average, which is the highest rate among the EU countries. In addition, the country demonstrates high indicators of labour productivity – 256.2% of the EU average, knowledge-intensive services exports – 128.8% and exports of medium and high-tech products – 111.6%. This indicates that the combination of tax incentives, support for digitalisation and investments in the knowledge economy creates favourable conditions for the development of entrepreneurial activity and increasing the competitiveness of the economy (European innovation scoreboard 2025, n.d.). To summarise the impact of fiscal incentives on the development of small businesses and innovative activity in Germany, France and Ireland, it is advisable to conduct a comparative analysis of key indicators of the effectiveness of state support for entrepreneurship (Table 2).

Table 2. Impact of fiscal incentives on innovation activity and entrepreneurial development in Germany, France and Ireland

Indicator	Germany	France	Ireland
SMEs implementing innovations	41% of SMEs introduced at least one innovation during 2022-2024	High level of innovative SME cooperation	High level of product innovation among SMEs
Innovation expenditure	EUR 35.4 billion in 2024	High level of public support for business R&D	Significant share of support through R&D tax credits
Share of innovative large enterprises	73%	Strong innovation performance above EU average	Strong Innovator; 5 th place in EU
Share of innovative microenterprises	37%	Lower commercialisation performance of innovations	High commercialisation of innovations
Government support for business R&D	Expanded Forschungszulage and innovation programmes	1 st place in EU for public support of business R&D	144.3% of EU average
Venture capital and start-up support	Innovation grants and technology programmes	2 nd place in EU by venture financing volumes	Strong venture and angel investment incentives
SMEs collaborating with others	Support through ZIM and KMU-innovative programmes	131.3% of EU average	178.1% of EU average
Cloud computing adoption	Moderate growth	Below EU average	146% of EU average
Sales of new-to-market innovations	Growth constrained by uneven SME access to innovation resources	52.1% of EU average	195.4% of EU average
Main impact of fiscal incentives	Support of technological modernisation and R&D	Support of innovation ecosystems and startup activity	Development of high-tech SMEs and digital economy

Source: compiled by the authors based on European innovation scoreboard 2025 country... (2025a; 2025b), KfW Research: German SMEs... (2026), Forschungszulage – up to EUR 3.5 million in R&D... (n.d.)

The comparative analysis showed that fiscal incentives in Germany, France and Ireland have different effects on the development of small businesses depending on the structure of tax policy and state support mechanisms. Germany focuses mainly on stimulating

technological modernisation and supporting R&D through tax breaks and innovation programmes, France – on the development of innovation networks, start-ups and state funding for research, while Ireland demonstrates the highest indicators of digitalisation, commercialisation of

innovations and integration of tax incentives with mechanisms for attracting private capital. Overall, the results confirm that the most effective are models of fiscal support that combine tax incentives for R&D, simplification of administrative procedures, digitalisation of tax administration and development of venture financing for small businesses. Thus, the experience of Germany, France and Ireland shows that the effectiveness of fiscal support for small businesses is determined by a complex combination of tax incentives, innovation programmes, digitalisation of tax administration and access to financial resources for enterprises. The most effective models are those that combine tax credits for innovation activities with venture financing mechanisms, grant support and simplification of administrative procedures for small businesses. The results of this study are consistent with the findings of Y. Ding (2024), who also identified tax incentives in the field of VAT and corporate taxation as important instruments for reducing the financial burden on SMEs and stimulating innovation activity. Both studies confirmed that fiscal incentives contribute to enterprise modernisation and support the development of innovation-oriented sectors. However, while Y. Ding (2024) focused mainly on sectoral differences in the effectiveness of tax incentives in China, this study emphasised the comparative effectiveness of fiscal support models in Germany, France and Ireland within the framework of European economic integration. Similar conclusions regarding the role of fiscal incentives in supporting enterprise sustainability and investment activity were presented by K.O. Deyganto (2022). Both studies showed that tax incentives may strengthen the economic resilience of SMEs and facilitate the redirection of resources toward modernisation and business development. At the same time, this study focused primarily on long-term mechanisms of innovation and investment support in EU countries rather than on anti-crisis fiscal measures.

The findings of this study also complement the conclusions of P. Du *et al.* (2022), who emphasised the importance of government support and financial instruments for enterprise development. While P. Du *et al.* (2022) analysed fiscal incentives mainly through the perspective of ESG and financial technologies, this study examined them as instruments for stimulating innovation, technological modernisation and the competitiveness of SMEs in the EU. The conclusions are also consistent with the work of A. Lynch *et al.* (2026) and L. Judijanto (2024), which highlighted the importance of institutional conditions, financial awareness and administrative accessibility for the effectiveness of tax incentives. In contrast to these studies, which focused mainly on generalised or behavioural aspects of fiscal policy, this research concentrated on the practical effectiveness of fiscal support instruments in Germany, France and Ireland, particularly their influence on innovation activity, commercialisation and SME competitiveness. The comparative analysis showed that Germany, France and Ireland apply different

fiscal support models for small businesses depending on national economic priorities and the structure of their tax systems. Germany's model is focused on technological modernisation and industrial innovation through accelerated depreciation, R&D incentives and digital tax administration. France demonstrates a stronger role of the state in financing innovation activity through large-scale tax credits and startup support mechanisms, while Ireland's approach is based on maintaining low corporate taxation and stimulating private investment and venture financing. The analysis also showed that the effectiveness of fiscal incentives depends not only on the scale of tax benefits, but also on the level of administrative simplicity and the orientation of support instruments toward commercialisation and investment activity. Countries combining tax incentives with simplified administration and access to financing demonstrate higher indicators of innovation activity and SME competitiveness. At the same time, high fiscal complexity, uneven access of microenterprises to innovation resources and dependence on external investment may reduce the long-term effectiveness of support mechanisms.

CONCLUSIONS

Summarising the results of the study, it can be concluded that fiscal incentives are an important instrument for supporting small businesses in the EU, contributing to innovation activity, investment development and enterprise competitiveness. EU countries apply tax incentives, special VAT regimes, R&D tax credits and simplified tax administration mechanisms to support SMEs. The study showed that Germany, France and Ireland use different models of fiscal support depending on national economic priorities. Germany focused mainly on technological modernisation and innovation support through accelerated depreciation and R&D programmes. During 2022–2024, 41% of German SMEs implemented at least one innovation, while innovation expenditures reached EUR 35.4 billion in 2024. However, innovation activity remained unevenly distributed, as 73% of large enterprises introduced innovations compared to 37% of microenterprises. France emphasised support for R&D and start-ups through the CIR and CII mechanisms. France demonstrated an innovation efficiency level of 108.6% of the EU average and ranked first in the EU in government support for business R&D, although sales of new-to-market and new-to-firm innovations accounted for only 52.1% of the EU average. The highest effectiveness indicators were observed in Ireland, where a 12.5% corporate tax rate was combined with innovation incentives and private investment support mechanisms. SMEs introducing product innovations reached 120.5% of the EU average, while sales of new-to-market and new-to-firm innovations amounted to 195.4% of the EU average. Ireland also demonstrated labour productivity at 256.2% of the EU average. The comparative analysis confirmed that the most effective fiscal support models combine innovation tax incentives,

administrative simplification and mechanisms for attracting private investment. Further research may focus on econometric analysis of the long-term impact of fiscal incentives on SME competitiveness in the EU.

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CONFLICT OF INTEREST

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Фіскальні стимули розвитку малого підприємництва в країнах Європейського Союзу

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Анотація. Метою дослідження було оцінювання ефективності фіскальних інструментів підтримки малого бізнесу в Європейському Союзі на прикладі Німеччини, Франції та Ірландії. Методологія базувалася на аналізі нормативно-правових і статистичних джерел, порівняльному аналізі податкової політики та оцінюванні інноваційних показників малих і середніх підприємств у 2022-2025 роках. Результати засвідчили, що найефективніші моделі поєднували податкові стимули для інновацій, цифровізацію податкового адміністрування та механізми залучення приватного капіталу. Показники Німеччини, де 41 % малих і середніх підприємств упровадили щонайменше одну інновацію протягом 2022-2024 років, а витрати на інновації у 2024 році сягнули 35,4 млрд євро, продемонстрували відносно високий рівень інноваційної активності за підтримки фіскальних та інвестиційних стимулів, хоча розрив між великими підприємствами (73 %) та мікропідприємствами (37 %) відображав нерівний доступ до інноваційних ресурсів. Рівень ефективності інновацій у Франції, що становить 108,6 % від середнього показника по Європейському Союзу, підтвердив важливу роль податкових кредитів та державного фінансування в підтримці науково-дослідних і дослідно-конструкторських робіт. Показники Ірландії, зокрема впровадження малими та середніми підприємствами продуктових інновацій на рівні 120,5 % від середнього по ЄС та продуктивність праці на рівні 256,2 %, відобразили ефективність поєднання низького корпоративного оподаткування з інвестиційними стимулами. Дослідження встановило, що ефективність фіскальних інструментів залежить не лише від податкових пільг, а й від спрощення адміністративних процедур та інтеграції механізмів податкової та фінансової підтримки. Практичне значення дослідження полягає в можливості використання його результатів для вдосконалення фіскальних інструментів підтримки та формування інноваційно орієнтованої податкової політики для малого бізнесу в країнах Європейського Союзу.

Ключові слова: податкова політика; корпоративне оподаткування; податок на додану вартість; економічне зростання; підтримка інновацій

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