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Features of Optimising the Digital Transformation of International Business

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ABSTRACT

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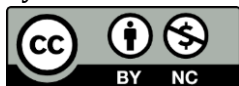
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The article is devoted to a comprehensive analysis of the features of optimising the digital transformation of international business in the context of rapid technological, economic and social changes. The paper reveals the essence of digital transformation as a multidimensional process that includes the integration of the Internet of Things, artificial intelligence, cloud services, data analytics and other technologies capable of ensuring the increased efficiency and adaptability of companies in global markets. The main focus is on the need to take into account regional differences, local regulatory conditions, cultural characteristics, and the level of technological readiness of markets, which makes it possible to form balanced and flexible digital strategies in the international business environment. The study demonstrates that digital technologies are significantly changing the structure of global value chains, increasing the transparency of operations, shortening production cycles, and forming new formats of interaction between business and government institutions. Considerable attention is paid to changes in the labour market caused by digitalisation, which require a reorientation towards highly skilled personnel and accelerated updating of competencies. The author also emphasises the importance of systematic measurement of the digital economy as a tool for improving strategic effectiveness and timely adjustment of management decisions. The article analyses the unevenness of digital progress between countries, the impact of generative AI on business adaptability, and the key demographic, infrastructural, economic and technological factors that determine the speed and effectiveness of transformations. It shows that successful digital transformation requires not only technological innovation, but also a profound rethinking of business models, the development of digital ecosystems, the integration of sustainable approaches, and the use of conceptual frameworks for comprehensive change management. The results of the study emphasise the strategic importance of digitalisation for the long-term competitiveness of international companies and outline directions for further improvement of digital strategies.



KEYWORDS

optimisation, digital transformation, international business, digitalisation, digital technologies.



Особливості оптимізації цифрової трансформації міжнародного бізнесу

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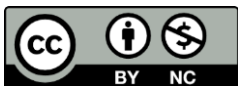
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Статтю присвячено комплексному аналізу особливостей оптимізації цифрової трансформації міжнародного бізнесу в умовах швидких технологічних, економічних і соціальних змін. У роботі розкрито сутність цифрової трансформації як багатовимірного процесу, що включає інтеграцію Інтернету речей, штучного інтелекту, хмарних сервісів, аналітики даних та інших технологій, здатних забезпечити підвищення ефективності та адаптивності компаній на глобальних ринках. Основна увага приділена необхідності врахування регіональних відмінностей, локальних регуляторних умов, культурних характеристик та рівня технологічної готовності ринків, що дає змогу формувати збалансовані й гнучкі цифрові стратегії у міжнародному бізнес-середовищі. Дослідження демонструє, що цифрові технології суттєво змінюють структуру глобальних ланцюгів доданої вартості, підсилюють прозорість операцій, скорочують виробничі цикли та формують нові формати взаємодії між бізнесом і державними інституціями. Значна увага приділена змінам на ринку праці, зумовленим цифровізацією, які вимагають переорієнтації на висококваліфіковані кадри та прискорення оновлення компетентностей. Автор також підкреслює важливість системного вимірювання цифрової економіки як інструменту підвищення стратегічної ефективності та своєчасного коригування управлінських рішень. У статті проаналізовано нерівномірність цифрового прогресу між країнами, вплив поширення генеративного ШІ на адаптивність бізнесу, а також ключові демографічні, інфраструктурні, економічні та технологічні чинники, що визначають швидкість і результативність трансформацій. Показано, що успішна цифрова трансформація потребує не лише технологічних інновацій, а й глибокого переосмислення бізнес-моделей, розвитку цифрових екосистем, інтеграції сталих підходів та використання концептуальних рамок для комплексного управління змінами. Результати дослідження підкреслюють стратегічне значення цифровізації для довгострокової конкурентоспроможності міжнародних компаній і окреслюють напрями подальшого вдосконалення цифрових стратегій.



КЛЮЧОВІ СЛОВА

оптимізація, цифрова трансформація, міжнародний бізнес, цифровізація, діджитал технології.

1. Introduction

The current stage of development of the world economy is characterized by unprecedented dynamics of technological changes that form a new architecture of the global business environment. Digital transformation has become not only a tool for improving efficiency, but also a key condition for the competitiveness of international companies, which are forced to adapt to multidirectional challenges – from rapid technology updates to changes in consumer behavior patterns and global value chains. Despite the obvious importance of digitalization and its implementation remains uneven and contradictory: countries differ in the level of readiness for innovation, the availability of digital infrastructure, the digital skills of the population and the institutional capacity to support transformation processes. This causes significant disparities in the ability of companies to integrate and optimize digital solutions, creating new risks and barriers to international economic interaction.

The importance of studying the issue of optimizing the digital transformation of international business is due to a number of key problems. On the one hand, digital technologies open up significant opportunities – automation of processes, increased productivity, reduction of transaction costs, new formats of business models, and the development of digital ecosystems. On the other hand, in practice, companies face difficulties in strategic planning, lack of investment, insufficient competence of personnel, lack of systematic methodologies for assessing digital maturity, and uneven pace of innovation implementation in different regions of the world. Especially acute is the problem of adapting to the transformation of global supply chains, which, under the influence of digital technologies, become more transparent, but at the same time more difficult to coordinate. The impact of technological changes on the labor market is also a cause for concern, which requires a rapid reorientation to new digital competencies.

For science, the importance of this problem lies in the need to develop systematic approaches to assessing digital transformation, identifying the factors that determine its success, and creating conceptual models for unified management of digital change. Currently, the scientific discourse only partially covers the relationship between digital technologies, the transformative capacity and the effectiveness of international strategies of companies, which creates a gap in the theoretical and applied support of this process.

For international business, the problem of optimizing digital transformation is of strategic importance. Access to global markets, the speed of scaling, the quality of managerial decision-making, and the level of competitive advantage depend on the ability of companies to quickly adapt to digital trends. The unevenness of digital development between countries can hinder innovation activity, deepen the digital divide and reduce the investment attractiveness of individual regions. In such conditions, the study of mechanisms for optimizing digital transformation becomes a necessary prerequisite for the development of effective business strategies that can ensure the stable functioning and development of companies in the face of global turbulence.

Thus, the problem of optimizing the digital transformation of international business is complex and requires a deep interdisciplinary analysis, which will allow us to identify promising development models, minimize the risks of digital inequality and form scientifically based recommendations for strengthening the adaptability and competitiveness of companies in the digital age.

2. Literature Review

The analysis of scientific sources demonstrates the interest of modern researchers in approaches and key areas for optimizing the digital transformation of international business in the context of globalization and technological challenges.

Ukrainian scientists, in particular moliak, emphasize that digital transformation is a key driver of company development today, especially in the context of intensified global competition [1, p. 186]. The actor also focuses on the strategic implementation of technologies such as the Internet of Things, blockchain, cloud solutions, AI, and big data, and shows that their use really accelerates the growth of the efficiency of business models [1, p. 186]. At the same time, he identifies such important barriers to digital transformation in Ukraine as limited funding, low level of digital literacy of personnel and insufficient regulatory support [1, p. 186]. Such an analysis clearly demonstrates that optimizing the

transformation of international business involves not only technical solutions, but also strategic investment in human capital and regulatory reforms.

Sorokina considers the mechanisms of interaction between business and state institutions in the digital environment [2, p. 12]. The author points out that the digital transformation of business is accompanied not only by technical but also by social ones, therefore, accordingly, the optimization of transformation should include “soft” institutional aspects: building trust, regulatory openness, and mechanisms for attracting stakeholders [2, p. 12].

Shvetsov analyzes how digital technologies change the architecture of business models: the importance of platforms, network ecosystems, digital assets is growing [3, p. 496]. The author shows that the optimization of transformation at the international level consists precisely in the transition from classical vertical models to hybrid models with open platforms and cooperation [3, p. 496]. This is important for international business, as it allows you to flexibly respond to global challenges, scale into new markets, and integrate into digital ecosystems.

Yurchenko explores the advantages of implementing digital management systems – CRM, ERP, blockchain, smart panels, AI at enterprises and notes that these systems significantly optimize business processes, increase the speed of data exchange, save resources and strengthen trust between stakeholders [4, p. 142]. At the same time, the author draws attention to the obstacles: lack of investment for implementation, lack of regulatory framework, low level of digital competence of specialists [3, p. 496]. In the context of international business, this means that optimizing transformation must include economic and institutional levers – not just technological ones.

Authors such as Pushak and Trushkina emphasize the importance of cybersecurity in the digital age [5, p. 137]. In particular, she emphasizes that the legal framework of many countries (including Ukraine) is not yet fully prepared for the challenges of digital transformation, and therefore the optimization of the digital transformation of international business should take into account the risks of cyber and information security, and also require the formation of an international legal framework [5, p. 137].

Thus, it is worth noting the interest of researchers in the topic of digital transformation of international business, but at the same time, it is worth noting the openness and importance of analyzing the issues of optimization and success of integrating digital achievements into the activities of international business entities.

3. Problem Statement

The methodological basis of the research is formed by a combination of general scientific and specialized methods used to analyze the processes of digital transformation of international business. The study is based on a systematic and interdisciplinary approach that allows considering digital transformation as a complex socio-economic and technological phenomenon. To achieve the research objectives, methods of analysis and synthesis were applied to generalize theoretical approaches to digitalization and international business development; comparative analysis was used to identify differences in the level of digital progress and technological readiness between countries and regions; statistical analysis was applied to interpret indicators of digital development, including international datasets and reports. The research materials include scientific publications of domestic and foreign scholars, analytical reports of international organizations, including the World Economic Forum, OECD, World Bank, International Telecommunication Union and the European Commission, as well as statistical indicators characterizing the development of the digital economy, the level of digital infrastructure, digital skills and the spread of new technologies. The use of these sources made it possible to assess key drivers, barriers and trends in digital transformation and to identify the factors that determine the effectiveness of digital strategy optimization in international business.

4. Methods and Materials

The methodological basis of the research is formed by a combination of general scientific and specialized methods used to analyze the processes of digital transformation of international business. The study is based on a systematic and interdisciplinary approach that allows considering digital transformation as a complex socio-economic and technological phenomenon. To achieve the research

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5. Results and Discussion

Today, digital transformation is one of the key determinants of the formation of global development strategies for international companies. Its essence lies in the holistic integration of advanced technological solutions – digital platforms, the Internet of Things (IoT), artificial intelligence, robotics systems, cloud infrastructures, big data analytics and additive manufacturing. new opportunities to increase your own efficiency and competitiveness in a rapidly changing global business environment.

One of the key aspects of developing digital strategies is the need to take into account the specifics of local markets [6]. It is not only about adapting to the current regulatory framework, but also about taking into account cultural norms, market expectations and the level of technological readiness of specific regions. This approach allows for an optimal balance between global standardization and regional flexibility, which is especially important for companies operating in different legal and economic environments.

An equally significant task is the adaptation of enterprises to transformations in global value chains. Digital tools are significantly changing the structure of interaction between manufacturers, suppliers, logistics agents and end users, opening up opportunities for cost optimization, increased transparency and reduction of production cycle times [6]. At the same time, there is a transformation of business relations with state institutions, which is due to the emergence of new regulatory requirements, digital standards and mechanisms to support innovations [6]. All this creates favorable conditions for the large-scale implementation of digital solutions and enhances the strategic importance of digital transformation in the modern economy.

Analytical forecasts for the future of the labor market demonstrate that digitalization processes and the rapid development of technological innovations are radically changing the structure of demand for professional skills, as well as transforming the organizational models of enterprises [7]. In such conditions, businesses are forced to adapt their strategies in much shorter time intervals than previously required, as the competitive environment becomes more dynamic and unpredictable [7]. There is a growing need for highly skilled workforce capable of working with digital tools, analyzing large amounts of data, managing automated systems, and making decisions in the face of rapid technological change.

The effective formation of such adaptive business strategies is possible only if a systematic approach to measuring the digital economy is used. This approach provides companies with a comprehensive set of methodological tools that allow not only to track key digital trends, but also to timely adjust internal policies and strategic decisions in accordance with new challenges [8]. Monitoring digital processes allows enterprises to more accurately assess the impact of technological innovations, predict changes in consumer behavior and form more flexible management models [8]. As a result, the systematic measurement of the digital economy is becoming an important prerequisite for the long-term competitiveness of business in the digital age.

European statistics show a significant unevenness in the pace of digital transformation between Member States, which is confirmed by the results of the DESI index for different years. Thus, according to DESI 2022, EU countries have allocated about €127 billion for digitalization under national recovery and resilience plans, which is an average of 26% of total project funding. However, the results of DESI 2024 indicate significant disparities in the availability of high-speed networks (≥ 1 Gbps), differences in the level of digital skills of the population, slow progress in the digital modernization of small and

medium-sized businesses, as well as uneven implementation of 5G infrastructure [9–12]. Some indicators, such as the fact that in 2023 only 56% of EU citizens possessed basic digital skills, and in 2024, 73% of SMEs reached a basic level of digital intensity, emphasize the need to form targeted public policies and corporate strategies focused on overcoming regional disparities [12]. These indicators demonstrate that even with significant investment, digital progress remains uneven both between countries and within sectors of the economy.

At the same time, the influence of generative artificial intelligence, which is becoming an important driver of business adaptability and technological modernization, is growing rapidly. Analysis of alternative data sources – including web traffic volumes and Google Trends statistics – shows that the most popular generative AI tools attract billions of visits every month (as of March 2024) [13]. The spread of these technologies is unprecedentedly rapid: their active use was recorded in almost all economies of the world during the first 16 months after the launch of ChatGPT. At the same time, the speed of implementation and compensating factors – the level of income of the population, demographic structure, the quality of digital infrastructure, the prevalence of English – vary sharply between countries [13]. This creates significant differences in the ability of businesses to adapt technologically and improve efficiency, forming a new configuration of competitive advantages on a global scale.

According to the report “Digital Progress and Trends” (2023), the key factor in the effective functioning of modern economies is the systematic monitoring of the dynamics of digital development, since it is regular monitoring that makes it possible to adjust strategic priorities in time in the face of fast-paced global changes [14]. The results of the Digital Progress Assessment for 2023 show that global Internet coverage has reached 67% (about 5.4 billion people), but the disparities between countries with different income levels remain significant: in low-income countries, only 27% of the population had access to the Internet, while in high-income countries this figure was 93%, which confirms the persistence of a persistent digital divide and unequal starting conditions for digital adaptation [15]. Such asymmetry affects the ability of states and businesses to implement innovative solutions at the same pace, forming different trajectories of digital integration and competitiveness.

Despite the fact that the growth of investments in digital assets demonstrates their increasingly important role as a strategic resource, the structure and effects of digitalization for economic systems remain heterogeneous. For example, the share of digital investment in value added in Australia in 2016 was 2.2–2.9%, while in the United States in 2020 it was only 0.8%, which highlights the differences in the pace and scale of digital transformation between individual economies [16]. At the same time, a simple increase in investments does not guarantee proportional changes in productivity or innovative development, since the effectiveness of digitalization is largely determined by the quality of institutions, the level of human capital and the ability of organizations to adapt business models to new technological conditions.

The COVID-19 pandemic has become a kind of accelerator of digital transformation processes. It stimulated productivity gains in sectors with a high level of digitalization and contributed to the preservation of employment through a large-scale transition to remote work formats. At the same time, the subsequent economic recovery showed a more complex picture: a number of less digitalized industries showed a faster return to pre-crisis levels, while the share of workers engaged in digital occupations continued to grow at a slower pace than expected. In addition, changes in the structure of labor supply – in particular, the consolidation of the practice of remote employment – have the potential to become long-term, and sometimes permanent, significantly affecting management models, labor organization, and the formation of new competencies in the market [17].

Table 1 presents a generalization of the main drivers of adaptability, their impact and relevant empirical illustrations selected on the basis of the analyzed sources. The analysis of the consolidated data shows that demographic parameters, in particular the higher share of the young population, significantly increase the speed of dissemination of innovative solutions and stimulate the adoption of new technologies in society. At the same time, infrastructure constraints, one of the most common of which is the uneven deployment of 5G networks, significantly reduce the level of adaptability in low-income regions and create additional barriers to digital alignment.

The role of human capital and structural specialization of the economy in increasing the ability to implement innovations is also decisive: countries and regions with a higher level of skills, scientific competencies and technological orientation of the business sector, as shown by the above examples, demonstrate a much more dynamic transformative capacity. In addition, technological megatrends – including the integration of artificial intelligence, the development of hybrid AI-PC systems, as well as

the spread of approaches to the sustainable development of IT infrastructures – are shaping a new range of opportunities for modernizing business models and societal processes.

At the same time, these same trends increase the risks of volatility, unpredictability, and unevenness of changes, which emphasizes the critical importance of constant updating of management approaches and strategic planning. In such conditions, adaptability ceases to be a one-time reaction to external shifts and turns into a continuous process necessary to maintain competitiveness in the conditions of rapid technological evolution.

Table 1. Key factors influencing adaptability to market dynamics in the context of digital transformation

Factor category	Specific factors	Impact on adaptability	Empirical examples and sources
Demographic	Proportion of young people in the population (20–34 years old), gender and educational gap	Positive: young users adapt faster to innovations like AI; Negative Divide Limits Inclusivity	67% of global internet coverage, but only 27% in low-income countries; Youth is a key driver of GenAI diffusion
Infrastructure	Digital infrastructure (internet speed, 5G coverage, fiber), investments in digital assets	Critical: high-speed networks enhance performance; unevenness (0% in some EU countries) creates barriers	Investments of 127 billion. euros in the EU; 67% of 5G coverage, but only 23% in the key band; speed – 0.282 factor for ChatGPT
Human capital	Digital skills, English proficiency, level of education and literacy	Positive: correlation with higher adoption of AI; lack of skills (only 56% basic in the EU) limits transformation	10.3 million. ICT specialists in the EU (instead of 20 million); English proficiency – coefficient of 0.224 for GenAI; literacy rate – 0,023
Economic	Income level, specialization in highly qualified services, trade openness	Positive: middle-income economies – >50% of GenAI traffic; Volatility due to tariffs requires flexibility	Increased risks due to US tariffs; GDP per capita – correlation of 0.030 with GenAI; specialization – 0.0005
Technological trends	GenAI integration, AI PC, IT sustainability, continuous transformation	Positive: 70% impact on development by 2026; AI-PC – 55% of the market by 2026, but slowdown due to uncertainty	Gartner: 80% CIO with KPI sustainability by 2027; 40% of vendors invest in AI features; Continuous transformation for adaptability

Source: Compiled by the author based on [7–25].

In general, we can say that digitalization is a key tool for improving the efficiency of modern enterprises, as it allows you to optimize production processes, improve interaction between business partners, reduce operating costs, and ensure the use of real-time data for more accurate decision-making. It also creates opportunities to automate routine tasks and increase staff productivity. However, successful transformation is impossible without a deep review of existing business models, because the introduction of new technologies alone does not guarantee the full disclosure of the potential of digital solutions [26]. This approach requires a strategic rethinking of goals, operational processes and ways of interacting with the market.

Digital transformation is also driving the development of innovation ecosystems that connect companies, entrepreneurs, technology vendors, and a variety of complementary resources. Such ecosystems, in particular based on digital platforms such as Amazon or Microsoft, enable the creation of new forms of added value and contribute to increased cross-sectoral interaction. The ecosystem approach makes it possible to integrate natural, social and business ecosystems, forming “green” models of digital transformation (GDT) and supporting the implementation of the Sustainable Development Goals (SDGs) [27]. This enhances the consistency of digital changes and expands the possibilities of their scaling.

Successful implementation of digital transformation involves much more than automating existing business processes. It involves a deep reform of business models by synchronizing technological, strategic, operational and managerial dimensions. For this purpose, a unified conceptual framework is used, in particular the digital transformation canvas, which helps to structure the key elements of digital change and ensure the consistency of management decisions [28]. It is an integrated

approach that allows enterprises to fully adapt to the challenges of the digital economy and ensure long-term competitiveness.

6. Conclusions

Digital transformation has become a key determinant of international business development, determining the ability of companies to adapt to rapid technological, economic and social changes. The integration of digital technologies – from artificial intelligence and data analytics to IoT, cloud services and robotics – is shaping a new architecture of global value chains, optimizing business processes and expanding opportunities for strategic growth.

Optimizing the digital transformation of international business is a multidimensional task that covers technological, economic, managerial and social aspects. The success of this process depends on a combination of innovation capacity, institutional support, investment in human capital and the ability of companies to respond strategically to global technological trends. The results show that systemic and adaptive digital transformation is the key to increasing the competitiveness of international business in the fast-paced digital age.

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