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Digital Transformation as a Strategic Imperative for the Development of Innovative Entrepreneurship in Ukraine in the Context of International Economic Cooperation

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ABSTRACT

The article examines digital transformation as a strategic imperative for the development of innovative entrepreneurship in Ukraine under international economic cooperation. The purpose of the study is to substantiate the impact of digital transformation on the international cooperation of innovative firms and to develop a methodological toolkit for assessing their readiness for international digital cooperation. The methodological framework combines systemic, structural-functional, comparative, and indicator-based approaches. Drawing on recent international and Ukrainian studies, as well as analytical materials from the OECD, the European Commission, and the European Digital Innovation Hubs Network, the paper identifies four mechanisms through which digital transformation reshapes international economic cooperation: partnership-related, coordination-institutional, production-integration, and market-internationalization mechanisms. The study develops an original methodological toolkit for assessing the readiness of innovative firms for international cooperation, structured into five blocks: digital infrastructure, digital competencies and managerial capacity, innovation activity, international integration, security and organizational resilience. An integral index of readiness for international digital cooperation and an interpretation matrix are proposed, combining criteria, indicators, readiness levels, and an adaptation vector for Ukraine. The practical value of the results lies in the possibility of applying the model for firms' self-assessment, advisory support by development institutions, and the design of targeted public policies aimed at the digital transformation of small and medium-sized enterprises.

KEYWORDS

innovative entrepreneurship, digital transformation, international economic cooperation, international cooperation, digital maturity, digital capabilities, SME internationalisation, methodological toolkit, digital resilience.

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СОЦІАЛЬНИЙ РОЗВИТОК: економіко-правові проблеми

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Цифрова трансформація як стратегічний імператив розвитку інноваційного підприємництва України в умовах міжнародного економічного співробітництва

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СТАТТЯ

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АНОТАЦІЯ

У статті досліджено цифрову трансформацію як стратегічний імператив розвитку інноваційного підприємництва України в умовах міжнародного економічного співробітництва. Метою дослідження є обґрунтування її впливу на міжнародну кооперацію інноваційних підприємств і розроблення методичного інструментарію оцінювання готовності до міжнародної цифрової кооперації. Методологічну основу становить поєднання системного, структурно-функціонального, порівняльного та індикаторного підходів. На основі сучасних міжнародних і українських досліджень, а також аналітичних матеріалів ОЕСР, Європейської Комісії та мережі європейських цифрових інноваційних хабів виокремлено чотири механізми її впливу на міжнародне економічне співробітництво: партнерський, координаційно-інституційний, виробничо-інтеграційний і збутово-інтернаціоналізаційний. Розроблено методичний інструментарій оцінювання готовності інноваційного підприємства до міжнародної кооперації, структурований за п'ятьма блоками: цифрова інфраструктура, цифрові компетентності та управлінська спроможність, інноваційна активність, міжнародна інтегрованість, безпекова й організаційна стійкість. Запропоновано інтегральний індекс готовності до міжнародної цифрової кооперації та матрицю інтерпретації результатів, яка поєднує критерії, індикатори, рівні готовності й адаптаційний вектор для України. Практичне значення моделі полягає в її придатності для самооцінювання підприємств, консультативної підтримки з боку інституцій розвитку та формування цільових заходів державної політики цифрової трансформації малих і середніх підприємств.

КЛЮЧОВІ СЛОВА

інноваційне підприємництво, цифрова трансформація, міжнародне економічне співробітництво, цифрова зрілість, цифрові спроможності, інтернаціоналізація малих і середніх підприємств, глобальні ланцюги створення вартості, методичний інструментарій, цифрова стійкість.

1. Introduction

In the modern economy, digital transformation has moved from the sphere of technological modernization to the range of basic prerequisites for the development of innovative entrepreneurship in the international environment. For small and medium-sized enterprises, its importance is associated with internal efficiency, access to foreign markets, participation in international cooperation networks, access to knowledge, partners and customers through digital channels, as well as inclusion in global value chains. war, destruction of part of the infrastructure, change in logistics, the European integration course, and the need for accelerated adaptation of the business sector to new formats of international interaction. Under such circumstances, scientific interest is focused on the mechanisms of influence of digital transformation on international economic cooperation of innovative enterprises and on the development of tools for assessing their readiness for international digital cooperation.

2. Literature Review

In modern scientific works, the digital transformation of small and medium-sized enterprises is increasingly considered as an important factor in internationalization, updating business models and enhancing innovation activity. In this context, Bargoni et al. [1] in a systematic literature review show that digitalization affects the international development of SMEs through digital technologies, digitalization of value chains and the use of digital tools for access to knowledge and foreign markets. H. Aghazadeh et al. [2] prove that the international results of the digital transformation of SMEs depend not only on the introduction of technologies as such, but also on the level of digital capabilities, digital resilience and digital maturity of the enterprise. Jiang and Wang [3] establish that digital transformation accelerates the speed of internationalization of enterprises, and the strength of such an effect increases in the presence of developed innovation capacity.

A separate segment of modern literature is devoted to the internal mechanisms through which digital transformation turns into a factor in the innovative development of an enterprise. Thus, Jie et al. [4] substantiate that the digital maturity of high-tech SMEs has a positive effect on their innovative performance through the development of dynamic capabilities. Merín-Rodrigáñez et al. [5] prove that for innovative SMEs, the key link between digital transformation and performance is the innovation of the business model, therefore, the effect of digitalization is realized through organizational and market reconfiguration of the logic of value creation. Zhang et al. [6] show that digital platforms simultaneously expand SMEs' access to international markets and form new dependencies, and the nature of such influence is determined by the level of internal digitalization of the enterprise. Brieger et al. [7] prove that the digitalization of new enterprises is related to their international orientation combined with the institutional conditions of the country of origin and the quality of digital infrastructure.

In the Ukrainian scientific segment, interest in the digital transformation of business in the conditions of war, restrictions on the development of SMEs and the need to strengthen innovation and foreign economic activity is growing markedly. Shveda et al. [8] interpret digital transformation as an imperative for the innovative development of business processes in wartime conditions and emphasize its role in increasing the adaptability of enterprises. Reshetnyak et al. [9] systematize the features of digitalization of small and medium-sized businesses in Ukraine, emphasizing the barriers of investment, personnel and organizational nature. Anopa and Illiashenko [10] consider digital transformation as an environment for conducting innovative business, within which technological solutions are combined with the renewal of business models, management flexibility and personalization of market interaction. Rusnyak [11] has already directly analyzed the digitalization of SMEs as a driver of their internationalization, emphasizing its importance for entering foreign markets, reducing transaction costs and inclusion in global value chains.

Modern scientific literature fully covers certain components of the relationship between digital transformation, innovative entrepreneurship and international activities of enterprises: the role of digital capabilities and digital maturity, the importance of business model innovation, the impact of platform mechanisms, institutional environment and innovation capacity on the internationalization of SMEs. Research remains segmented by individual aspects of the problem. Insufficient attention remains paid to a holistic methodological approach to assessing the readiness of an innovative enterprise for

international cooperation, which would combine digital infrastructure, managerial and technological competencies, innovation activity, platform inclusion, organizational resilience and the ability to work in an international environment. Such an analytical gap determines the subject focus of the article. In contrast to the existing studies, which mainly analyze either the digitalization of SMEs or their internationalization, the article proposes an integrated model that combines digital, innovative, international and security dimensions in a single toolkit for assessing the readiness of an enterprise for international digital cooperation.

3. Problem Statement

The article is aimed at substantiating digital transformation as a strategic imperative for the development of innovative entrepreneurship in the context of international economic cooperation and developing methodological tools for assessing the readiness of an enterprise for international cooperation. To achieve this goal, the article solves the following tasks: to clarify the theoretical and analytical content of the relationship between digital transformation, innovative entrepreneurship and international economic cooperation; to identify the strategic imperatives of digital transformation for the development of innovative entrepreneurship; to systematize the criteria and indicators for assessing the readiness of the enterprise for international cooperation; to propose a generalized methodological approach to assessing such readiness in the form of an analytical matrix.

4. Methods and Materials

The methodological basis of the study is a combination of systemic, structural-functional, comparative and indicator approaches. The paper uses methods of scientific generalization and systematization to streamline modern approaches to the analysis of digital transformation, innovative entrepreneurship and international economic cooperation; structural and functional analysis – to identify connections between the digital resources of the enterprise, its innovative activity and opportunities international cooperation; comparative analysis – to compare international and Ukrainian approaches to the digitalization of SMEs; indicator modeling – to build an author's system of indicators for assessing the readiness of an enterprise for international cooperation. The materials of the study were modern international and Ukrainian scientific publications on the problems of digital transformation of SMEs, innovative entrepreneurship, platform economy, digital maturity and internationalization of business. The result of the methodological part of the study is a system of criteria and an analytical matrix for assessing the readiness of an innovative enterprise for international cooperation.

5. Results and Discussion

Digital transformation is a structural factor in the development of innovative entrepreneurship in the context of international economic cooperation. Modern research shows that the digitalization of small and medium-sized enterprises expands the opportunities to enter foreign markets, inclusion in international value chains and the use of digital channels of access to knowledge and external partners [1]. The level of digital capabilities and digital maturity of the enterprise is of decisive importance [2; 4]. In this study, digital capabilities are understood as a set of organizational, human and technological capabilities that ensure the effective use of digital solutions in production, management, communication and market interaction. Digital maturity characterizes the degree of integration of such solutions into the business model, management system and value creation processes. The combination of these parameters determines the international effectiveness of the digitalization of the enterprise.

For innovative enterprises, this connection is especially important, since digital transformation accelerates internationalization in the presence of developed innovation capacity [3], contributes to the growth of innovation efficiency through the development of dynamic capabilities [4] and realizes its effect through the renewal of the business model [5]. Separately, it is shown that digital platforms are able to expand the international presence of small and medium-sized enterprises, although at the same time they form new dependencies on the platform infrastructure and the internal level of digitalization of the enterprise [6]. The institutional environment also significantly modifies this effect, influencing the

extent to which digitalization is transformed into the international activity of new enterprises [7]. Therefore, digital transformation is no longer reduced to internal optimization of processes, but determines access to markets, partner networks, external knowledge, platform mechanisms of cooperation and new models of value creation.

For Ukraine, the strategic importance of digital transformation is enhanced by military losses, the destruction of part of the infrastructure, the need to restore business ties and a change in the geography of sales. According to OECD estimates, small and medium-sized enterprises account for 99.9% of all enterprises in Ukraine, but the level of their use of digital tools remains lower than that of large businesses, which narrows their adaptability and scalability [12]. Under such conditions, digital transformation for Ukrainian innovative small and medium-sized enterprises is a basic factor of sustainability, recovery and inclusion in international cooperation networks.

The practical significance of this imperative is enhanced by the formation of a digital infrastructure to support entrepreneurship in Ukraine. As of March 16, 2026, Diia united 24 million users and provided 77+ services in the app [13]. At the same time, the Diia.Business platform has deployed a network of 16 entrepreneur support centers, of which 13 were operating at the beginning of 2026 [14], and is also developing an export direction focused on helping small and medium-sized enterprises enter new markets, find partners, and use foreign economic tools [15]. Taken together, this gives grounds to talk about the gradual formation of the national digital environment, in which public services, consulting infrastructure and market adaptation tools begin to work as interconnected elements of supporting entrepreneurial development.

The European dimension of digital transformation for Ukraine has strengthened since joining the Digital Europe program in September 2022, which opened up access for Ukrainian enterprises, organizations and public authorities to competitions and support tools in the areas of supercomputing, artificial intelligence, digital skills and widespread adoption of digital technologies [16]. In March 2025, six Ukrainian hubs were included in the network of European digital innovation hubs – CentralUkrainianEDIH, CLOTEX-HUB, Eastern Ukraine EDIH, LEAP EDIH, POLIDIH and WIN2EDIH [17]. The EDIH service model covers digital maturity assessments, testing of investment decisions, training, support in finding funding, and networking [18]. For Ukrainian innovative enterprises, this means expanding access to European digital ecosystems, technological expertise and institutional mechanisms of international cooperation.

The strategic nature of digital transformation does not eliminate the internal limitations of its implementation. For small and medium-sized enterprises, uneven access to financial resources, a shortage of digital competencies, the need for continuous staff training, high costs for the implementation of new solutions, and digital security risks remain barriers [2; 9; 12]. The effectiveness of digital transformation depends on a combination of technological, organizational, human resources, and institutional prerequisites. Because of this, it is advisable to transfer the analysis from the level of general declarations to the plane of evaluation criteria and indicators.

In the international dimension, the importance of digital transformation is manifested through four interrelated mechanisms: search for partners, coordination of cooperation, integration into value chains and digitally mediated access to foreign markets. Its impact on the international economic cooperation of innovative enterprises is realized through the introduction of digital technologies, the digitalization of value chains and the use of digital tools for access to knowledge and markets [1]. In the context of Ukrainian small and medium-sized enterprises, this logic is confirmed by Rusnyak [11], who considers digitalization as a driver of internationalization.

The first mechanism is related to changing the ways of finding international partners. Digital platforms, electronic marketplaces, and other platform environments reduce transaction costs, weaken geographical barriers, and expand opportunities for business networking in the international space [6]. For small and medium-sized businesses, this means moving from a limited circle of local contacts to wider access to external counterparties, customers and partner networks. This model is not neutral: expanding access to international interaction is accompanied by increased dependence of enterprises on the rules of platform infrastructure, commission policy, visibility algorithms and data management modes [6]. As a result, the architecture of international cooperation is changing due to the opening of new channels of interaction and the formation of new types of digital dependence, which should be taken into account when assessing the readiness of an enterprise for international cooperation.

The second mechanism concerns the coordination of joint projects and access to the institutional infrastructure of digital cooperation. With a total budget of more than €8.1 billion for 2021–2027, the Digital Europe Programme forms the framework conditions for the diffusion of digital technologies, the development of digital skills, artificial intelligence tools, cybersecurity and other components of the digital economy [19]. At the application level, these capabilities are complemented by a network of European digital innovation hubs. The official tool for primary diagnostics in this network is the Digital Maturity Assessment Tool, which allows you to assess the digital maturity of the organization and outline the further trajectory of its digital development [20]. At the same time, EDIHs function not only as advisory cells but as an institutional infrastructure for testing technologies for investment, training, fundraising, and networking [21]. After the inclusion of six Ukrainian hubs in the network in 2025, these tools have become of direct importance for Ukrainian enterprises [17], as they have facilitated access to European services for digital transformation and cross-border cooperation.

The third mechanism is related to the integration of innovative enterprises into global value chains. In this case, it is not primarily about the sales presence in foreign markets, but about the inclusion of the enterprise in production, technological and innovation networks, within which it participates in the creation of a product, process, or a separate functional unit of value. Digital transformation reduces coordination barriers, simplifies information exchange and increases the ability of the enterprise to interact with remote partners [1; 2]. At the same time, the very participation in global value chains stimulates the innovative activity of small and medium-sized enterprises. As shown by Eissa and Zaki [22], such participation has a positive effect on product and process innovations and can partially compensate for the limited own costs for research and development. For innovative entrepreneurship, this means that digital solutions do not work in isolation, but as a tool for production and innovation integration into the international division of labor.

The fourth mechanism concerns access to foreign markets as a form of international sales and the spread of innovations outside the national economy. Here, e-commerce, digital promotion channels, platform models of market entry, and specialized export services are of key importance. For Ukrainian small and medium-sized enterprises, the export direction of the Diia.Business platform [15] is of additional importance, which reduces information and organizational barriers to entering new markets. At the same time, digital innovations enhance the internationalization of enterprises not only through sales channels, but also through the dissemination of knowledge to foreign markets. As Wu and Xu [23] show, digital innovations have a positive effect on the international activity of enterprises, and this effect is enhanced by the characteristics of the enterprise itself and its market presence. In combination with the conclusions of Jiang and Wang [3] and Jie et al. [4], this gives grounds to assert that digital transformation accelerates the international spread of innovations, primarily when it relies on the innovative and dynamic capacity of the enterprise.

In the crisis dimension, the impact of digital transformation on international economic cooperation acquires additional importance. The OECD, in its study on Ukraine, considers the digital transformation of business as a factor in increasing resilience and economic recovery during the war [12]. At the same time, the OECD D4SME Survey 2024 shows, in a broader international context, that digital tools help SMEs weather short-term shocks and strengthen long-term resilience [24]. For Ukraine, where small and medium-sized enterprises dominate the economic structure, this means that digital transformation not only expands the competitiveness of innovative entrepreneurship, but also forms systemic conditions for its adaptation, international cooperation and inclusion in global digitally mediated ecosystems.

The identified mechanisms of the impact of digital transformation on international economic cooperation require applied assessment tools. For this purpose, a model for assessing the readiness of an innovative enterprise for international digital cooperation has been developed, built on a combination of approaches to digital maturity, dynamic capabilities, innovation activity, international integration and security resilience. Its difference from tools focused mainly on diagnosing the state of digitalization is to assess the ability of an enterprise to use digital solutions in cross-border interaction. The model covers five blocks: digital infrastructure, digital competencies and managerial capacity, innovation activity, international integration, security and organizational resilience. Each block contains four indicators normalized in the range from 0 to 1, and the integral indicator is defined as the arithmetic mean of five block estimates. For the analytical interpretation of the results, working intervals are proposed: low level of readiness – less than 0.4; medium – from 0.4 to 0.7; high – more than 0.7. Such

boundaries are of a preliminary methodological nature and are intended for the typology of digital cooperation profiles.

For the applied use of the proposed model, its indicators can be operationalized on the basis of a combination of internal documents of the enterprise, management self-assessment, confirmation of participation in digital programs, data on international activities and information on the actual use of digital solutions. Such logic ensures the reproducibility of the assessment and the suitability of the model for further adaptation to industry conditions.

The first block, digital infrastructure, fixes the technical and platform basis of international cooperation. Its indicators should include: the share of employees or workplaces provided with stable access to broadband Internet; the share of critical business processes supported by cloud solutions; availability of integrated resource and customer relationship management systems with the possibility of automated data exchange; the level of integration of the enterprise with national digital services for business. It is advisable to measure the last indicator not by a general declaration, but by the number or share of key administrative and service procedures that the company actually carries out through digital government platforms.

The second block, digital competencies and managerial capacity, characterizes not only the skills of personnel but also the ability of management to turn digital solutions into a tool for international development. Indicators here can be: the share of employees who have completed verified training in digital skills; the level of use of data analytics and artificial intelligence tools by the management team; the degree of automation of management processes; the speed of adaptation of the enterprise to new digital technologies. The latter indicator should be measured by the average time between the identification of a relevant digital solution and its actual implementation in the company's activities or by the frequency of updating digital processes during a certain period.

The third block, innovation activity, translates into a measurable form the ability of the enterprise to create and commercialize new solutions. It is advisable to take into account: the number of implemented digital products or process innovations over the past three years; research and development costs as a percentage of revenue; the presence of formalized results of intellectual activity related to digital technologies; share of innovations commercialized through digital channels. To ensure comparability with digital innovation, it is advisable to attribute only those solutions that have changed the product, process, customer interaction channel or way of creating value, and not any technical update.

The fourth block, international integration, is directly related to the results of the preliminary analysis of international economic cooperation. The indicators of this block can be: the share of revenue from international sales made through e-commerce and digital platforms; participation in European digital networks and programs, in particular EDIH and Digital Europe; the number of active international partnerships supported by digital coordination tools; and the degree of inclusion of the enterprise in global value chains. The latter indicator should be evaluated due to the presence of regular contractual links with international production or innovation networks, the share of income from such connections and the functional role of the enterprise in the value chain.

The fifth block, security and organizational stability, fixes the condition without which digital cooperation in the international environment is unstable. This block should include: the presence of a certified information security management system or functionally equivalent procedures; compliance with personal data protection requirements compatible with European Union law; availability of business continuity plans in the face of cyber threats and disruptions; availability of procedures for checking the compliance of data processing regimes with the requirements of international contracts and regulatory acts. For Ukrainian enterprises, this block is of particular importance due to war risks, increased vulnerability of infrastructure and requirements for trust in international relations.

To summarize the logic of the toolkit, it is advisable to present the strategic imperatives of digital transformation in the form of a table.

Strategic imperatives systematized in Table 1 show the functioning of digital transformation in modern European practice as an institutionally supported factor of international competitiveness. For Ukraine, their importance is enhanced by the need for post-war recovery, European integration and overcoming structural constraints on the development of SMEs. The interconnection of digital infrastructure, competencies, innovation activity, international integration and security resilience

necessitates an integral assessment that allows you to determine the limitations of international cooperation and adaptation priorities.

Table 1. Strategic imperatives of digital transformation of innovative entrepreneurship in the context of international economic cooperation

Imperative	Content in European/international practice	Effect for Ukraine
Access to digital infrastructure	Digital Europe Programme, EDIH Network, Cloud Solutions and Digital Computing Power	Expanding opportunities for scaling exports and inclusion in international partnerships
Development of digital competencies	Systematic training programmes, digital maturity assessment tools, EU initiatives in the field of digital skills	Improving the quality of management, adaptability and readiness of SMEs for international cooperation
Innovation activity	Use of artificial intelligence, data analytics, platform solutions, and digital commercialization channels	Accelerating the commercialization of innovations and strengthening competitiveness
International Integration	Participation in European networks, development of e-commerce and cross-border digital cooperation	Entering EU markets and integrating into European digital ecosystems
Safety Resilience	Information security standards, data protection requirements, digital resilience tools	Data and Business Process Protection in International Cooperation

Source: Compiled by the authors based on [1; 2; 12; 19; 20; 24].

The choice of five blocks is due to the need to combine in one analytical design the technological basis of digitalization, human resources and managerial capacity, innovation potential, foreign economic inclusion and security resilience as a minimum sufficient set of dimensions of international digital cooperation. The use of the equilibrium integration model is not due to the assumption of the same actual significance of all blocks, but to the need to ensure the transparency of the calculation, inter-company comparability and suitability of the model for primary analytical application.

Within the framework of this study, the integral indicator is proposed to be defined as an index of readiness for international digital cooperation, which is calculated as the arithmetic mean of five block assessments:

$$IRIDC = \frac{(B1 + B2 + B3 + B4 + B5)}{5}, \quad (1)$$

where B1 is digital infrastructure;
B2 is digital competence and managerial capacity;
B3 is innovation activity;
B4 is international integration;
B5 is security and organizational resilience.

This approach ensures the comparability of results between enterprises and suitability for further monitoring of dynamics. In further applied research, a weighted model can also be used if industry specifics require an increased value of individual blocks.

To interpret the integral indicator, it is advisable to distinguish three levels of readiness. The low level means that international cooperation for the enterprise remains mainly potential, as digital infrastructure, competencies and security procedures do not create a sufficient basis for sustainable cross-border interaction. The middle level characterizes enterprises that already use separate digital solutions, have experience in participating in foreign markets or networks, but have not yet achieved a holistic integration of digital, innovation and international dimensions. A high level is inherent in enterprises where digital transformation has already become a component of the business model, and international cooperation is supported technologically, organizationally, and institutionally.

To ensure analytical clarity, it is advisable to summarize the results in the form of an assessment matrix that combines criteria, examples of indicators, an interpretation scale, and an adaptation vector for the Ukrainian context. Such a matrix performs not only a diagnostic, but also a strategic function, since it combines the assessment of the current state with possible directions of further development.

The matrix given in Table 2 allows you to move from the description of individual characteristics of the enterprise to its typology according to the level of readiness for international cooperation. A low level means that the company has not yet formed the necessary combination of digital infrastructure, competencies, international relations and security procedures.

Table 2. Matrix of primary diagnostics of the readiness of an innovative enterprise for international digital cooperation

Criterion	Indicators (examples)	Interpretation scale	Adaptation vector for Ukraine
Digital infrastructure	stable broadband Internet; use of cloud solutions; integrated resource and customer relationship management systems; the use of digital government services for business, in particular Diia.Business and related electronic tools	Low – lack of cloud solutions, occasional use of digital services, scattered control systems; medium – partial integration of individual processes; High – system integration of digital infrastructure into core business processes	development of access to digital infrastructure, involvement of EDIH tools, use of the opportunities of the Digital Europe program
Digital competences and managerial capacity	staff training; the use of data analytics and artificial intelligence tools; automation of management processes; Digital Onboarding Speed	Low – digital skills are fragmented, management decisions are mostly not based on analytics; medium – there are separate digital competencies and partial automation; High – systematic management of digital development and rapid implementation of new solutions	government and corporate training programs, strengthening managerial capacity, development of digital skills
Innovation activity	implemented digital product or process innovations; research and development costs; formalized results of intellectual activity, including not only patents, but also copyrights, databases, trademarks, know-how; Digital commercialization channels	Low – single innovative solutions without sustainable commercialization; medium – regular updates of individual products and processes; high – systemic innovation activity and entry of innovations into international circulation	support for startups, expansion of innovative financing programs, development of digital commercialization channels
International Integration	international sales through e-commerce and digital platforms; participation in European digital networks and programs; international partnerships; inclusion in global value chains	Low – predominantly local orientation and lack of a stable external presence; medium – partial integration through separate sales channels or partnerships; high – systemic international presence, multi-channel cooperation and sustainable participation in cross-border networks	harmonization with EU approaches, involvement in EDIH, development of export platforms, strengthening cross-border cooperation
Security and organizational resilience	information security; compliance with data protection requirements; business continuity plans; Conformity Verification Procedures in International Transactions	Low – reactive approach and lack of formalized procedures; medium – the presence of separate security and organizational mechanisms; high – systematic management of safety, business continuity and compliance with international requirements	strengthening cybersecurity, adapting to European data protection requirements, developing business continuity mechanisms

Source: Compiled by the authors based on [1–4; 12; 15; 19; 20; 24].

The intermediate level reflects an intermediate state when individual elements are already present, but they do not yet form an integral system. A high level means that digital transformation is already integrated into the business model, and international cooperation is based on a stable institutional, organizational and technological framework.

The practical value of the matrix is primarily associated with the identification of blocks that hinder the transition to a higher level of readiness. With infrastructure constraints, technological retrofitting and connection to digital services become a priority. With a shortage of competencies, the key direction is the training of personnel and the management team. With insufficient international integration, export support tools, digital platforms, and network cooperation are being updated. With a weak security bloc, international enlargement remains unstable.

An illustrative application of the model can look like this: the enterprise demonstrates high values in terms of digital infrastructure and competencies, but low values in security and organizational stability. With this profile, the expansion of the digital presence will be constrained by insufficient data protection, lack of business continuity procedures, or non-compliance with the requirements of

international contracts. The matrix allows you to record the level of development and localize the primary direction of corrective actions. The existing OECD estimates of the uneven digitalization of Ukrainian SMEs indicate a high probability of significant inter-company variability in individual blocks of the model, confirming the feasibility of not only integral, but also profile analysis of readiness for international digital cooperation.

6. Conclusions

The article substantiates that digital transformation in modern conditions is a key prerequisite for increasing the internal efficiency of an innovative enterprise, its capacity for international cooperation, participation in global value chains and adaptation to external shocks. For Ukraine, this conclusion is of particular importance given the military challenges, structural limitations on the development of SMEs and the need for accelerated integration into the European digital and economic space.

The analysis made it possible to identify four mechanisms of the impact of digital transformation on international economic cooperation of innovative enterprises and, on this basis, to develop a toolkit for assessing readiness for international digital cooperation. Its distinction lies in the combination of digital, innovative, international and security dimensions in a single model suitable for diagnosing the level of readiness and identifying the structural limitations of international enterprise expansion.

The practical significance of the model is related to its suitability for self-assessment of enterprises, advisory support from development institutions and the formation of targeted measures of the state policy for the digital transformation of SMEs. The proposed toolkit creates an analytical basis for typologizing the profiles of digital readiness of enterprises, identifying structural limitations of international cooperation and coordinating corporate and political decisions in the field of digital transformation of SMEs.

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