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DIGITALIZATION PROCESSES IN THE MANAGEMENT OF THE FUNCTIONING OF AGRICULTURAL ENTERPRISES: A CASE STUDY OF UKRAINE

Mykola DZIAMULYCH[1*], Olha SHULHA[2], Olesya BINERT[3], Viacheslav OSADCHYI[2], Oleksii SYSOIEV[4], Volodymyr KOVALIV[3], Oksana KOSHCHII[1], Iryna SHUBALA[1*], Tetiana SHMATKOVSKA[5]**

[1]Lutsk National Technical University, *Department of Economics, **Department of Management, 75 Lvivska str., 43018, Lutsk, Ukraine. Emails: m.dziamulych@lntu.edu.ua, o.kocshiy@lntu.edu.ua, i.shubala@lntu.edu.ua
[2]Borys Grinchenko Kyiv Metropolitan University, Department of Management, 13-B, Levka Lukianenka str., 04212, Kyiv, Ukraine. Emails: o.shulha@kubg.edu.ua, v.osadchy@kubg.edu.ua
[3]Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, Department of Management and Development of Territories named after Yevhen Khraplyvy, 50 Pekarska Str., 79010, Lviv, Ukraine. E-mails: olesya200678@ukr.net, volodymyrkovaliv@gmail.com
[4]The Mazovian University in Płock**,** Department of Social Sciences, 2, Generała Jarosława Dąbrowskiego sqr., 09-402, Plock, Poland. E-mail: o.sysoiev@mazowiecka.edu.pl
[5]Lesya Ukrainka Volyn National University, Department of Accounting and Taxation, 28 Vynnychenko str., 43025, Lutsk, Ukraine. E-mails: shmatkovska2016@gmail.com, shmatkovska.tetyana@vnu.edu.ua

Corresponding author: shmatkovska2016@gmail.com

Abstract

The article explores the peculiarities of digitalization in the management of agribusiness enterprises as a key factor in enhancing their efficiency under modern economic conditions. Data from the Statistical Institute and other sources have been processed using abstract-logical method, analysis and synthesis, induction, systematization and generalization, monographic and grouping methods. The distribution of countries around the world by the level of digitalization of the economy was studied. The evolution of business models in the agricultural sector amid economic digitalization is examined. The study analyzes contemporary information technologies widely used in the Ukrainian agrarian business. The dynamics of enterprises engaged in e-commerce operations in Ukraine are assessed. A regional classification of Ukraine is conducted based on the share of agribusiness processing enterprises involved in e-commerce. The research also investigates the dynamics of agricultural product volumes sold through electronic commerce in Ukraine. Conceptual foundations for the implementation of strategic directions for digital transformation in the agribusiness sector of Ukraine are proposed.

Key words**:** *digitalization, agribusiness, management, e-commerce, information technologies, business models*

INTRODUCTION

The digitalization of the agribusiness sector serves as a fundamental vector in the evolution of economic systems, driving radical transformations in managerial processes and the strategic positioning of enterprises within the industry. Amid increasing global market volatility and escalating regulatory pressures, digital technologies have emerged as key drivers of operational efficiency and the sustainable development of agribusiness in Ukraine. Institutional and technological changes accompanying digitalization processes are shaping a new paradigm of agribusiness management, where information-analytical tools and automated control systems play a central role.

It is noteworthy that the application of digital platforms and algorithmic forecasting models facilitates a synergistic effect by integrating production, logistics, and financial processes. Consequently, adaptive digital management models in the agricultural sector are transforming decision-making methodologies, emphasizing the minimization of transaction costs and the overall optimization of resource allocation. At the same time, the differentiation

of digital strategies is contingent upon the level of technological maturity, scale of operations, and specific market conditions of enterprises, resulting in a heterogeneous impact of digitalization on the industry's overall competitiveness.

Many scientists and practitioners have studied this issue, among which it is worth highlighting the research of such authors as N. Antoniuk [1], I. Arakelova [2], M. Bezpartochnyi [3], I. Britchenko [4-8], A. Dibrova [10], S. Ionitescu [12], N. Khomiuk [13], V. Kostiuk [14], M. Kryshtanovych [15], N. Kunitsyna [16], M. Kuzheliev[17], I. Mazniev [19], T. Mirzoieva [22], A. Popescu [23-32], M. Rudenko [33], V. Sarioglo [34], T. Shmatkovska [35-41], R. Sodoma [42-43], A. Verzun [45], Zastrozhnikova [47], A. Zielińska [47] and others.

In the context of Ukraine, the digitalization of the agricultural sector is an integral component of its adaptation to integration challenges associated with European integration and broader geoeconomic shifts. Thus, an in-depth examination of these processes is critically important for the formulation of effective strategies for digital development in the agricultural sector, the mitigation of associated risks, and the maximization of economic benefits.

MATERIALS AND METHODS

The study of digitalization processes in the management of agribusiness enterprises in Ukraine utilized a range of specialized scientific analysis methods, ensuring a comprehensive assessment of digital transformation and its impact on the efficiency of business activities in the sector.

The abstract-logical method was employed for the theoretical generalization of key trends in the digitalization of agribusiness enterprises, the formulation of conceptual principles, and the determination of the logical sequence of transformation processes. This method contributed to the systematization of scientific approaches to analyzing digital tools used in enterprise management.

Based on the use of analysis and synthesis methods, the specifics of digitalization of business processes at agribusiness enterprises were assessed, the level of integration of modern digital technologies in them was determined, and the impact of digitalization on the growth of productivity of their production activities was investigated. In addition, the results obtained were summarized using the synthesis method, on the basis of which approaches were formed to intensify the pace of digitalization in the agricultural sector of Ukraine on the basis of increasing the operational efficiency of business processes.

The induction method clarified the features of digitalization in agribusiness processes and regional distinctions, while deduction was applied to define the role of digitalization in managing economic activities and its influence on managerial functions.

The monographic method facilitated an in-depth analysis of contemporary approaches to the digitalization of management processes in Ukrainian agribusiness enterprises. Both scientific and practical aspects of using information technologies were examined, focusing on the automation of operational processes, monitoring of production indicators, and market situation forecasting.

The method of systematization and generalization enabled the structuring and interpretation of collected information on digital tools and technological solutions used in Ukraine's agricultural sector.

To construct and visualize the cartogram of digital transformation in agricultural enterprises, a grouping method was applied, allowing the identification of digitalization levels across Ukraine's regions. Based on this, key factors causing the unevenness of the process were clarified, and prospects for transforming the infrastructure of agricultural enterprises in specific regions were outlined.

These methods enabled a comprehensive assessment of digital transformation specifics in Ukraine's agricultural sector and highlighted the main directions for the further development of the digital agricultural ecosystem.

RESULTS AND DISCUSSIONS

In the context of transformational processes of the modern economy, digital modernization of business entities in the agricultural sector appears as a determinant vector of increasing their operational efficiency and strategic

adaptability to fluctuations in the market environment. At the same time, the institutionalization of digital tools and algorithmic solutions ensures not only the total automation of agricultural production cycles, but also the implementation of digital systems in the context of management synergy, which creates the prerequisites for increasing system manageability and optimizing the functional and organizational architecture of enterprises of the agro-industrial complex. At the same time, disparities in access to technology, institutional barriers, and financial constraints create imbalances in the pace of digital transformation both within individual economies and on a global scale. In particular, current trends in the global differentiation of digital transformation levels among national economies, in our view, are determined by the uneven development of information and communication technologies and the level of investment in the digital economy. Based on this, distinct groups of countries can be identified according to the level of digitalization of their economic systems (Fig. 1).

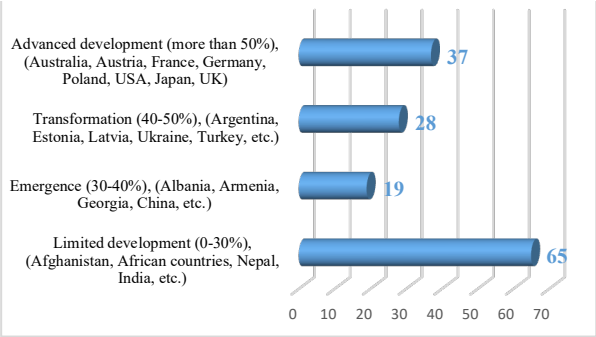

Fig. 1. Distribution of countries by level of economic digitalization in 2024
Source: systematized based on [11].

As seen in Fig. 1, the leading countries in digitalization (those with a high level of digital technology implementation) demonstrate strong integration of automated business management systems, as well as well-developed digital financial and logistics services. In our opinion, this contributes to increased productivity and the formation of new business models within these economic systems.

It is also important to note that countries in the transformation phase, including Ukraine, exhibit a moderate level of digital adaptation, characterized by the active implementation of electronic document management, the development of online trade, and the automation of production processes. However, key challenges remain, such as the digital divide between economic sectors and the need for large-scale investments in digital infrastructure. Conversely, countries with a limited level of digitalization face insufficient funding for technological development and low levels of digital literacy among the population, which slows their integration into the global digital economy. Overall, the growing role of digital competitiveness can be identified as a key factor in economic development and driving the modernization of market relations, including in the agricultural sector.

It is essential to highlight that the integration of digital technologies into the agricultural sector has its specific characteristics, dictated by the industry's unique features. Consequently, the evolution of business models in agricultural enterprises under economic digitalization has followed a slightly different trajectory compared to traditional industrial production (Fig. 2).

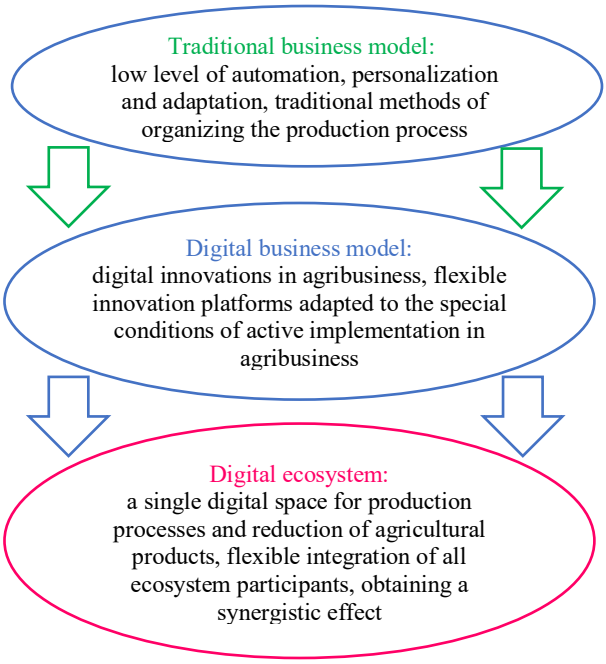

Fig. 2. Evolution of business models in agricultural enterprises under economic digitalization
Source: developed by the author.

In this context, a gradual paradigm shift in agribusiness management can be observed, influenced by digital technologies that have

enabled the optimization of production processes and increased productivity.

It should be noted that the absence of digital solutions in traditional business models has limited the scalability and flexibility of agricultural enterprises, maintaining high transaction costs and dependence on physical resources. Therefore, the transition to digital business models among agricultural producers has been driven by several key factors, including the automation of production processes, the development of e-commerce, and the integration of analytical systems for yield forecasting and cost optimization.

As a result of this transition, agricultural enterprises have achieved cost reductions in logistics and improved overall control over production processes. At present, the formation of digital ecosystems in the agribusiness sector is reshaping the nature of competition. Enterprises that implement automated management algorithms and gain competitive advantages are capable of enhancing their operational efficiency by mitigating the impact of seasonal risks and adopting a personalized approach to agribusiness management.

Under such conditions, the implementation of digital solutions creates the prerequisites for market concentration, as enterprises with access to innovative digital technologies become more resilient to market fluctuations, whereas less technologically advanced businesses risk losing their market share due to relatively lower efficiency and limited sales channels.

Table 1. Modern information technologies widely used in the Ukrainian agribusiness

Field of Application	Information Technologies
Mechanized soil cultivation, crop growing processes, and harvesting systems	Modern electronic cartographic solutions and tools based on satellite image analysis; visualization of real-time soil express analysis dynamics; development of yield maps for agricultural crops; monitoring of crop development dynamics and changes; identification of the most productive and fertile land plots; environmental condition monitoring of fields; crop yield forecasting.
Information solutions for the logistics and distribution of agribusiness products	Optimization of financial and time expenditures for planning routes for the collection and transportation of harvested agricultural products from the field to storage facilities or processing enterprises.
Monitoring the condition and utilization time of agricultural machinery	Optimization of scheduling and costs for routine and capital maintenance of agricultural machinery; prevention of premature wear of specific parts or mechanisms through a notification system and record-keeping.

Source: summarized based on [20; 46].

At the same time, the efficiency of enterprises largely depends on the functional purpose and scope of modern information technologies applied in agribusiness in Ukraine (Table 1).

Analyzing the parameters of the economic effectiveness of the implementation of digital technologies in the domestic agricultural sector, it is advisable to divide them structurally and functionally into priority vectors of digitalization. Among them, aerial photogrammetric complexes based on unmanned aircraft systems, agrochemical spectroscopy and geochemical analysis of soil cover, satellite remote agricultural monitoring analytics, as well as integrated meteorological forecasting systems are distinguished. These technological domains act as strategic drivers of the transformation of agricultural production in the digital economy. (Table 2).

Table 2. The multiplier effect of integrating digital technologies in the agricultural sector

Digital Technology	Economic Impact
Parallel guidance	Fuel, seed, fertilizer, and crop protection cost savings of up to 15%.
Variable rate application	Resource savings of up to 10%, increased profitability due to higher crop yields.
Soil analysis	Reduction in production costs, optimized fertilizer application, yield increase, and efficiency improvements by 10-30%.
Drones	Fuel savings, minimized use of seed materials, fertilizers, and irrigation water; preservation and enhancement of yields through timely sowing and harvesting; optimization of production costs and improved planning quality in agricultural enterprises.
Satellite monitoring	Reduction in fuel, seed, fertilizer, and crop protection costs; increased production efficiency; capability to assess land suitability, develop land reclamation plans, and estimate potential yield levels.
Meteorological monitoring	Increased efficiency of production operations, improved yield performance with reduced dependency on climatic conditions, resource savings, and enhanced financial results.

Source: systematized based on [9].

Assessing the dynamics of the number of Ukrainian enterprises engaged in e-commerce operations, as well as the total number of agribusiness enterprises involved in e-commerce, allows us to conclude a steady increase in market participants amid the digital transformation of the economy. In recent years, the overall number of enterprises engaged in e-commerce has demonstrated a growing trend, which is a result of the active implementation

of digital technologies and the increasing accessibility of internet infrastructure in Ukraine (Table 3).

Analyzing structural changes, attention should be paid to the dynamics of processing enterprises in Ukraine, whose share in the total number of e-commerce entities has gradually increased from 27.1% in 2020 to 28.3% in 2023. This dynamic reflects the institutional and technological adaptation of the processing sector to the paradigm of digital distribution channels and the evolution of electronic commercial interfaces within the B2B and B2C segments. At the same time, the specific index of the presence of processing industry enterprises in the total mass of Ukrainian economic entities involved in e-commerce activity has undergone a regressive trend (from 5.7% in 2020 to 5.3% in 2023), which is interpreted as evidence of a higher intensity of digital transformation in related sectoral domains of the national economy.

Table 3. Dynamics of enterprises engaged in e-commerce operations in Ukraine (2020–2023)

Indicator	Value by year			
	2020	2021	2022	2023
Number of enterprises that implement the full range of business operations within the electronic business environment, units	2,476	2,441	2,495	2,522
Total number of processing sector involved in digital transaction processes, units	676	663	685	723
- specific value in the structure of the total number of e-commerce entities, %	27.2	27.3	27.6	28.4
- specific weight in the total array of Ukrainian enterprises operating in the e-commerce format, %	5.7	5.4	5.5	5.3
The total number of agro-industrial formations integrated into electronic sales and procurement channels, units	157	148	156	172
- share in the total number of all processing enterprises in Ukraine engaged in e-commerce, %	23.3	22.2	22.3	22.6
- share in the total number of all enterprises engaged in e-commerce, %	6.9	6.5	6.7	7.0

Source: compiled based on [18, 44].

The agricultural sector deserves special attention, as its share among enterprises operating in e-commerce fluctuates between 6.5% and 7.0%. This indicates a stable interest of Ukrainian agribusiness in digital sales of finished products, although the growth rate here is noticeably lower than in related industries.

One of the key determinants of this phenomenon, in our analytical assessment, is the inertial dominance of classic sales trajectories combined with the complication of logistics configurations associated with the digital distribution of agricultural products within the national economic space of Ukraine. At the same time, the absolute number of Ukrainian agricultural enterprises using e-commerce has increased (from 157 units in 2020 to 172 units in 2023), pointing to the gradual formation of new market interaction models, particularly through electronic exchanges and marketplaces.

In Ukraine, the practical formation of new models of interaction of agricultural companies with the market through electronic exchanges and marketplaces occurs mainly through the integration of digital platforms into the processes of buying and selling agricultural products. Electronic exchanges, such as GrainTrade, AgroMarket and Agroxy, provide transparency of transactions, access to analytical data and expansion of sales markets. In turn, marketplaces, in particular Prom.ua, OLX Agro and specialized agricultural platforms, allow small and medium-sized producers to directly interact with end consumers and traders, which helps to minimize intermediary costs and increase price competition.

In our view, the key factors influencing these changes include economic incentives,

macroeconomic instability (the search for alternative sales channels amid logistical constraints), and targeted state support for business digitalization in Ukraine. The consequences of these processes may include further market concentration around major players, increased competition, and growing investments in technological solutions that optimize the operational activities of enterprises in the e-commerce sector in Ukraine.

Assessing the trends in the digitalization of Ukrainian agricultural enterprises at the regional level, we have developed a cartogram of Ukraine's regions based on the share of agribusiness processing enterprises engaged in e-commerce in 2022 (Fig. 3).

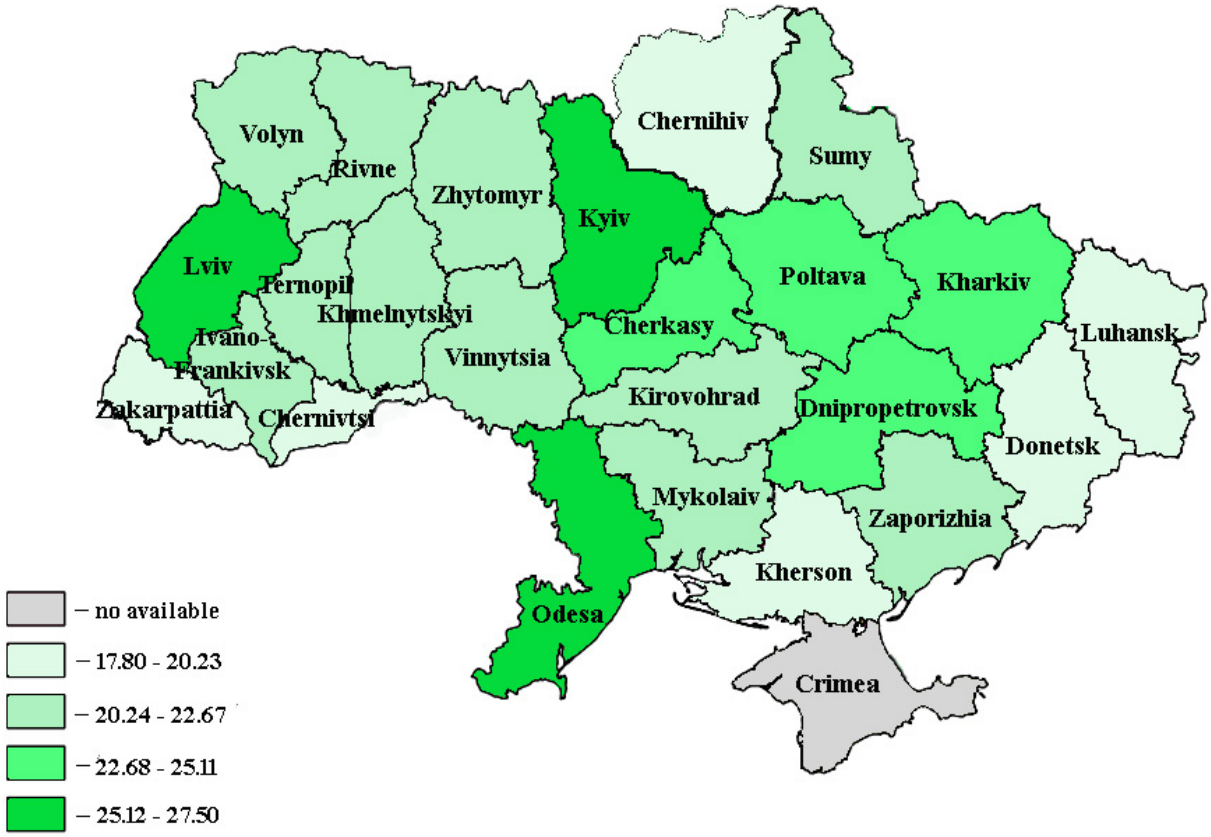

Fig. 3. Cartogram of the classification distribution of regions of Ukraine by the specific weight of entities of the processing segment of the agro-industrial system involved in e-commerce activities in 2022.
Source: constructed by the author based on [21].

In parallel, an analytical interpretation of the temporal dynamics of product sales volumes within the e-commerce sector in Ukraine indicates intensive scaling of virtualized product sales channels. The total volume of products sold via e-commerce in Ukraine increased from UAH 228.1 billion in 2020 to UAH 395.4 billion in 2023, indicating a large-scale transition of businesses to digital models for selling finished products (Table 4).

As Table 4 shows, the processing sector demonstrates a significant contribution to the macrostructure of the e-commerce segment of Ukraine - its share in the total volume of products sold increased from 27.1% in 2020 to 28.3% in 2023. Such dynamics serve as an indicator of the evolution of the commercial paradigm and its functional adaptation to the transformed requirements of the digitalized consumer market.

However, in the structure of sales volume sold via e-commerce in Ukraine, the share of agribusiness products decreased from 14.9% in 2020 to 11.2% in 2023. This may be due to the relatively low flexibility of Ukraine's agricultural sector in terms of digitalization and its predominant reliance on traditional distribution channels.

Table 4. Dynamics of product volumes sold via e-commerce in Ukraine (2020–2023)

Indicator	Value by year			
	2020	2021	2022	2023
Total volume of products from all types of production and commercial activities in e-business, billion UAH	228.1	292.9	364.7	395.4
Total volume of processed industry products sold via e-commerce, billion UAH	52.7	56.4	61.0	64.7
- share in the consolidated volume of goods sold through e-commerce channels, %	27.1	27.3	27.6	28.4
- relative indicator in the total volume of product sales through digital sales mechanisms, %	2.8	3.2	3.2	3.9
Integral volume of agricultural products sold through electronic trading platforms, billion UAH	33.8	36.6	38.5	40.3
- share in the total volume of products sold by the processing industry through e-commerce, %	14.9	12.6	10.8	11.2
- structural indicator in the total volume of products sold within digital commerce, %	5.3	5.9	5.3	5.4

Source: compiled based on [18, 44].

At the same time, the absolute growth in sales of agricultural products in Ukraine (from UAH 33.8 billion in 2020 to UAH 40.3 billion in 2023) confirms the gradual adoption of digital technologies, particularly in high-tech segments of agribusiness. Accordingly, structural changes in e-commerce in Ukraine indicate a redistribution of market share in favor of sectors that adapt more quickly to digital tools. The long-term consequences of these changes in Ukraine may include market consolidation, increased competition among producers, and further growth in investment in automation and digital logistics. Figure 4 presents a multi-level approach to the digitalization of Ukraine's agribusiness sector, identifying key factors influencing this process and strategic directions for development. Methodological platform of the study is formalized through the prism of mutual determination of endogenous and exogenous market determinants in combination with the target guidelines of digital renovation of the agricultural sector.

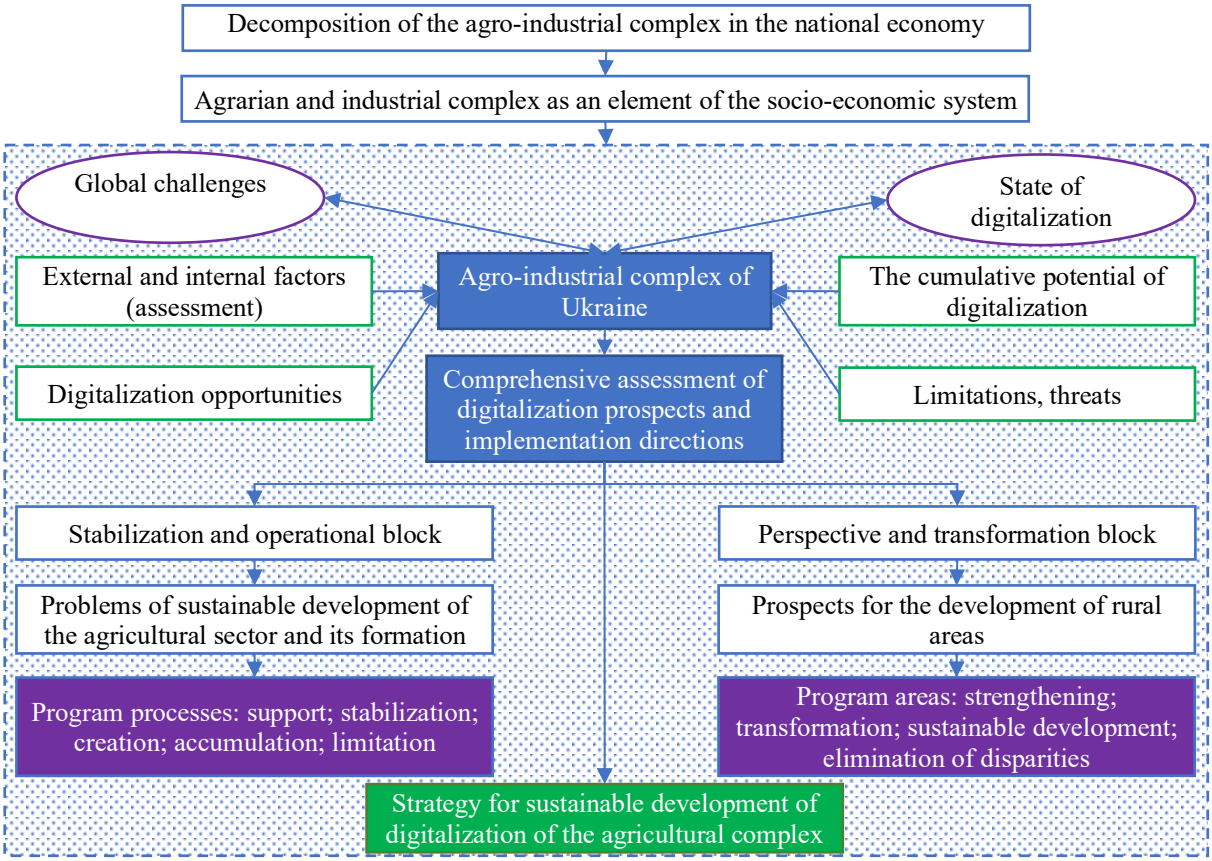

Fig. 4. Theoretical and methodological imperatives of implementing strategically oriented vectors of digital transformation of the agro-industrial sector of Ukraine
Source: own generalizations.

In our opinion, in the paradigm of progressive development of the agricultural sector of Ukraine, it is advisable to focus on a comprehensive audit of digitalization potential, which includes the identification of structural and resource support and the level of innovative susceptibility of the subjects of the agro-industrial complex to digital integration. The conceptual structure we have formulated integrates the stabilization and operational module (assessment of the current demand for digital solutions) and the strategic and evolutionary cluster (long-term digital transformation of agricultural production with an emphasis on the implementation of high-tech tools). A specific focus in shaping the conceptual foundations for implementing strategic directions of digitalization in Ukraine's agribusiness sector has been placed on software processes and digital transformation pathways. This means that the concept not only outlines the necessary changes but also proposes implementation mechanisms, including support for innovative solutions, a strategy for sustainable digitalization development, and bridging the digital divide between large agribusiness enterprises and small-scale producers in Ukraine.

CONCLUSIONS

Thus, we conclude that the digitalization of agribusiness management determines a shift in the economic behavior of enterprises, transforming their strategic orientations, efficiency assessment methodologies, and competitive positions in the market. Therefore, the use of analytical approaches to the systematization and forecasting of managerial decisions contributes to the development of adaptive business models based on resource flow integration and the enhancement of operational efficiency. The results of the analytical testing showed the asymmetric pace of digital transformation in the agro-industrial complex of Ukraine, which is determined by the degree of technological adaptability of business structures and the level of their resource and material support. It was found that the productivity of digital transformations demonstrates a high degree of correlation with the institutional ability of business entities to implement intelligent analytical platforms and automated systems of management contour control. At the same time, for small and medium-sized agricultural production units, significant barrier restrictions remain, which inhibit the process of scaling digital solutions and provoke risks of deepening intra-sectoral structural fragmentation. The summarized research findings indicate the necessity of a comprehensive approach to regulating digital transformation, which would combine strategic support for innovation with mechanisms to minimize technological inequality within the agribusiness sector.

Thus, the implementation of the presented Conceptual Model for the formation of strategic vectors of digital transformation of the agro-industrial complex of Ukraine involves the institutionalization of an integrated digital space within the agro-industrial complex, which will function as a multifunctional catalyst for increasing the productive and efficient parameters of agricultural production and accelerating the processes of digitalization of the national agricultural sector. We believe that this could result in enhanced competitiveness of the Ukrainian agribusiness sector in international markets and a general increase in agricultural production productivity.

REFERENCES

[1]Antoniuk, N., Melnykova, K., Kholodna, Y., Britchenko, I., Khomiuk, N., Rogach, S., Shmatkovska, T., 2023, Financial support of logistics: security aspects and sustainable development (in Ukrainian context). AD ALTA: Journal of interdisciplinary research, Vol. 13(2), Special Issue XXXVIII: 135-140.

[2]Arakelova, I., Shulpina, N., Tokareva, V., Nahorna, O., Shulha, O., Khomiuk, N., Sodoma, R., Shmatkovska, T., 2024, Research and management of the price policy in the field of marketing services of the enterprise using modern information technologies in the conditions of sustainable development. AD ALTA: Journal of interdisciplinary research, Vol. 14(1), Special Issue XL: 240-244.

[3]Bezpartochnyi, M., Britchenko, I., Lošonczi, P., 2022, Ensuring economic security of trade enterprises in the formation of pricing policy. Financial and Credit Activity: Problems of Theory and Practice, Vol. 2(43): 146-156.

[4]Britchenko, I., 2023, Innovative approaches to business management in conditions of economic instability. Studies of the industrial geography commission of the Polish geographical society, Vol. 37(4): 41-49.
[5]Britchenko, I., Bezpartochnyi, M., 2020, Optimization of commodity stocks the enterprise by means of HML-FMR clustering. Financial and Credit Activity: Problems of Theory and Practice, Vol. 3(34): 259-269.
[6]Britchenko, I., Drotárová, J., Antonov, M., Kholodna, J., Polonska, O., Popova, Y., 2022, Environmental and economic security in the conditions of digitalization of the Ukraine`s economy. AD ALTA: Journal of interdisciplinary research, Vol. 12(2), Special Issue XXIX: 118-122.
[7]Britchenko, I., Drotárová, J., Yudenko, O., Holovina, L., Shmatkovska, T., 2022, Factors and conditions of the environmental and economic security formation in Ukraine. AD ALTA: Journal of interdisciplinary research, 12(2), Special Issue XXIX: 108-112.
[8]Britchenko, I., Svydruk, I., Pidlypnyi, Y., Krupskyi, O. P., 2020, Lessons to Be Learned from Ukraine's Positioning in International Rankings: The Need for Institutional Support and Financial Support for Economic Creativity. Management Issues, Vol. 18(4): 90.
[9]Chernytska, T. V., Ionitsoy-Dotsenko, E. Yu., Petrykei, O. Yu., 2021, Economic effects of digitalization of the agro-industrial complex using the example of the sugar industry. Strategy of Economic Development of Ukraine, Vol. 49: 91-110.
[10]Dibrova, A., Mirzoieva T., Baidala, V., Chmil, A., Stepasyuk, L., Dibrova, L., 2024, Forecasting the development of the oat market in Ukraine in the context of transformational economic processes. Financial and Credit Activity Problems of Theory and Practice, Vol. 6(59): 487–508.
[11]Global Digitalization Index (GDI) 2024. https://www.huawei.com/en/gdi, Accessed on March 1, 2025.
[12]Ionitescu, S., Popescu, A., Gudanescu, N. L., Cristea, A., 2023, Digitalization and agriculture-impact on human resources in the European Union and Romania. Scientific Papers. Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 23(3): 361-372.
[13]Khomiuk, N., Bochko, O., Pavlikha, N., Demchuk, A., Stashchuk, O., Shmatkovska, T., Naumenko, N., 2020, Economic modeling of sustainable rural development under the conditions of decentralization: a case study of Ukraine. Scientific Papers. Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 20(3): 317-332.
[14]Kostiuk, V., Khudolii, A., Korniiko, Y., Petrenko, O., Dybchuk, L., Shmatkovska, T., 2024, Logistics infrastructure management in the system of digital transformation of the economy of Ukraine. AD ALTA: Journal of interdisciplinary research, Vol. 14(2). Special Issue XLIII: 138-142.
[15]Kryshtanovych, M., Britchenko, I., Lošonczi, P., Baranovska, T., Lukashevska, U., 2022, State Management Mechanisms for the Exchange of Information Regarding Cyberattacks, Cyber Incidents and Information Security Incidents. IJCSNS International Journal of Computer Science and Network Security, Vol. 22(4): 33-38.
[16]Kunitsyna, N., Britchenko, I., Kunitsyn, I., 2018, Reputational risks, value of losses and financial sustainability of commercial banks, Entrepreneurship and Sustainability Issues, Vol. 5(4): 943-955.
[17]Kuzheliev, M., Britchenko, I., Zhytar, M., 2015, Weighted coefficient model for bank investment portfolio optimization. 14th Conference on Business and Non-Profit Organizations Facing Increased Competition and Growing Customers' Demands: 149-162.
[18]Kwilinski A., Hnatyshyn L., Prokopyshyn O., Trushkina N., 2022, Managing the Logistic Activities of Agricultural Enterprises under Conditions of Digital Economy. Virtual Economics, Vol. 5(2): 43-70.
[19]Mazniev, I., Bielousov, Ya., Luchechko, Yu., Rozbytskyi, M., Kolosok, A., Shepelenko, S., Dziamulych, M., 2024, Analysis of modern trends in labour market transformation in Ukraine. AD ALTA: Journal of interdisciplinary research, Vol. 14(2). Special Issue XLIII: 138-142.
[20]Memetov A., 2022, Practice of digitalization of domestic agricultural enterprises. Economic analysis, Vol. 32(1): 71-80.
[21]Ministry of Agrarian Policy and Food of Ukraine. https://minagro.gov.ua, Accessed on March 1, 2025.
[22]Mirzoieva, T., Stepasyuk, L., Diachkov, D., Nitsenko, V., Velychko, O., Lozynska, T., Kapelista, I., 2024, Prospects for the Production of Niche Grain Crops in the Context of the Need to Ensure Food Security. Rocznik Ochrona Środowiska, Vol. 26: 568-586.
[23]Popescu, A., 2015, An Empirical Research on the Bankruptcy Risk Prediction In Romania's Agriculture. Proceedings of 26th IBIMA Conference Innovation Management and Sustainable Economic Competitive Advantage: From Regional Development to Global Growth, Madrid, Spain, Novemner 11-12, pp. 2196-2204.
[24]Popescu, A., 2017, Analysis of sheep and goats livestock and milk and meat production in Romania, 2007-2016. Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol. 17(4): 267-279.
[25]Popescu, A., 2003, Financial analysis in dairy farming. Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Series Zootechnics and Biotechnologies (Buletinul Universitatii de Stiinte Agricole si Medicina Veterinaria Cluj-Napoca Seria Zootehnie si Biotehnologii). Vol.59: 11-14.
[26]Popescu, A., 2014, Research regarding the use of discriminant analysis for assessing the bankruptcy risk of agricultural companies. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". 14(4): 193-200.
[27]Popescu, A., 2017, Trends and correlations in Romania's agro-food foreign trade in the period 2007-2016. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". 17(4): 293-303.

[28]Popescu, A., Alecu, I. N., Grigoras, M. A., 2009, Economic profitability and interest rate–fundamentals of firm financing decisions. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". Vol. 9(2): 129-130.
[29]Popescu, A., Dinu, T. A., Stoian, E., 2019, Efficiency of the agricultural land use in the European Union. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". 19(3): 475-486.
[30]Popescu, A., Dinu, T. A., Stoian, E., Serban, V., 2020, Turnover's impact on profitability in the commercial companies dealing with dairy farming. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". 20(1): 437-445.
[31]Popescu, A., Marcuta, A., Tindeche, C., Angelescu, C., Marcuta, L., 2020, Profit and profitability of the commercial companies dealing with dairy farming. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". 20(1): 447-460.
[32]Popescu, A., Matei, A., 2013, Estimation of expenses, income and profit in mulberry tree growing. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". 13(3): 207-212.
[33]Rudenko, M., Berezianko, T., Halytsia, I., Dziamulych, M., Kravchenko, O., Krivorychko, V., 2023, International experience of capitalization of knowledge in terms of innovation economy. Financial and Credit Activity Problems of Theory and Practice. Vol. 4(51): 508–518.
[34]Sarioglo, V., Levkovska, L., Kotenko, T., Horemykina, Y., Didkivska, O., Rozbytskyi, M., Shmatkovska, T., 2024, Dynamics of formation of the labour market and employment of the rural population of Ukraine: a case study of Vinnytsia region. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 24(1): 857-866.
[35]Shmatkovska, T., Agres, O., Luchechko, Y., Korobchuk, L., Naumenko, N., Voichuk, M., Dziamulych, M., 2023, Realities and prospects of managing the development of agricultural business in Ukraine. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development". Vol. 23(4): 777-783.
[36]Shmatkovska, T., Derevianko, S., Rogach, S., Shulha, O., Chudovets, V., Artemchuk, L., Begun, S., Khomiuk, N., 2023, Financial, accounting-analytical support and management of economic security in the system of sustainable development. AD ALTA: Journal of interdisciplinary research, Vol. 13(2), Special Issue XXXVII: 155-159.
[37]Shmatkovska, T., Krupka, I., Synenko, V., Sydorenko, R., Mostovenko, N., Talakh, T., Danchevska, I., Melnyk, N., 2023, Accounting and analytical tools for the formation of subordinated debt of commercial banks in Ukraine. AD ALTA: Journal of interdisciplinary research, Vol. 13(1), Special Issue XXXIV: 52-55.
[38]Shmatkovska, T., Kulinich, T., Dziamulych, M., Rogach, S., Bilochenko, A., Serdiukova, O., 2022, Analysis of investment efficiency in the agricultural sector of Ukraine on the basis of sustainable development. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 22(3): 649-657.
[39]Shmatkovska, T., Shubalyi, O., Rogach, S., Kupyra, M., Dobryanskyy, O., Shved, A., Voichuk, M., 2023, Simulation of socio-economic security of rural areas in the conditions of sustainable development: a case study of Ukraine. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 23(1): 709-718.
[40]Shmatkovska, T., Talakh, V., Talakh, T., Avramchuk, L., Agres, O., Sadovska, I., Kolodiy, A., Kolodii, I., 2024, Analysis of the dynamics of employment and economic activity of the rural population: a case study of Ukraine. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 24(3): 803-810.
[41]Shmatkovska, T., Volynets, L., Dielini, M., Magopets, O., Kopchykova, I., Kytaichuk, T., Popova, Yu., 2022, Strategic management of the enterprise using the system of strategic management accounting in conditions of sustainable development. AD ALTA: Journal of interdisciplinary research, Vol. 12(2), Special Issue XXIX: 123-128.
[42]Sodoma, R., Kobylkin, D., Shmatkovska, T., Pavuk, I., 2024, Management of infrastructure development projects of Ukraine and rural areas. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 24(3): 821-832.
[43]Sodoma, R., Lesyk L., Hryshchuk, A., Dubynetska, P., Shmatkovska, T., 2022, Innovative development of rural territories and agriculture in Ukraine. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 22(4): 685-696.
[44]State Statistics Service of Ukraine. http://www.ukrstat.gov.ua, Accessed on March 1, 2025.
[45]Verzun, A., Voinycha, L., Fedyk, O., Shulha, O., Lipych, L., Shmatkovska, T., Herylo, V., 2023, Export potential of agricultural-industrial complex of Ukraine: logistics and development prospects. Scientific Papers Series Management, Economic Engineering in Agriculture & Rural Development, Vol. 23(4): 915-926.
[46]Zastrozhnikova, I. V., 2021, The impact of digitalization on personnel policy in the agricultural sector. Investments: practice and experience, Vol. 4: 77–81.
[47]Zielińska, A., Britchenko, I., Jarosz, P., 2018, Leading innovations and investments into the new energy technologies. In Advances in Social Science, Education and Humanities Research. Proceedings of the 2nd International Conference on Social, Economic and Academic Leadership (ICSEAL 2018), Vol. 217: 320-324.