

МАРКЕТИНГ ♦ MARKETING

<https://doi.org/10.26565/2524-2547-2026-74-13>
UDC 338.43:658.7:004.9

Alla Humeniuk*,
PhD (Economics), Associate Professor
allagumen@ukr.net
<https://orcid.org/0000-0002-4333-0478>

Nataliia Biloshkurska*,
PhD (Economics), Associate Professor
biloshkurska.n@udpu.edu.ua
<https://orcid.org/0000-0002-7617-7836>

*Uman National University,
2, Sadova Str., Uman, Cherkasy region, 20300, Ukraine

TRANSFORMATION OF LOGISTICS PROCESSES AS A COMPONENT OF DIGITALIZATION OF MARKETING MANAGEMENT OF THE AGRO-INDUSTRIAL COMPLEX

Abstract. We examine the importance of effective organization of logistics processes as a key factor that ensures stable operations and competitiveness of agro-industrial enterprises, especially under military challenges in Ukraine. We emphasize logistics as an integrated system that connects production, storage, transportation, and distribution of agricultural products and we show how it supports timely delivery to domestic and external markets. We highlight the importance of uninterrupted functioning of the agricultural sector because it guarantees state food security, stabilizes regional economies, and ensures the supply of essential products and resources, including delivery to frontline and remote territories affected by instability.

We analyze the role of digital competence of employees in applying modern marketing management tools and in using online services and digital platforms. We argue that digital literacy directly influences managerial decision-making, communication with partners, and adaptability to rapidly changing market conditions. We define the main components of digital competence in agricultural production, including the ability to use specialized software, stable Internet access, cloud-based services, web resources, and mobile applications for farm management, monitoring, and market analysis.

We further examine modern digital technologies in the agricultural sector, including geographic information systems (GIS), sensors and measuring devices, unmanned aerial vehicles (drones), robotic systems, the Internet of Things (IoT), and blockchain technologies. We show how these tools improve management efficiency, optimize production processes, and support continuous monitoring of soil conditions and crop development. We also demonstrate that these technologies increase transparency and traceability across supply chains and strengthen trust between producers, suppliers, and consumers.

We conclude that we must implement innovative digital solutions as a necessary condition for improving productivity, reducing operational costs, and strengthening resilience of agricultural enterprises. We also find that digital transformation significantly enhances competitiveness of agro-industrial enterprises under modern economic changes and supports their integration into global markets.

Keywords: *Agro-Industrial Complex, Digital Competence, Digital Technologies, Precision Agriculture, Geographic Information Systems, Sensors and Gauges, Drones, Blockchain.*

JEL Classification: Q13; Q16; M31; L90; O33.

© Alla Humeniuk, Nataliia Biloshkurska, 2026



This is an open-access article distributed under the terms of the Creative Commons Attribution License 4.0.

In cites: Humeniuk, A., & Biloshkurska, N. (2026). Transformation of logistics processes as a component of digitalization of marketing management of the agro-industrial complex. *Social Economics*, 74, 153-163. <https://doi.org/10.26565/2524-2547-2026-74-13>

Introduction. The effectiveness of the organization of logistics processes is a determining factor not only in the stable functioning of agro-industrial enterprises, but also in their competitiveness in the market. In the conditions of military operations in Ukraine, the economy was forced to quickly adapt to new challenges associated with disruption of supply chains, changes in transportation routes and increased risks for business.

The agro-industrial complex is one of the critically important industries that ensure the food security of the state, therefore its activities cannot be suspended even in difficult conditions. The uninterrupted delivery of agricultural products, food, material and technical resources and medicines is of particular importance, in particular to territories close to combat zones.

The application of marketing management tools in the activities of an agricultural enterprise requires the use of modern services and websites, which is impossible without the appropriate digital competence of employees. In this context, the introduction of digital technologies into logistics processes is important, in particular supply chain management systems, electronic platforms for coordinating transportation, as well as analytical tools for forecasting demand and optimizing routes.

Thus, the integration of logistics, marketing management and digital technologies becomes a necessary condition for increasing the efficiency of agro-industrial enterprises, ensuring their resilience to crisis phenomena and adaptation to dynamic changes in the external environment.

The purpose of the study is to substantiate the theoretical foundations and develop practical recommendations for increasing the efficiency of organizing logistics processes of agro-industrial enterprises using marketing management tools and digital technologies in an unstable environment.

The object of the study is the processes of organizing logistics activities of agro-industrial enterprises.

The subject of the study is the theoretical, methodological and practical aspects of managing logistics processes of agro-industrial enterprises using marketing management tools and digital solutions.

To achieve the goal, the following research tasks were defined in the work:

1. To analyze the current state and features of the functioning of logistics systems of agro-industrial enterprises in conditions of an unstable external environment and martial law.

2. To consider the essence and possibilities of using marketing management tools in managing logistics processes of enterprises in the agricultural sector.

3. To study modern digital technologies and software solutions used to manage logistics, supply chains and transport flows.

4. To develop practical recommendations for improving the organization of logistics processes of agro-industrial enterprises based on the use of marketing management tools and digital technologies.

Literature Review. The issue of improving the logistics activities of enterprises, in particular in the agro-industrial complex, has been widely reflected in the works of domestic scientists. Thus, in the study of A. Humeniuk and N. Biloshkurskaya it is substantiated that effective logistics is a key factor in increasing the effectiveness of enterprises, as it ensures the optimization of material flows, reducing costs and increasing the level of consumer service (Humeniuk & Biloshkurska, 2023, p. 14-19). The authors emphasize the need to implement modern logistics approaches and technologies to adapt enterprises to changes in the external environment.

Considerable attention in scientific research is paid to the marketing aspect of the activities of agricultural enterprises. In particular, Balanovskaya T. I. and Voskolupov V. V. (Balanovska & Voskolupov, 2021, p. 32-34). In subsequent works of these authors, the role of marketing management in ensuring the effective functioning of agricultural enterprises, in particular through the integration of marketing and logistics processes, is revealed.

The problems of forming a comprehensive agricultural marketing system are investigated in the works of Bagorka M. O. and Abramovich I. A., which substantiate the need for a systematic approach to organizing the marketing activities of an enterprise. The authors emphasize the importance of combining marketing tools with innovative technologies to increase management efficiency and ensure sustainable development of agricultural business (Bagorka & Abramovych, 2021, p. 97-102).

A significant contribution to the study of the digital transformation of the agricultural sector was made by Rudenko M. V., who classifies modern digital technologies used by agricultural enterprises and determines their role in increasing productivity and production efficiency. The author emphasizes the growing importance of such technologies as geographic information systems, sensors, the Internet of Things, and artificial intelligence (Rudenko, 2019, p. 8-18).

The issue of developing digital competence of employees as an important component of anti-crisis management is considered by Balanovska T. I., Havrysh O. M. and Vyrzhykovska B. In their research, they prove that the level of digital skills of personnel directly affects the ability of an enterprise to introduce innovations and function effectively in conditions of instability (Balanovska et al. 2020, p. 97-106).

Scientists pay special attention to modern concepts of marketing. In particular, Voichak A. and Shumeiko V. study the evolution of marketing approaches and emphasize the need to transition to customer-oriented management models, which is especially relevant for the agricultural sector in conditions of growing competition (Voichak & Shumeiko, 2009, p. 52-55).

Practical aspects of implementing innovative technologies in the agricultural sector are also covered in materials from industry resources and specialized platforms, such as «Agribusiness Today» and official websites of professional associations, in particular the Association of Farmers and Private Landowners of Ukraine¹. They provide up-to-date information on the use of drones, digital services and other innovations in the practice of agricultural enterprises.

Thus, the analysis of scientific sources indicates a growing interest of researchers in the problems of digitalization, logistics and marketing management in the agricultural sector. At the same time, the issue of a comprehensive combination of logistics processes with digital technologies in the context of modern challenges requires further in-depth research.

Research Methodology. The methodological basis of the study is a systematic and comprehensive approach to the analysis of the functioning of agro-industrial enterprises in the conditions of digital transformation and military

challenges. To achieve the set goal, a set of general scientific and special research methods was used.

In particular, the methods of theoretical generalization and scientific abstraction were applied to clarify the essence of logistics processes, digital competence and digital technologies in agriculture. Using analysis and synthesis, the components of the digital transformation of agricultural enterprises were investigated, as well as their impact on the efficiency of production and management activities.

The comparative analysis method was used to evaluate various digital tools and platforms (online services, mobile applications, geographic information systems, drones, sensors, etc.) and determine their advantages and limitations in the practice of agricultural enterprises. The structural-functional method made it possible to systematize the components of the digital competence of commodity producers and classify modern digital technologies used in the agricultural sector.

The empirical basis of the study is data from official websites of state institutions, specialized agricultural platforms, analytical resources and scientific publications. The content analysis method was used to process information on the functional capabilities of digital services, in particular information and analytical portals, mobile applications and software products for agribusiness.

A descriptive method was also used to characterize the capabilities of modern technologies (precision agriculture, sensor systems, unmanned aerial vehicles, blockchain solutions) and their impact on increasing the efficiency of agricultural production. Elements of system analysis allowed us to determine the relationship between logistics processes, digitalization and the competitiveness of enterprises.

Thus, the chosen methodology provided a comprehensive study of the problem, made it possible to substantiate the importance of digital technologies in increasing the efficiency of agricultural enterprises and to form practical conclusions regarding their further development.

Main Results. The use of marketing management tools in the activities of an agricultural enterprise requires the use of modern services and websites, which cannot be done without the appropriate digital competence of the employee. For example, the Google Alerts service is able to track all information that appears on the Internet regarding selected products, in particular

¹ Association of Farmers and Private Landowners of Ukraine : website. URL: <https://farmer.co.ua/> (date of access: 11.04.2026).

Agrianalytica products	
Agri: Business plan: - Ukrainian online program created specifically for farmers (suitable for all types of activities); - free support from a personal consultant 24/7; - suitable for obtaining state support, grants, bank loans; - helps in attracting investments; - allows you to better understand your business and make it even more profitable; - a living business plan that can be changed and updated throughout the year to meet your needs	Agri: Accounting: - Ukrainian online program created specifically for farmers (suitable for all types of activities); - free support of a personal accountant-consultant 24/7; - all accounting entries and primary business documents are generated automatically; - formation of financial and statistical reporting; - full analytics of production income and expenses
Agri: Accounting and Production Management: - Ukrainian online program created specifically for farmers (suitable for all types of activities); - free support from a personal consultant 24/7; In addition to the Agri module: Accounting, you get: - control of the use of material and technical resources; - plan/fact of income and expenses; - all the necessary analytics for the manager to make management decisions	

Fig. 1. Products of agrianalytica

Source: developed on the data AgriAnalytica: website. URL: <https://agrianalytica.com/uk/agrarians> (date of access: 16.04.2026).

agricultural products, and send selections to e-mail. Google Trends is one of the promising services for conducting marketing research, as it measures what people are searching for right now, determines the number of users searching for a particular product, and illustrates current interest.

Having analyzed the information sources of the websites of state institutions of Ukraine (ministries, departments, state regional administrations), it can be noted that one of the important websites containing a lot of useful information for the development of agricultural enterprises is the «Information and Analytical Portal of the Agricultural Industry of Ukraine»¹.

Another useful website for agricultural enterprises is Agrianalytica².

The only platform in Ukraine that offers agricultural producers the opportunity to find optimal financing and purchase the necessary material and technical resources from leading market operators, apply for state support, profitably sell their harvest and prepare for the opening of the land market: optimize their business processes and increase the level of financial literacy with integrated online products Agri: Accounting, Agri: Business Plan and Agri: Accounting and Production Management (Fig. 1).

There is a wide range of digital technologies for agricultural enterprises. Rudenko M. V. grouped modern digital technologies used by agricultural enterprises into five main groups: space technologies; sensors and gauges; information and communication technologies; artificial intelligence and Internet technologies (Rudenko, 2019).

The efficiency of an agricultural enterprise can be increased through the mastery and use of geoinformation systems by employees.

«Digital» (precision) agriculture is a fundamentally new management strategy in agronomy, based on the use of «digital» technologies, new technical means, and also involves the adoption of technological measures for growing plants taking into account the spatial heterogeneity of the field. This is a new stage in the development of the agrosphere, associated with the use of geoinformation systems, global positioning, on-board computers, management and executive mechanisms capable of differentiating cultivation methods, rates of fertilizer application, chemical ameliorants and plant protection products. Precision technologies in agriculture are aimed primarily at economic efficiency and soil protection, increasing yields per hectare of land, reducing crop losses in the fields, and increasing the coefficient of useful use of the country's land bank as a whole (Shabatura, 2019).

With the help of geographic information systems, it is possible to solve the following tasks:

¹ Agricultural Consulting for friendly farming : website. URL: <https://www.farming.org.ua> (date of access: 15.04.2026).

² AgriAnalytica : website. URL: <https://agrianalytica.com/uk/agrarians> (date of access: 16.04.2026).

Technological solutions of DroneUA company	
	Field monitoring with drones
	Nitrogen application maps
	Herbicide application maps
	Visual and NDVI field maps
	Field measurement
	Research and analytics
	Application of plant protection products
	Trichogramma
	AgroCares soil analysis

Fig. 2. Technological solutions of DroneUA company

Source: developed on data.. DroneUA : website. URL: <https://drone.ua> (date of access: 16.04.2026).

– to carry out centralized storage and management of the cartographic database of an agricultural enterprise (the resource contains information about the boundaries of land plots and agricultural lands, cartograms of agricultural soil groups, crop rotation projects, agrotechnical passports of land plots, land allocation projects with all accompanying documentation, digital terrain models, etc.);

– to effectively manage land resources, promptly resolve territorial conflicts and illegal land seizure, monitor landowners and land users;

– to control the implementation of agricultural work in the fields, track crops by crop and field;

– assess the quality of soils, their potential productivity, agroecological condition, degradation processes (allocation of especially valuable soils, nature of soil cover, distribution of lands by slope steepness and exposure, contamination by chemical products);

– analyze the efficiency of agricultural management (justify the feasibility of land sharing and land formation, assess the compliance of the targeted use of lands with the agricultural production potential of soils, etc.);

– to carry out operational audits of agricultural lands, to control the activities of remote (field) workers (land managers, agronomists), to provide the possibility of collecting spatial data in field conditions in real time thanks to a mobile cartographic application connected to an interactive map;

– to automate the process of reporting, planning and forecasting the development of the enterprise's work.

Robotic greenhouses and livestock complexes can also be introduced into the practice of agricultural production, which will allow to obtain significant savings due to more efficient use of water, fertilizers and plant protection products. In addition, such technologies will allow to optimize the number of personnel involved in crop care, as well as minimize losses arising from the human factor.

The use of special sensors and monitoring software included in the complex of robotic livestock complexes contributes to increasing animal productivity and, as a result, improving the quality of the final product by introducing automated feeding and milking systems for cows in agricultural enterprises. The use of software and hardware monitoring of the health of the cow population contributes to increasing milk yields by up to 40% (Bagorka & Abramovich, 2021).

Thus, the practical use of sensors and gauges significantly enhances the processes of digital transformation of both production processes and management of agricultural enterprises. Over the past 10–15 years, the capabilities of agricultural technologies have been growing exponentially, and their cost is constantly decreasing, which leads to significant growth of the AgTech market (agricultural technologies), therefore, ignoring modern digital drivers of agricultural development makes it impossible to increase its efficiency, which is a key task for domestic agricultural enterprises.

The use of drones is becoming increasingly popular in agricultural enterprises. For example, in China, 15% of work in the agricultural sector is performed by drones, and this share is constantly growing. DroneUA is the leader of the drone market in Ukraine.

The main services of DroneUA for agricultural enterprises are shown in (Figure 2).

Today, drones are used primarily to monitor the condition of plants at different stages of their development. This includes assessing weediness, disease and pest infestation, determining the availability of plants with nutrients and water. This also includes monitoring the condition of the soil, i.e. high-precision survey data is used to build soil maps, assess the heterogeneity of the soil cover in terms of the amount of humus and the availability of nutrients, to monitor soil degradation processes and, in general, any processes occurring on the studied site.

Research conducted for the journal «Agribusiness» on the use of drones by agricultural enterprises in Ukraine shows that most agricultural producers order a service for measuring the land bank using drones, and this, unfortunately, is still limited to this (Rudenko, 2019).

For example, blockchain in agriculture allows you to track information in the agri-food value chain in order to improve the safety of food products. Scientists note that the use of blockchain technology in agriculture has potential advantages:

- reduction of transaction time;
- product quality control;
- prevention of product counterfeiting;
- improvement of product quality;
- transparency of operations;
- supply chain organization;
- supply chain traceability;
- simplification of product sales;
- consumer awareness and increased satisfaction;
- reduction of overall transaction commission costs;
- reduction of dependence on intermediaries (Shabatura, 2019).

Blockchain technologies can track all kinds of information about plants, including seed quality and cultivation processes, and create a record of the plant's journey as it leaves the farm. This data can increase the transparency of supply chains and reduce problems associated with illegal and unethical production, product contamination.

The focus on implementing blockchain technology in the technological side of logistics reduces risks and significantly increases stability, as it forms its practical focus. The implementation of blockchain technologies in industry is beneficial for increasing efficiency in document flow, data storage, management of goods supplies, payment systems, e-commerce, and voting systems

and public opinion research. Advantages of implementing blockchain technology for the development of transport logistics at an enterprise:

- reducing the number of errors in document flow;
- simplifying work;
- ensuring transparency and reliability of information about manufacturers (suppliers) of goods and the process of goods movement, etc.;
- reducing the duration of document flow;
- forming a unified infrastructure for managing goods flows;
- reducing the duration of the logistics cycle (Bahorka & Abramovych, 2021).

Agricultural robots automate slow, monotonous and often repetitive operations, allowing farmers to focus more on improving overall productivity and efficiency. The most common robots in agriculture are used for: harvesting crops; weed control; autonomous mowing, pruning, sowing, spraying, thinning, etc.; sorting and packaging; milking livestock, etc.

Today, the use of robotic systems by agricultural enterprises has many obstacles. For example, a robotic system for harvesting sweet peppers, which advanced farms have been testing in southern Ukraine. Vision systems must determine the location and ripeness of peppers in harsh conditions, including the presence of dust, variable light intensity, temperature fluctuations and wind-generated movement. Therefore, domestic practice has shown that the use of robots in harvesting is still limited. Agricultural mobile applications for external use are usually designed to search for business partners, product sales markets, suppliers of raw materials, seeds, plant protection products, fertilizers, etc., customers for products, etc. For example, the AgroPoint mobile application is designed to search for agribusiness partners. Using it, the user can navigate the necessary services in one click, find partners, suppliers and customers in agriculture anywhere in the country (Rudenko, 2019). The PROD mobile application was created for farmers by the USAID project «Support to Agricultural and Rural Development». This is a convenient application for working with a database of prices for vegetables and fruits throughout Ukraine. The user receives only current prices for fruit and vegetables, while not having to visit many non-target sites. Everything is carefully collected in one place. In a few clicks you can find out how much the product costs and determine the best price for yourself for the purchase.

Digitalization in marketing management of an agricultural enterprise	
Aerospace: - satellite imagery; - drones; - unmanned aerial vehicles (UAVs); - geographic information services (GIS)	Sensors and sensors: - intelligent biosensors; - high-tech agricultural sensors
Information and communication: - digital platforms; - agricultural mobile applications and managers	Artificial Intelligence: - Machine Learning; - Robotics; - IoT (agricultural internet of things); - Bid Data (structured and unstructured data processing);
Internet technologies: - IoT (agricultural Internet of Things); - agricultural online applications and services; - blockchain technologies; - smart contracts; - agricultural forums.	Biotechnology: - precision agriculture; - plant breeding; - hybridization; - genetic engineering; - tissue culture
Increasing the digital competence of personnel: - Online classes; - Offline classes; - trainings; - field conferences, etc.	

Fig. 3. Elements of digital support for marketing activities of agricultural enterprises

Source: developed on (Shabatura, 2019; Yurchuk & Kiporenko, 2022; Tarasiuk & Hamalii, 2021)

The application allows you to place your own ads for the purchase and sale of vegetables and fruits, quickly contact the author of the ad directly (without intermediaries) to make a deal, get detailed information about cost and product features, etc.

The founders of the Agro UA mobile application position their product as an agricultural information and communication platform. The wide range of applications of the application is from news and current prices for agricultural products to placing commercial and informational ads. The Agro UA mobile application allows you to be at the epicenter of the country's agricultural life and keep up to date with new events and technologies. You can announce yourself to all market participants, publish in catalogs, advertise yourself and your products, announce events and innovations. There is also the opportunity to announce tenders, place purchase/sale ads, communicate in the forum, follow offers and vacancies on the market, announce yourself to employers, share experience, follow tenders of agricultural holdings, read news, visit all agricultural Facebook groups, go to all popular agricultural sites, use guides to some agricultural events and many other opportunities¹

An important feature of external

agricultural mobile applications is the ability to send push messages, which allows you to quickly send information to all users at the same time. Such a message is displayed on the screens of mobile devices, which allows you to reach all subscribers without exception. push messages are a powerful channel for transmitting information to the target audience. This service is used in the Agroschit project to help farmers in case of raider attacks (the «raider» button).

Social networks are also becoming a popular marketing platform for agricultural enterprises. They provide agricultural enterprises with significant opportunities for interaction and communication with consumers. This allows consumers to exchange information with each other, thus contributing to the strengthening of the effect of electronic interaction, forming social groups. Such online communities promote interaction between consumers and agricultural enterprises, which can shape the perception of potential customers and ideas. With the support of bloggers on social media, agricultural enterprises promote their products and services on social media platforms, including Instagram, TikTok, Facebook, Youtube and Weibo. This provides brands with the opportunity to establish individual connections with consumers in a much more personalized way. Another equally important tool for the digitalization of the studied

¹ Agroportal UA : website. URL: <https://agroportal.ua/> (date of access: 11.04.2026).

agricultural enterprises is e-commerce on the Internet, as an effective component of promotion, advertising and sales of goods. That is why, in order to expand product sales channels and more effectively interact with consumers and suppliers, the studied agricultural enterprises are invited to develop their own websites.

In our opinion, the implementation of digitalization in the marketing management of an agricultural enterprise should consist of the components shown in Fig. 3.

When developing websites, it is necessary to use keyword research tools to identify the most relevant and popular search terms in the agricultural production topic. After that, it is advisable to enter keywords into the content of web pages, metadata and other HTML attributes. This improves the recognition of content by robots during the scanning process and contributes to the growth of the site's position in the Google search engine.

Conclusion. The study found that effective organization of logistics processes is a critically important condition for the functioning of agro-industrial enterprises, especially in conditions of military operations and unstable economic environment. Disruption of traditional supply chains, changes in logistics routes and increased risks force agricultural enterprises to quickly adapt, introducing flexible and innovative approaches to resource and product flow management. Logistics is becoming not only a tool for ensuring business continuity, but also a source of competitive advantages.

It has been proven that the digital transformation of the agricultural sector is one of the key drivers of increasing production and management efficiency. The level of digital competence of employees directly affects the ability of the enterprise to implement modern marketing management tools, use analytical online services, monitor the market and make informed management decisions. The use of specialized platforms, information portals and mobile applications helps to improve communication, access to current information and expand product sales opportunities.

It has been established that the introduction of modern digital technologies,

such as geographic information systems, sensors and gauges, unmanned aerial vehicles, robotic systems, the Internet of Things and blockchain, significantly increases the accuracy, transparency and manageability of agricultural production. In particular, precision agriculture technologies allow optimizing the use of resources, reducing costs and minimizing the negative impact on the environment. Sensor systems provide constant monitoring of the condition of soils, plants and animals, which allows for prompt response to changes and prevention of losses.

Special attention is paid to the use of drones and robotic complexes, which significantly expand the capabilities of farmers in the field of monitoring, analysis and automation of production processes. At the same time, it has been established that the level of their practical application in Ukraine remains limited, which is associated with technological, financial and organizational barriers. This indicates the need for further development of infrastructure and increasing the investment attractiveness of agricultural innovations.

The use of blockchain technologies in agriculture has been proven to be promising, ensuring transparency of supply chains, increasing consumer confidence, reducing transaction costs and minimizing the risks of product counterfeiting. The integration of such solutions into the activities of agricultural enterprises opens up new opportunities for market development and improving product quality.

In general, it has been established that the further development of the agro-industrial complex of Ukraine is impossible without the active implementation of digital technologies and increasing the level of digital literacy of personnel. Innovations are becoming a determining factor in increasing productivity, resource efficiency and strengthening the positions of enterprises in the domestic and foreign markets. In modern conditions, it is the combination of logistical efficiency and digitalization that forms the basis for sustainable development of the agricultural sector.

Список використаної літератури

1. Багорка М. О., Юрченко Н. І. Формування комплексної системи маркетингу на підприємстві. Вчені записки ТНУ імені В. І. Вернадського. Серія: Економіка і управління. 2020. № 1. Т. 31(70). С. 102–108. <https://doi.org/10.32838/2523-4803/70-1-17>
2. Балановська Т. І., Гоголю О. П., Драмарецька К. П., Восколунов В. В., Голік В. І. Використання маркетингового менеджменту для забезпечення конкурентоспроможності

References

1. Bahorka, M. O., & Yurchenko, N. I. (2020). Formation of complex marketing system at enterprise. *Vcheni zapysky Tavriiskoho natsionalnoho universytetu imeni V. I. Vernadskoho. Seriya: Ekonomika i upravlinnia*, 1(31(70)), 1, 102–108. <https://doi.org/10.32838/2523-4803/70-1-17> (in Ukrainian)
2. Balanovska, T. I., Gogulya, O. P., Dramaretska, K. P., Voskolupov, V. V., & Holik, V. I. (2021). Using marketing management to ensure competitiveness of agricul-

- сільськогосподарських підприємств. *Agricultural and Resource Economics: International Scientific E-Journal*. 2021. Vol. 7. No. 3. С. 141–160. <https://doi.org/10.51599/are.2021.07.03.09>
3. Гуменюк А.В., Білошкурська Н.В. Шляхи удосконалення логістичної діяльності підприємств. *Modeling the development of the economic*. 2023. № 3. С. 14–19. <https://doi.org/10.31891/mdes/2023-9-2>
4. Балановська Т. І., Восколунов В. В. Роль маркетингової товарної політики у діяльності сільськогосподарських підприємств. Маркетинг та логістика в агробізнесі: II Міжнародна науково-практична конференція, м. Київ, 15 квітня 2021 року : тези доповіді. Київ : НУБІП України, 2021. С. 32–34.
5. Багорка М. О., Абрамович І. А. Формування комплексної системи аграрного маркетингу підприємства. Проблеми системного підходу в економіці. 2021. № 1(87). С. 97–102. <https://doi.org/10.32782/2520-2200/2022-1-14>
6. Руденко М. В. Технології цифрової трансформації сільськогосподарських підприємств. *Агросвіт*. 2019. № 23. С. 8–18. <https://doi.org/10.32702/2306-6792.2019.23.8>
7. Шабатура Т. С. Перспективи розвитку аграрного сектору України в контексті цифрових технологій. Приазовський економічний вісник. 2019. Вип. 3(14). С. 123–128. URL: http://pev.kpu.zp.ua/journals/2019/3_14_uk/23.pdf (дата звернення: 14.04.2026).
8. Lezoche M., Hernandez J. E., Alemany Diaz M. M. E., Panetto H., Kacprzyk J. Agri-food 4.0: A Survey of the Supply Chains and Technologies for the Future Agriculture. *Computers in Industry*. 2020. Vol. 117. Article 103187. <https://doi.org/10.1016/j.compind.2020.103187>
9. Юрчук Н. П., Кіпоренко С. С. Особливості використання цифрових технологій в агробізнесі. Східна Європа: економіка, бізнес та управління. 2022. № 36. С. 109–116. <https://doi.org/10.32782/easterneurope.36-17>
10. Тарасюк А., Гамалій В. Тренди цифровізації сільськогосподарських підприємств України. *SCIENTIA-FRUCTUOSA*. Вісник Київського національного торговельно-економічного університету. 2021. Вип. 139(5). С. 72–85. [https://doi.org/10.31617/visnik.knute.2021\(139\)05](https://doi.org/10.31617/visnik.knute.2021(139)05)
11. Балановська Т. І., Гавриш О. М., Виржиковська Б. Формування та розвиток цифрової компетентності працівників як складова антикризового управління організацією. *Економіка. Менеджмент. Бізнес*. 2020. № 1 (31). С. 97–106. <https://journals.duikt.edu.ua/index.php/emb/article/view/2391>
12. Войчак А., Шумейко В. Дослідження сучасних концепцій маркетингу та маркетингового менеджменту. *Маркетинг в Україні*. 2009. № 4. С. 52–55. http://nbuv.gov.ua/UJRN/Mvu_2009_4_10
13. Kyfyak O., Kyfyak V., Kindzerskyi V., Kovbas H., Finagina O., Todoruk S. The Role of Digital Marketing and Logistics in the Optimization of Business Processes of Agricultural Enterprises. *Management Theory and Studies for Rural Business and Infrastructure Development*. 2023. Vol. 45. No. 3. P. 213–220. <https://doi.org/10.15544/mts.2023.21>
14. Бондаренко В. М., Омеляненко О. В. Особливості впровадження інтернет-маркетингу в діяльність агропідприємств. *Український журнал прикладної економіки та техніки*. 2023. Том 8. № 3. С. 211–219. <https://doi.org/10.36887/2415-8453-2023-3-31>
15. Харенко А. О., Цимбалюк Ю. А. Комплекс маркетингу сільськогосподарських підприємств. *Збірник наукових праць Уманського національного університету садівництва*. 2016. Вип. 89. Ч. 2. С. 146–157. URL: <https://journal.udau.edu.ua/assets/files/89/Ekon/Ukr/14.pdf> (дата звернення: 14.04.2026).
- tural enterprises. *Agricultural and Resource Economics: International Scientific E-Journal*, 7(3), 142–160. <https://doi.org/10.51599/are.2021.07.03.09> (in Ukrainian)
3. Humeniuk, A. V., & Biloshkurska, N. V. (2023). Ways of improving logistics activities of enterprises. *Modeling the Development of the Economic Systems*, (3), 14–19. <https://doi.org/10.31891/mdes/2023-9-2> (in Ukrainian)
4. Balanovska, T. I., & Voskolupov, V. V. (2021). The role of marketing product policy in the activities of agricultural enterprises. In *Marketing and logistics in agribusiness: Proceedings of the II International Scientific and Practical Conference, Kyiv, April 15, 2021* (pp. 32–34). *Natsionalnyi universytet bioresursiv i pryrodokorystuvannya Ukrainy*. (in Ukrainian)
5. Bahorka, M. O., & Abramovich, I. A. (2021). Formation of complex system of agricultural marketing of the enterprise. *Problemy systemnoho pidkhodu v ekonomitsi*, 1(81), 97–102. <https://doi.org/10.32782/2520-2200/2022-1-14> (in Ukrainian)
6. Rudenko, M. V. (2019). Digital transformation technologies in agricultural enterprises. *Ahrosvit*, (23), 8–18. <https://doi.org/10.32702/2306-6792.2019.23.8> (in Ukrainian)
7. Shabatura, T. S. (2019). Prospects for development of agricultural sector of economy of Ukraine in the context of digital technologies. *Pryazovskyi ekonomichnyi visnyk*, 3(14), 123–128. http://pev.kpu.zp.ua/journals/2019/3_14_uk/23.pdf (in Ukrainian)
8. Lezoche, M., Hernandez, J. E., Alemany Díaz, M. M. E., Panetto, H., & Kacprzyk, J. (2020). Agri-food 4.0: A survey of the supply chains and technologies for the future agriculture. *Computers in Industry*, (117), Article 103187. <https://doi.org/10.1016/j.compind.2020.103187>
9. Yurchuk, N. P., & Kiporenko, S. S. (2022). Features of the use of digital technologies in agribusiness. *Shidna Yevropa: Ekonomika, Biznes ta Upravlinnia*, (36), 109–116. <https://doi.org/10.32782/easterneurope.36-17> (in Ukrainian)
10. Tarasiuk, A., & Hamalii, V. (2021). Digitalization trends of agricultural enterprises in Ukraine. *Scientia Fructuosa*, 139(5), 72–85. [https://doi.org/10.31617/visnik.knute.2021\(139\)05](https://doi.org/10.31617/visnik.knute.2021(139)05) (in Ukrainian)
11. Balanovska, T., Havrysh, O., & Vyrzhikovska, B. (2020). Formation and development of digital competence of employees as a component of anti-crisis management of the organization. *Ekonomika. Menedzhment. Biznes*, 1(31), 97–106. <https://journals.duikt.edu.ua/index.php/emb/article/view/2391> (in Ukrainian)
12. Voichak, A., & Shumeiko, V. (2009). Research of modern concepts of marketing and marketing management. *Marketynh v Ukraini*, (4), 52–55. http://nbuv.gov.ua/UJRN/Mvu_2009_4_10 (in Ukrainian)
13. Kyfyak, O., Kyfyak, V., Kindzerskyi, V., Kovbas, H., Finagina, O., & Todoruk, S. (2023). The role of digital marketing and logistics in the optimization of business processes of agricultural enterprises. *Management Theory and Studies for Rural Business and Infrastructure Development*, 45(3), 213–220. <https://doi.org/10.15544/mts.2023.21>
14. Bondarenko, V. M., & Omelianenko, O. V. (2023). Features of implementation of internet marketing in the activities of agricultural enterprises. *Ukrainskyi zhurnal prykladnoi ekonomiky ta tekhniky*, 8(3), 211–219. <https://doi.org/10.36887/2415-8453-2023-3-31> (in Ukrainian)
15. Kharenko, A. O., & Tsymbaliuk, Yu. A. (2016). Marketing mix of agricultural enterprises. *Zbirnyk naukovykh prats Uman'skoho natsionalnoho universytetu sadivnytstva*, 89(2), 146–157. <https://journal.udau.edu.ua/assets/files/89/Ekon/Ukr/14.pdf> (in Ukrainian)

16. Шабала О. П., Матійчук Л. П. Біоенергетичний потенціал України: тенденції розвитку в умовах воєнного стану. *Економічний простір*. 2023. № 183. С. 31–36. <https://doi.org/10.32782/2224-6282/183-5>
17. Melnyk S., Shuprudko N., Kolosovska I., Berest I., Pasichnyk M. Anti-crisis personnel management in the process of ensuring the economic security of the enterprise. *Business: Theory and Practice*. 2020. Vol. 21. No. 1. P. 272–281. <https://doi.org/10.3846/btp.2020.11438>
18. Sobocińska M., Mazurek-Łopacińska K., Skowron S., Graczyk A., Kociszewski K. The Role of Marketing in Shaping the Development of the Market of Organic Farming Products in Poland. *Sustainability*. 2021. Vol. 13. No. 1. Article 130. <https://doi.org/10.3390/su13010130>
19. Markina I., Somych N., Taran-Lala O., Varaksina E., Potapiuk I., Vovk M. Managerial aspects of forming enterprises' competitive advantages: The case of agri-food sector. *International Journal on Food System Dynamics*. 2022. Vol. 13. No. 1. P. 56–68. <https://doi.org/10.18461/ijfsd.v13i1.A5>
20. Sharma R., Shishodia A., Kamble S., Gunasekaran A., Belhadi A. Agriculture supply chain risks and COVID-19: Mitigation strategies and implications for the practitioners. *International Journal of Logistics Research and Applications*. 2024. Vol. 27. No. 11. P. 2351–2377. <https://doi.org/10.1080/13675567.2020.1830049>
21. Wang W., Li Z., Meng Q. Digital Transformation Drivers, Technologies, and Pathways in Agricultural Product Supply Chains: A Comprehensive Literature Review. *Applied Sciences*. 2025. Vol. 15(19). Article 10487. <https://doi.org/10.3390/app151910487>
22. Kamble S., Gunasekaran A., Sharma R. Modeling the blockchain enabled traceability in agriculture supply chain. *International Journal of Information Management*. 2020. Vol. 52. Article 101967. <https://doi.org/10.1016/j.ijinfomgt.2019.05.023>
23. Granillo-Macías R., González Hernández I.J., Olivares-Benítez E. Logistics 4.0 in the agri-food supply chain with blockchain: a case study. *International Journal of Logistics Research and Applications*. 2024. Vol. 27. No. 10. P. 1766–1786. <https://doi.org/10.1080/13675567.2023.2184467>
24. Yu P., Abdul Hamid R., Osman L. H., Liao J. Bridging the Digital Gap: Empirical Insights into Agri-Food Supply Chain Transformation. *Sustainable Futures*. 2025. Vol. 10. Article 100810. <https://doi.org/10.1016/j.sfr.2025.100810>
16. Shabala, O. P., & Matichuk, L. P. (2023). Bioenergy potential of Ukraine: Development trends under martial law. *Ekonomichnyi prostir*, (183), 31–36. <https://doi.org/10.32782/2224-6282/183-5> (in Ukrainian)
17. Melnyk, S., Shuprudko, N., Kolosovska, I., Berest, I., & Pasichnyk, M. (2020). Anti-crisis personnel management in the process of ensuring the economic security of the enterprise. *Business: Theory and Practice*, 21(1), 272–281. <https://doi.org/10.3846/btp.2020.11438>
18. Sobocińska, M., Mazurek-Łopacińska, K., Skowron, S., Graczyk, A., & Kociszewski, K. (2021). The Role of Marketing in Shaping the Development of the Market of Organic Farming Products in Poland. *Sustainability*, 13(1), Article 130. <https://doi.org/10.3390/su13010130>
19. Markina, I. A., Somych, N. M., Taran-Lala, O. M., Varaksina, E. A., Potapiuk, I. P., & Vovk, M. V. (2022). Managerial aspects of forming enterprises' competitive advantages: The case of agri-food sector. *International Journal on Food System Dynamics*, 13(1), 56–68. <https://doi.org/10.18461/ijfsd.v13i1.A5>
20. Sharma, R., Shishodia, A., Kamble, S., Gunasekaran, A., & Belhadi, A. (2024). Agriculture supply chain risks and COVID-19: Mitigation strategies and implications for the practitioners. *International Journal of Logistics Research and Applications*, 27(11), 2351–2377. <https://doi.org/10.1080/13675567.2020.1830049>
21. Wang, W., Li, Z., & Meng, Q. (2025). Digital Transformation Drivers, Technologies, and Pathways in Agricultural Product Supply Chains: A Comprehensive Literature Review. *Applied Sciences*, 15(19), Article 10487. <https://doi.org/10.3390/app151910487>
22. Kamble, S. S., Gunasekaran, A., & Sharma, R. (2020). Modeling the blockchain-enabled traceability in agriculture supply chain. *International Journal of Information Management*, (52), Article 101967. <https://doi.org/10.1016/j.ijinfomgt.2019.05.023>
23. Granillo-Macías, R., González Hernández, I. J., & Olivares-Benítez, E. (2024). Logistics 4.0 in the agri-food supply chain with blockchain: A case study. *International Journal of Logistics Research and Applications*, 27(10), 1766–1786. <https://doi.org/10.1080/13675567.2023.2184467>
24. Yu, P., Abdul Hamid, R., Osman, L. H., & Liao, J. (2025). Bridging the digital gap: Empirical insights into agri-food supply chain transformation. *Sustainable Futures*, (10), Article 100810. <https://doi.org/10.1016/j.sfr.2025.100810>

Алла Валеріївна Гуменюк*,
кандидат економічних наук, доцент
allagumen@ukr.net
<https://orcid.org/0000-0002-4333-0478>

Наталія Володимирівна Білошкурська*,
кандидат економічних наук, доцент
biloskurska.n@udpu.edu.ua
<https://orcid.org/0000-0002-7617-7836>

* Уманський національний університет, вул. Садова, 2, Умань, Черкаська обл., 20300, Україна

ТРАНСФОРМАЦІЯ ЛОГІСТИЧНИХ ПРОЦЕСІВ ЯК СКЛАДОВА ЦИФРОВІЗАЦІЇ МАРКЕТИНГОВОГО УПРАВЛІННЯ АГРОПРОМИСЛОВИМ КОМПЛЕКСОМ

Розглянуто важливість ефективної організації логістичних процесів як ключового фактора, що забезпечує стабільну роботу та конкурентоспроможність агропромислових підприємств, особливо

в умовах воєнних викликів в Україні. Наголошено на логістиці як інтегрованій системі, що поєднує виробництво, зберігання, транспортування та розподіл сільськогосподарської продукції, і показано, як вона підтримує своєчасну доставку на внутрішні та зовнішні ринки. Підкреслено важливість безперебійного функціонування аграрного сектору, оскільки він гарантує продовольчу безпеку держави, стабілізує регіональні економіки та забезпечує постачання необхідних продуктів та ресурсів, включаючи доставку на прифронтові та віддалені території, що постраждали від нестабільності.

Проаналізовано роль цифрової компетентності працівників у застосуванні сучасних інструментів управління маркетингом та у використанні онлайн-сервісів і цифрових платформ. Окреслено, що цифрова грамотність безпосередньо впливає на прийняття управлінських рішень, комунікацію з партнерами та адаптивність до швидкозмінних ринкових умов. Визначено основні компоненти цифрової компетентності у сільськогосподарському виробництві, включаючи здатність використовувати спеціалізоване програмне забезпечення, стабільний доступ до Інтернету, хмарні сервіси, веб-ресурси та мобільні додатки для управління фермерським господарством, моніторингу та аналізу ринку.

Розглянуто сучасні цифрові технології в сільськогосподарському секторі, включаючи геоінформаційні системи (ГІС), сенсори та вимірювальні прилади, безпілотні літальні апарати (дрони), роботизовані системи, Інтернет речей (IoT) та технології блокчейн. Продемонстровано, як ці інструменти покращують ефективність управління, оптимізують виробничі процеси та підтримують постійний моніторинг стану ґрунту та розвитку сільськогосподарських культур. Встановлено, що ці технології підвищують прозорість та простежуваність у ланцюгах поставок і зміцнюють довіру між виробниками, постачальниками та споживачами.

Практична значущість результатів полягає в тому, що обґрунтовано необхідність впровадження інноваційних цифрових рішень як обов'язкової передумови підвищення продуктивності, зниження операційних витрат та зміцнення стійкості сільськогосподарських підприємств. Виявлено, що цифрова трансформація значно підвищує конкурентоспроможність агропромислових підприємств за сучасних економічних змін та підтримує їх інтеграцію у світові ринки.

Ключові слова: агропромисловий комплекс, цифрова компетентність, цифрові технології, точне землеробство, геоінформаційні системи, сенсори та вимірювальні прилади, дрони, блокчейн.

JEL Classification: Q13; Q16; M31; L90; O33.

Конфлікт інтересів: автори повідомляють про відсутність конфлікту інтересів.
Автори підтверджують, що при написанні наукової статті ресурс штучного інтелекту не використовувався.

Conflict of Interest: The authors declare no conflict of interest. The authors confirm that no artificial intelligence resources were used in the writing of the scientific article

Стаття надійшла до редакції 18.04.2026 р.
Стаття пройшла рецензування 20.05.2026 р.
Стаття рекомендована до друку 28.05.2026 р.
Стаття опублікована 30.05.2026 р.

Received: 18 April 2026
Revised: 20 May 2026
Accepted: 28 May 2026
Published: 30 May 2026