



The role of policy and economic framework conditions in shaping digitalisation in the agricultural sector in Ukraine

Vitalii Dankevych*

Doctor of Economics, Professor
Polissia National University
10002, 7 Staryi Blvd., Zhytomyr, Ukraine
<https://orcid.org/0000-0002-0522-2927>

Olha Ivaniuk

PhD in Economics
Polissia National University
10002, 7 Staryi Blvd., Zhytomyr, Ukraine
<https://orcid.org/0000-0003-2089-0867>

Illias Akhmetov

PhD in Economics
Interregional Academy of Personnel Management
03039, 2 Frometivska Str., Kyiv, Ukraine
<https://orcid.org/0009-0001-5660-6197>

Article's History:

Received: 02.05.2025

Revised: 19.08.2025

Accepted: 24.09.2025

Abstract. The purpose of the study was to examine how political and economic framework conditions influenced the development and effectiveness of digital transformation in Ukraine's agricultural sector within the Ukraine Facility Plan 2024-2027. The research applied a mixed-methods approach combining policy and regulatory analysis with a structured survey of 127 agricultural producers, local government representatives, and experts, conducted in both online and offline formats between May and July 2025. Quantitative methods were used to identify measurable trends in digital tool adoption, while qualitative content analysis helped interpret the institutional and behavioural drivers of digitalisation. It was established that digital transformation in agriculture functions as a systemic mechanism for improving transparency, investment efficiency, and integration into the European digital space. The analysis of governmental strategies and the Ukraine Facility Plan demonstrated that digitalisation is embedded in six key reforms: EU policy alignment, land market development, investment management, agrarian register modernisation, irrigation enhancement, and demining of agricultural land. The survey results revealed that 37% of agricultural producers already use satellite or drone-based monitoring, 23% rely on GIS tools, 18% employ electronic document management, 14% use digital platforms for administrative procedures, and 8% do not yet apply digital technologies. The priority ranking of reforms highlighted the dominance of EU alignment (average rank 2.0), demining (2.3), and land market reform (2.5). The integration of quantitative and qualitative findings confirmed a direct

Suggested Citation:

Dankevych, V., Ivaniuk, O., & Akhmetov, I. (2025). The role of policy and economic framework conditions in shaping digitalisation in the agricultural sector in Ukraine. *Scientific Horizons*, 28(10), 32-43. doi: 10.48077/scihor10.2025.32.



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*Corresponding author

relationship between the success of digital reforms and producers' readiness for digital innovation. The practical value of the study lies in its applicability for policymakers, agribusiness associations, and research institutions in designing targeted strategies to enhance digital infrastructure, improve digital literacy, and accelerate sustainable post-war transformation of Ukraine's agricultural sector

Keywords: digital readiness; agricultural reforms; e-governance; innovation policy; post-war recovery; EU integration; sustainable development

INTRODUCTION

The digital transformation of agriculture has become a defining component of sustainable economic growth and competitiveness across the world. In the Ukrainian context, the development of digital technologies in the agricultural sector has gained strategic importance as a mechanism for rebuilding the economy, enhancing transparency, and integrating into the European Union's policy and market frameworks. The ongoing war and post-war reconstruction have exposed the vulnerability of traditional management systems, demonstrating that the adoption of digital solutions is crucial for ensuring resilience, effective governance, and resource efficiency. According to G. Celi *et al.* (2022), the asymmetry of recovery processes in European agriculture highlights that institutional and technological readiness are the key prerequisites for sustainable development. The Ukrainian agricultural sector, being one of the pillars of national recovery, therefore requires a comprehensive digital transition supported by political and economic reforms.

The conceptual link between policy, innovation, and economic transformation has been examined by S. Abbate *et al.* (2023), who demonstrated that digital transition in the agri-food sector can only be effective under coherent governance and sustainability strategies. Their research confirms that the integration of technology into institutional mechanisms ensures systemic efficiency and environmental performance. In turn, A. Sridhar *et al.* (2023) emphasised that the implementation of digital solutions in agriculture depends on the synergy between technological advancement, financial policy, and human capital development. The authors identify data-driven management systems, precision farming, and digital advisory services as fundamental elements of a resilient agri-food ecosystem. The Ukrainian academic community also contributes significantly to understanding digital transformation in agriculture. A. Cherep and L. Sarbey (2023) argue that digitalisation acts as a catalyst for rebuilding Ukraine's economy, primarily by improving administrative transparency and reducing corruption risks in state support mechanisms. O. Borodina (2022) emphasises that the post-war transformation of Ukraine's agricultural system must adhere to the principles of social and environmental sustainability, which are best achieved through digital governance tools and open-data systems. Similar conclusions were reached by Z. Taishykov *et al.* (2024), who found

that innovation management in agriculture requires strong institutional stability and a coherent investment policy to maintain the pace of technological progress.

According to Yu. Hurtovyi (2025), the modernisation of agricultural state support mechanisms, including digital monitoring and electronic application systems, improves both transparency and the efficiency of financial resource allocation. These findings align with the conclusions of B. Farace and A. Tarabella (2024), who confirmed that the implementation of digital tools in small and medium-sized enterprises fosters circular economy practices and reduces resource losses. Moreover, I. Kosmidailo and O. Makoviichuk (2025) note that adapting foreign digital platforms to Ukrainian agricultural management enhances efficiency but requires further investments in education and digital literacy. The importance of digitalisation for policy harmonisation and global competitiveness was underlined by I. Vysochyn & O. Zhuk (2025), who concluded that Ukraine's integration into the digital global space directly depends on the quality of national digital governance systems and the ability of institutions to align with EU regulatory standards. M. Wrzecińska *et al.* (2023) also observed that the effectiveness of digital transformation correlates with the availability of advisory infrastructure, financial incentives, and trust in public digital platforms.

Consequently, recent studies confirm that digitalisation in agriculture should be viewed not merely as a technological process but as a multidimensional reform encompassing political, economic, and institutional domains. The integration of digital governance instruments, sustainable financing models, and innovation ecosystems determines the effectiveness of Ukraine's agricultural modernisation and its future position within the European digital and economic landscape. The purpose of the study was to examine how political and economic framework conditions influenced the development and effectiveness of digital transformation in Ukraine's agricultural sector within the framework of the Ukraine Facility Plan 2024-2027.

MATERIALS AND METHODS

The study was designed to examine how political and economic framework conditions influenced the development of digital transformation in Ukraine's agricultural sector. A mixed-methods research design was applied, combining regulatory analysis, empirical

observation, and comparative evaluation to ensure both analytical depth and empirical reliability. Quantitative methods were used to identify measurable trends in the adoption of digital tools, levels of digital readiness, and trust in state digital systems. Qualitative content analysis complemented these findings by providing interpretive insights into the contextual and institutional factors shaping the effectiveness of digital reforms. The empirical component of the study was based on a structured survey involving 127 respondents, including agricultural producers, representatives of local governments, and expert communities from various regions of Ukraine. The questionnaire addressed digital readiness indicators, access to e-support systems, and perceptions of state digitalisation policies. The questionnaire also included a ranking module, where respondents assessed the relative importance of six agricultural reforms introduced under the Ukraine Facility Plan 2024-2027. Each reform was rated on a 1-6 priority scale (1 = highest, 6 = lowest). The survey was conducted in 2025, using a combined online and offline format to ensure representativeness across regions and accessibility for respondents with limited internet connectivity. Participation in the study was entirely voluntary and anonymous. No personal identifiers were collected, and respondents were informed of the purpose of the research, the use of their responses for academic purposes only, and their right to withdraw at any time without consequence. All participants provided informed consent prior to participation. The authors adhered to the principles of the American Sociological Association's Code of Ethic (1997).

The informational base of the study consisted of open-access governmental and institutional data sources. The main policy framework analysed was the Ukraine Facility Plan 2024-2027 (Ministry of Economy of Ukraine, 2024), complemented by the Strategy of Agriculture and Rural development of Ukraine – 2030 (2024), publications from the Ministry of Agrarian Policy and Food of Ukraine (2023), and legislative acts related to the State Agrarian Register and DREAM public investment platform (Public Investment Management System, n.d.). Additional materials were obtained from the State Statistics Service of Ukraine (n.d.), OECD (n.d.) agricultural policy reviews and analytical data from KSE Agrocenter (2022). Special attention was paid to the digital components of six key reforms: EU policy alignment, land market, investment management, agrarian register development, irrigation, and demining of land. Data were processed using descriptive statistical analysis for quantitative responses and thematic coding for qualitative statements. The integration of both methods ensured a comprehensive understanding of the relationship between policy frameworks, economic mechanisms, and the practical capacity of the agricultural sector to adopt digital technologies during the post-war recovery period.

RESULTS AND DISCUSSION

The conducted research confirms that policy and economic framework conditions play a fundamental role in shaping the trajectory of digitalisation in Ukraine's agricultural sector. In the post-war context, digital transformation functions not merely as a technological upgrade but as a structural reform mechanism that enhances transparency, aligns governance with EU standards, and improves the efficiency of public resource allocation. As noted by A. Devaux *et al.* (2018), effective digital innovation in agriculture requires strong institutional support, adaptive policy instruments, and inclusive mechanisms for integrating producers into innovation systems. This corresponds to Ukraine's strategy of embedding digital solutions in the Ukraine Facility Plan as a cross-cutting component of all major reforms. The Ukraine Facility is the European Union's financial assistance programme for Ukraine. During the period of 2024-2027, 50 billion euros from the EU will be allocated to finance the state budget, stimulate investment, and provide technical support in the implementation of the program (Ministry of Economy of Ukraine, 2024).

European experience demonstrates that digital agriculture is most effective where policy design and economic instruments are closely integrated (Câmpeanu, 2022). In Ukraine, key reforms—such as the interoperability of land and property registries, the introduction of automated monitoring systems, the digitalisation of the State Agrarian Register, and the integration of geospatial land valuation—mirror EU practices aimed at building transparent and efficient agri-food governance systems. These approaches are fully aligned with the principles of the Common Agricultural Policy, which emphasises data-driven governance and sustainable resource use (Abbate *et al.*, 2023). The trust factor and inclusiveness are equally critical. As R. Tomble and H. Smuts (2023) highlight, digital transformation is most impactful when farmers are active participants in decision-making through accessible, reliable platforms. In Ukraine, such platforms include the State Agrarian Register and automated public monitoring systems, which serve not only as administrative tools but also as instruments of accountability. B. Farace and A. Tarabella (2024) note that digital technologies foster circular economy practices, which in turn strengthen sustainability outcomes in agricultural production and value chains. This corresponds with findings from N. Mamono (2023), which emphasise that transparent and inclusive mechanisms increase resilience in rural areas during and after crises.

The economic dimension of digitalisation involves both national and international investment frameworks. According to O. Radchenko *et al.* (2023) investment in digital infrastructure enables wider technological diffusion and accelerates structural transformation. A. Sridhar *et al.* (2023) emphasise the role of public-private partnerships in scaling up digital solutions,

particularly for small and medium-sized farms. In Ukraine, this is reflected in the integration of digital investment platforms, such as DREAM, into key recovery and modernisation strategies, which helps link policy priorities with concrete financial mechanisms (Kyivstar Business Hub, 2022; KSE Agrocenter, 2022). Finally, the development of human capital and advisory systems is a cornerstone of sustainable digital transformation. N. Pavlishyna and A. Kharin (2023) and Y. Doukas *et al.* (2022) stress the importance of education, extension services, and knowledge exchange in ensuring technology adoption. In this context, AKIS (Agricultural Knowledge and Innovation System) can serve as an institutional bridge between policy frameworks, economic mechanisms, and farm-level practices. Such systems enhance adaptive capacity, strengthen resilience, and enable alignment with EU Green Deal and CAP objectives (Pryshliak *et al.*, 2023). This creates a comprehensive ecosystem in which digitalisation acts as both a governance tool and a driver of economic modernisation in agriculture.

The development of digitalisation in Ukraine's agricultural sector is closely linked to the creation of a modern regulatory framework that defines the policy and economic conditions for reform implementation. One of the key steps in this direction was the adoption of the Strategy of Agriculture and Rural development of Ukraine – 2030 (2024). This document aims to shift from traditional administrative management to modern digital instruments that ensure land market transparency, more efficient interaction between stakeholders and government institutions, and alignment of national agricultural policy with EU standards. A central digital element of this strategy is the establishment of the Farm Sustainability Data Network (FSDN), which enables the collection, processing, and analysis of agricultural data from pilot regions in accordance with the *acquis communautaire*. This system provides continuous monitoring of the sector and supports evidence-based policy decisions on state support for producers.

Digital accounting of production indicators, environmental factors, and economic parameters forms the basis for a data-driven governance model, bringing Ukraine closer to the EU's sustainable development standards.

Another milestone in the digital transformation is the automated exchange of data between the State Land Cadastre of Ukraine (n.d.) and the State Register of Real Rights to Immovable Property (n.d.). This integration improves the efficiency and transparency of land transactions, reduces bureaucratic procedures, and minimises corruption risks. An automated public land monitoring system and a GIS-based mass land valuation system have also been launched, significantly increasing the transparency and efficiency of land resource management. A key role in digitalisation is played by the State Agrarian Register (n.d.) (SAR), officially recognised as a public digital register of all stakeholders in the agricultural sector – producers, processors, water users, and others (Table 1). Registration in SAR is a prerequisite for receiving state support, and the publication of the list of beneficiaries increases transparency in the allocation of financial resources. According to official reports, by the end of 2025, at least 80% of agricultural state support will be distributed through this platform. Systemic digitalisation also extends to water resource management, including the adoption of a Long-Term Development Plan for Ukraine's Irrigation System (Ministry of Agrarian Policy and Food of Ukraine, 2023). This plan integrates digital platforms into the planning, analysis, and implementation of irrigation projects, applying a basin management approach and environmental impact assessment consistent with EU and national legislation. Equally important is mine action, which plays a critical role in restoring agriculture in de-occupied regions. The adoption of the Strategic Document on Mine Action until 2033 sets out mechanisms for coordination, operator support, donor engagement, and the use of electronic certification registries to enhance transparency and operational efficiency (Ministry of Agrarian Policy and Food of Ukraine, 2023).

Table 1. Directions for the recovery of the agri-food sector within the Ukraine facility and the integration of digital components

Reforms and Investments	Content	Digital Component
Reform 1. Alignment of institutional frameworks for agriculture and rural development with EU policy	Adoption of the strategy for the development of agriculture and rural areas until 2030	An important part of the strategy is to ensure the functioning of the land market on the basis of transparency and openness, supported by digitalisation of processes, digital solutions for learning, service access, and registry interoperability.
	Creation of the farm sustainability data network (FSDN)	Creation of a digital system for data collection, processing and analysis to support digitalisation of public administration and analytics in the sector.
Reform 2. Ensuring the functioning of the land market	Automated data exchange between land cadastre and property register	Automation of data exchange between registers (interoperability) to ensure access to information in land relations.
	Launch of an automated public land monitoring system	Creation of a digital land relations monitoring system through the interaction of different registers (databases). A geoinformation system for automated land valuation as part of the digitalisation of land resource management.

Table 1. Continued

Reforms and Investments	Content	Digital Component
Reform 3. Strengthening investment program management	Entry into force of legislation on state support for agriculture in Ukraine	Digitalisation of producer information, expansion of electronic document management, and engagement of producers and processors through a single digital platform for state support distribution.
Reform 4. Improvement of the agricultural enterprise register	Entry into force of the Law on the State Agrarian Register	Use of the digital information and communication platform – the State Agrarian Register – for analysis and decision-making on state support (for public administration).
	Provision of support through the State Agrarian Register (SAR)	Prioritisation of the digital platform for providing state support to agricultural producers.
Reform 5. Long-term irrigation development for climate resilience	Adoption of a long-term irrigation system development plan	The digital component is ensured through the public investment platform.
Reform 6. Demining of land and water areas	Entry into force of the strategic document on mine action until 2033	Mine action certificate registry operates and is integrated into the DREAM investment platform

Source: developed by the authors based on the Ministry of Agrarian Policy and Food of Ukraine (2023) and Ministry of Economy of Ukraine (2024)

The investment component of this program foresees allocating at least €100 million for agricultural land demining, financed through the state budget and monitored using digital treasury and reporting tools. This ensures transparent fund allocation, efficient monitoring, and accelerated restoration of agricultural land for production purposes. Together, these results confirm that digitalisation is not just a technological upgrade but a core structural element of Ukraine's agricultural policy, enabling transparency, efficiency, and alignment with European standards in the post-war recovery period. Digitalisation is becoming an integral component of the policy and economic framework conditions for the development of Ukraine's agricultural sector. It ensures interoperability of state registers, transparency in resource allocation, supports data-driven decision-making, and facilitates the sector's adaptation to EU standards. These transformations not only stimulate post-war recovery but also shape a new quality of governance, enhancing the sector's international competitiveness. Digital infrastructure is emerging as the foundation for Ukraine's integration into the European economic space within the framework of the Ukraine Facility Plan 2024-2027.

Most measures for restoring the agri-food sector are based on digital solutions—building electronic interaction systems, collecting and analysing large datasets, and ensuring register interoperability. This is a key element of digital transformation for the development of e-governance in agriculture. Such measures not only enhance the efficiency of public authorities but also simplify access for businesses, citizens, and analysts to information and services by integrating registers into a unified interaction system at both the national and European levels. The 69 reforms in the Plan are supported by more than 150 quarterly implementation indicators. In addition to the reform indicators, the plan includes 16 investment indicators. To fulfill them, it is necessary to allocate funds for the implementation of individual projects – infrastructure development, demining,

renewable energy, support for small and medium-sized enterprises, etc (Ministry of Economy of Ukraine, 2024).

Reform 1. Alignment of the institutional framework for agriculture and rural development with EU policy. Reform 1 is strategically significant for modernising Ukraine's agricultural sector and bringing it closer to EU standards. Its central element is the adoption of the Strategy for the Development of Agriculture and Rural Areas until 2030, which identifies digitalisation as a core transformation tool. The document envisages the wide application of digital technologies to ensure transparency and efficiency in governance, particularly through interoperability of state registers, digitisation of phytosanitary documentation, integration into international data exchange systems, and automation of permitting procedures in the land sector. In the field of land relations, the strategy emphasises the full digital registration of agricultural land and the creation of online platforms for open data access. This will allow effective monitoring of land use, the implementation of state support programs—including compensation for war damages and increased transparency of all processes. Mandatory registration of all producers in the State Agrarian Register is a fundamental element of the new digital ecosystem, ensuring transparent resource allocation and creating a solid basis for EU integration of the sector. A key instrument of this reform is the establishment of the Farm Sustainability Data Network (FSDN), which evolves from the European FADN system. It expands the scope of analysis from economic to environmental and social indicators, supporting the implementation of the EU's Common Agricultural Policy. The integration of FSDN with the State Agrarian Register will allow combining producer data with sustainability metrics, thereby enabling evidence-based policy and support programs. An additional component is the integration of FSDN with the State Land Cadastre and GIS systems. This synergy will ensure the collection and analysis of spatial, environmental, and economic data necessary for strategic planning. It will strengthen the

state's analytical capacity, improve resource management efficiency, and establish a modern digital architecture for agricultural policy aligned with European sustainability standards.

Reform 2. Ensuring the functioning of the land market. Reform 2 focuses on establishing a transparent and efficient land market in Ukraine through the integration of key digital registries. Its foundation is the automated exchange of data between the State Land Cadastre and the State Register of Property Rights. This integration combines cadastral data with ownership, property rights, and encumbrance information. The result is a reliable market pricing database, reduced corruption risks, prevention of undervaluation of land, and the creation of a transparent valuation mechanism. Automated data exchange also enables electronic services for citizens and businesses, such as automatic land valuation and the issuance of property value certificates. Another important component is the automated public land monitoring system, integrated within the State Land Cadastre. It continuously collects, processes, and updates information on land resources, market transactions, ownership changes, and other indicators. Such monitoring increases market transparency, improves evidence-based decision-making, and allows for timely responses to changes in land use patterns. A key role in this reform is played by the GIS-based mass land valuation system, which is fully interoperable with cadastral software and connected to the State Service of Ukraine for Geodesy, Cartography, and Cadastre and the Unified State Register of Court Decisions. This creates a comprehensive digital platform for land valuation and management, increasing trust in the land market, improving the investment climate, and fostering sustainable development of the agricultural sector.

Reform 3. Strengthening institutional and administrative structures for investment program management. Reform 3 is aimed at creating an effective system of state support for the agricultural sector through the digitalisation of management processes. A key step was the adoption of the Law of Ukraine No. 13202-1 (2025), which establishes new principles for designing state aid policies and mandates automated data collection and processing on beneficiaries. The law provides for the transition to electronic document management and the operation of a single digital platform for distributing state funds. Producers and processors will receive support exclusively through this platform, ensuring transparency, preventing abuse, and increasing the efficiency of program administration. This approach strengthens institutional mechanisms and builds trust in state instruments supporting the agricultural sector.

Reform 4. Enhancing the official public electronic register of agricultural enterprises. Reform 4 defines the digital component as a structural foundation for governance transformation in the agricultural sector. Its goal is to improve regulatory quality, ensure data accuracy,

reduce corruption risks, and build an analytical base for forecasting agricultural development. A major step was the adoption of the Law of Ukraine No. 3980-IX (2024), which establishes the State Agrarian Register (DAR) as an automated electronic system and online platform for registering producers, informing them about support programs, and simplifying application procedures. SAR functions as a data hub, automatically exchanging information with other state registries – the Unified State Register (EDR), the State Land Cadastre, the State Register of Property Rights, and the Unified State Register of Animals. This minimises paperwork and consolidates data on land banks, livestock, and production activities. Such integration provides a comprehensive overview of the agricultural sector and prepares Ukraine to implement the Integrated Administration and Control System (IACS), a prerequisite for future EU financial support. The implementation of state support mechanisms through SAR has already shown tangible results. According to official reports, by the end of 2025 at least 80% of all agricultural state support will be allocated through this system. Consolidated, verified, and regularly updated data will allow for targeted and efficient support programs, enhance transparency, reduce corruption risks, and broaden access for producers to financing instruments.

Reform 5. Long-term irrigation development plan to strengthen climate resilience. Reform 5 targets climate adaptation of agriculture through the modernisation and digitalisation of irrigation systems. The focus is on enhancing climate resilience by automating water resource management during the construction or rehabilitation of irrigation infrastructure. This ensures more efficient water use, reduces costs, and increases productivity in irrigated farming. Although the digital component of this reform is relatively limited, it remains essential for integrated water governance. It provides for digitalisation of planning and water use control, and allows certain projects to be implemented through the DREAM public investment platform. This approach lays the groundwork for transparent resource management, attracting investment, and integrating irrigation solutions into Ukraine's modern digital agricultural ecosystem.

Reform 6. Demining of land and water areas. Reform 6 focuses on creating an effective system for mine action management and strengthening the safety of agricultural production. In 2024, the Cabinet of Ministers of Ukraine adopted the resolution on the approval of the National Mine Action Strategy until 2033 and the Operational Action Plan for 2024-2026 (Ministry of Economy of Ukraine, 2024). This document defines the state's key priorities in mine action and emphasises the importance of digital transformation of certification and control processes in line with Ukraine's national digitalisation strategy. Digitalisation in this sphere will enable more efficient control over operators' activities, standardise certification and record-keeping procedures,

and enhance transparency in resource management. The creation of modern digital mechanisms is an important step toward strengthening the confidence of international partners and donors supporting humanitarian demining. It will also improve the planning of operations, ensure rapid information exchange between state institutions, and reduce risks to the population and agricultural producers in demined areas.

A crucial element of the reform is the creation of a “Mine Action” sectoral portfolio on the DREAM public investment platform (Ministry of Economy of Ukraine, 2024). This tool enables real-time monitoring of project implementation in mine action, consolidates data on funding, implementers, and outcomes, and strengthens the state’s ability to manage resources transparently and efficiently. It provides a strategic digital instrument for coordinating humanitarian demining, supporting the safe return of agricultural land to production and fostering a favorable investment environment in liberated territories. Within the context of the study, a survey was conducted among representatives of the agricultural sector, public authorities, local governments, and experts. The main objective was to determine how public policy and economic conditions influence the adoption of digital technologies in agriculture. Special attention was paid to perceptions of reforms under the Ukraine Facility Plan 2024–2027 and the level of readiness of agricultural producers to adopt new digital solutions. The results show that most respondents view digitalisation not only as a tool to optimise production but also as a driver of transparency, market openness, and trust in state institutions. Participants

noted that the integration of digital registers and automated land management systems is a key prerequisite for reducing corruption risks and improving the investment climate in agriculture. At the same time, the survey revealed a significant gap between policy goals and the practical capacity of certain regions to meet new digital requirements. Respondents emphasised the need for additional investments in digital infrastructure, modernisation of IT solutions, capacity building, and mechanisms to support small and medium-sized producers. Without adequate funding and coordination, digital reforms risk being implemented unevenly across regions.

The interaction between policy decisions and economic framework conditions plays a crucial role in shaping Ukraine’s digital agricultural ecosystem. Respondents highlighted the importance of instruments such as the State Agrarian Register, automated public land monitoring systems, GIS-based land valuation tools, and digital investment platforms. These are viewed as fundamental mechanisms for transparent land governance and effective delivery of state support. The diagram 1 illustrates the current state of digitalisation in the Ukrainian agricultural sector based on survey data. The results indicate that satellite or drone monitoring is the most commonly used digital tool, applied by 37% of respondents. This reflects a growing interest in precision agriculture technologies, which enable farmers to optimise field management and increase productivity. GIS and field mapping tools are used by 23% of participants, showing that spatial data analysis is becoming an increasingly important component of modern agricultural practices (Fig. 1).

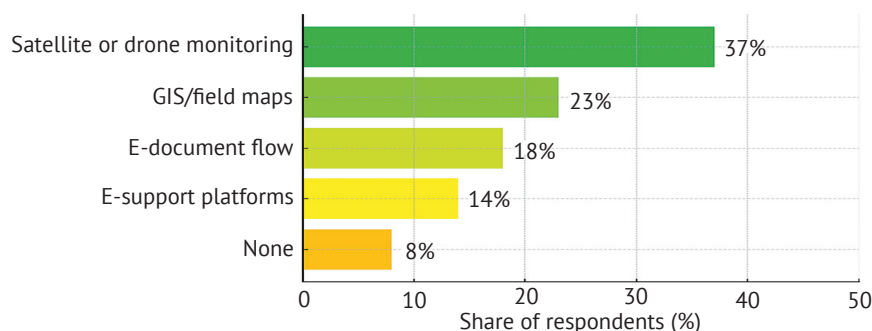


Figure 1. Use of digital tools in Ukrainian agriculture

Source: developed by the authors

At the same time, 18% of respondents utilise electronic document flow systems, and 14% rely on various e-support platforms, indicating steady progress toward administrative and operational digitalisation. However, 8% of respondents still do not use any digital tools, highlighting existing gaps in access to technology, infrastructure, or knowledge. These findings confirm that while the sector is undergoing digital transformation, its pace and coverage remain uneven, underscoring the need for supportive policies, capacity building, and investment in

digital infrastructure. The chart illustrates the level of trust in state digital systems among agricultural stakeholders in Ukraine. The largest share of respondents (46%) indicated that they partly trust these systems, reflecting a generally positive but cautious attitude toward state digitalisation efforts. Meanwhile, 22% of participants reported that they fully trust state platforms, which demonstrates a solid foundation of confidence in existing digital services and their potential to support transparency, efficiency, and accountability (Fig. 2).

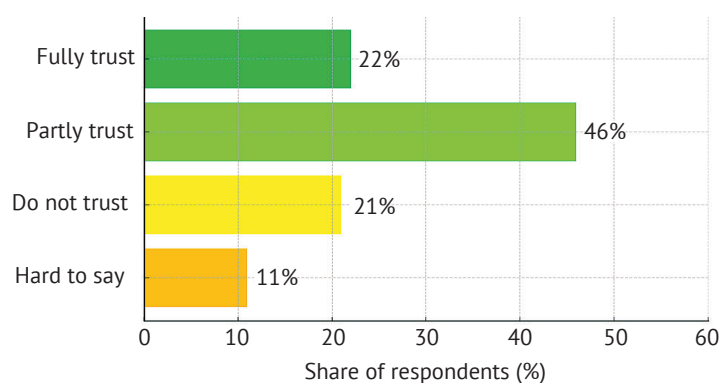


Figure 2. Trust in state digital systems

Source: developed by the authors

However, 21% of respondents stated that they do not trust state digital systems, and 11% found it hard to say, highlighting persistent concerns about data security, system reliability, and governance practices. These results suggest that, while digital transformation in the agricultural sector is progressing, strengthening trust in state platforms remains a critical task. This will require not only technological improvements but also greater institutional transparency, communication, and user-oriented service design. The chart presents the average priority ranking of key agricultural reforms in Ukraine, based on respondents' assessments. The two highest priorities are EU policy alignment (average rank 2.0) and demining of land and water areas (2.3), reflecting the urgent need to harmonise national agricultural policies with EU standards and to address the large-scale contamination of farmland caused by the war. The functioning of the land market ranks third (2.5), underscoring its crucial role in ensuring transparent property relations, investment attractiveness, and the efficient use of agricultural resources.

Reforms related to investment governance strengthening (3.5), irrigation development (3.8), and improvements to the State Agrarian Register (4.2) are

recognised as strategically important but are perceived as less urgent than land reform, EU integration, and demining efforts. This indicates that while stakeholders acknowledge their relevance to the sector's long-term modernisation and competitiveness, they view immediate priorities through the lens of security, land access, and compliance with European regulations. Such prioritisation reflects a practical understanding of the current recovery context, where addressing critical infrastructure and regulatory gaps comes first. At the same time, these reforms play an essential enabling role in ensuring sustainable growth. Strengthening investment governance can create a more predictable and transparent environment for both domestic and international investors. Expanding irrigation infrastructure is key to adapting to climate challenges and improving productivity, particularly in southern regions. Enhancing the functionality and interoperability of the State Agrarian Register will expand access to support programs and improve data-driven decision-making. Together, these reforms form the backbone for deeper structural transformation, aligning Ukraine's agricultural sector with EU standards and ensuring long-term resilience (Fig. 3).

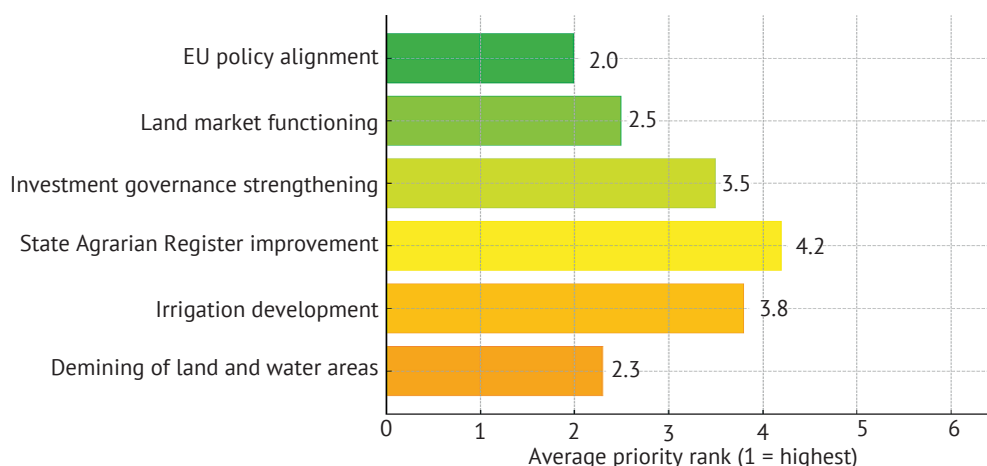


Figure 3. Priority ranking of reforms

Source: developed by the authors

The chart demonstrates respondents' views on the role of digitalisation in the successful implementation of agricultural reforms in Ukraine. A clear majority considers digitalisation essential: 37% of respondents view it as important, while 35% see it as critically important.

This highlights a strong consensus that digital tools and platforms are key to ensuring transparency, efficiency, and accountability in reform processes, particularly in land governance, resource management, and policy implementation (Fig. 4).

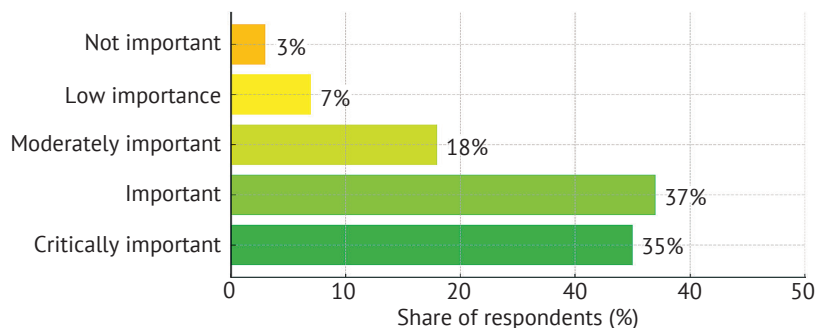


Figure 4. Importance of digitalisation for reform implementation

Source: developed by the authors

Meanwhile, 18% of respondents rated digitalisation as moderately important, and only 10% considered it of low or no importance, indicating limited skepticism toward the digital transformation agenda. These results confirm that digitalisation is widely perceived as a strategic driver of institutional change in the agricultural sector, reinforcing its role as a foundation for modernisation and integration with EU standards. The chart highlights the key priority areas for digital transformation in Ukraine's agricultural

sector. The highest priority identified by respondents is land resource management (29%), reflecting the critical role of digital tools in ensuring transparent and efficient use of land, improving cadastral data systems, and supporting decision-making. The second most important area is access to state support programs (21%), which underscores the need for user-friendly digital platforms that simplify administrative procedures and improve the targeting of financial assistance (Fig. 5).

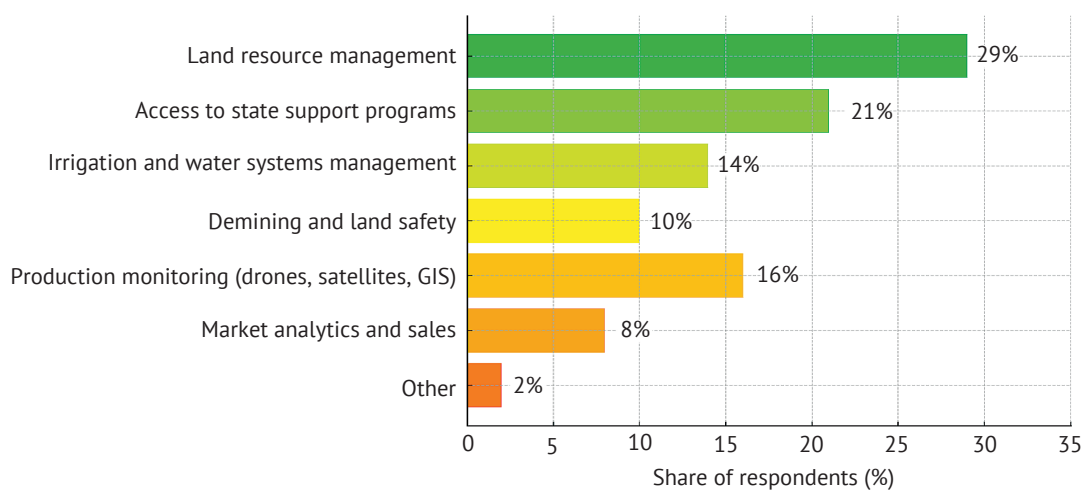


Figure 5. Priority areas for digitalisation in agriculture

Source: developed by the authors

Other notable priorities include production monitoring using drones, satellites, and GIS technologies (16%) and irrigation and water systems management (14%), which are essential for optimising resource use and climate adaptation. Meanwhile, demining and land safety (10%) and market analytics and sales (8%) were ranked lower but remain strategically significant for

post-war recovery and market competitiveness. These findings confirm that stakeholders view digitalisation primarily as a tool for improving governance, efficiency, and transparency in land and resource management. Thus, the survey results confirm that the effectiveness of digital transformation in Ukraine's agricultural sector directly depends on the quality of political decisions

and the economic mechanisms of their implementation. Digitalisation is viewed not merely as a technological upgrade but as a structural reform of sectoral governance. The combination of strategic decision-making, financial resources, and institutional support can form a resilient digital ecosystem, enhancing the competitiveness of Ukrainian agriculture and accelerating its integration into the European economic space.

The survey of farmers and agricultural producers revealed that one of the key factors for effective digital transformation is the development of knowledge, skills, and extension services. Most respondents emphasised that even with access to digital tools, practical training, peer learning, and expert support remain essential. This indicates the need for systematic institutional development to ensure effective communication and knowledge exchange between the state, businesses, research institutions, and producers. An effective model to address this challenge could be the Agricultural Knowledge and Innovation System. This system enables collaboration among research institutions, advisory services, businesses, and farmers to foster innovation and support the implementation of digital solutions. AKIS not only provides practical knowledge to producers but also helps disseminate innovations through the integration of educational, scientific, and governance tools. Within the implementation of state agricultural policy, AKIS can serve as an institutional platform linking political objectives with economic mechanisms. It can support small and medium-sized producers, promote public-private partnerships, attract investment in digital infrastructure, and expand extension services. In this way, digitalisation becomes not only a technological shift but also a socioeconomic transformation of the sector. The use of AKIS will also support Ukraine's alignment with the EU's Common Agricultural Policy and the European Green Deal. It will help create a sustainable innovation ecosystem based on digital solutions, ensure transparent information exchange, and enable effective knowledge management. Ultimately, this will enhance the competitiveness of Ukraine's agricultural sector, strengthen its integration into the European market, and ensure sustainable development in the face of global challenges.

CONCLUSIONS

The conducted study demonstrated that the digital transformation of Ukraine's agricultural sector is not merely a technological trend but a structural component

of the post-war economic recovery and European integration process. The analysis of the Ukraine Facility Plan 2024-2027 and related policy instruments confirmed that digitalisation serves as both an enabler and a driver of institutional transparency, resource efficiency, and investment accessibility. Empirical results revealed that Ukrainian agricultural producers show a growing level of digital readiness, though the pace of implementation remains uneven across regions and enterprise types. Survey findings indicate that 37% of respondents already use satellite or drone-based monitoring, 23% apply GIS systems for land management, 18% employ electronic document management, 14% rely on e-platforms for administrative procedures, while 8% still operate without digital tools. The perception of governmental digital initiatives was moderately positive: 46% of respondents expressed partial trust and 22% full trust in state digital systems, while the remainder noted the need for better data protection and user training. Among the six priority reforms identified under the Ukraine Facility Plan, the highest average rankings were assigned to EU policy alignment (2.0), land and water demining (2.3), and land market development (2.5), reflecting a focus on security, regulatory coherence, and economic resilience.

The integration of quantitative and qualitative analyses confirmed a clear correlation between the success of reforms and the adaptability of agricultural producers to new digital standards. However, infrastructural disparities, limited digital literacy, and insufficient institutional coordination continue to constrain the full-scale implementation of digital solutions. Strengthening advisory systems and expanding the Agricultural Knowledge and Innovation System (AKIS) network remain essential for achieving the long-term goals of sustainable and inclusive agricultural growth. Future research should focus on modelling regional disparities in digital adoption, assessing cost-benefit ratios of digital investments, and developing mechanisms for synchronising digital platforms across all levels of agricultural governance.

ACKNOWLEDGEMENTS

None.

FUNDING

None.

CONFLICT OF INTEREST

None.

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Роль політики та економічних рамок умов у формуванні цифровізації в аграрному секторі України

Віталій Данкевич

Доктор економічних наук, професор
Поліський національний університет
10008, бульв. Старий, 7, м. Житомир, Україна
<https://orcid.org/0000-0002-0522-2927>

Ольга Іванюк

Кандидат економічних наук
Поліський національний університет
10008, бульв. Старий, 7, м. Житомир, Україна
<https://orcid.org/0000-0003-2089-0867>

Ілляс Ахметов

Кандидат економічних наук
Міжрегіональна академія управління персоналом
03039, вул. Фрометівська, 2, м. Київ, Україна
<https://orcid.org/0009-0001-5660-6197>

Анотація. Метою дослідження було з'ясувати, як політичні та економічні рамок умов вплинули на розвиток і ефективність цифрової трансформації аграрного сектору України в межах програми Ukraine Facility Plan 2024-2027. У роботі застосовано змішаний методологічний підхід, що поєднує політико-нормативний аналіз із структурованим опитуванням 127 сільськогосподарських виробників, представників органів місцевого самоврядування та експертних спільнот, проведеним у онлайн та офлайн форматах у період з травня по липень 2025 року. Кількісні методи дозволили виявити вимірювані тенденції у використанні цифрових інструментів, тоді як якісний контент-аналіз допоміг інтерпретувати інституційні та поведінкові чинники цифровізації. Було встановлено, що цифрова трансформація в аграрній сфері виступає системним механізмом підвищення прозорості, інвестиційної ефективності та інтеграції до європейського цифрового простору. Аналіз державних стратегій і програми Ukraine Facility Plan показав, що цифровізація інтегрована у шість ключових реформ: узгодження політики з ЄС, розвиток ринку землі, управління інвестиціями, модернізацію аграрного реєстру, вдосконалення зрошення та розмінування сільськогосподарських земель. Результати опитування засвідчили, що 37 % агровиробників уже використовують супутниковий або дронний моніторинг, 23 % застосовують ГІС-технології, 18 % – електронний документообіг, 14 % – цифрові платформи для адміністративних процедур, а 8 % ще не впроваджують цифрових інструментів. Рейтинг пріоритетності реформ виявив домінування євроінтеграції (середній ранг 2,0), розмінування (2,3) та реформи ринку землі (2,5). Інтеграція кількісних і якісних результатів підтвердила прямий взаємозв'язок між успіхом цифрових реформ і готовністю виробників до цифрових інновацій. Практична цінність дослідження полягає в можливості використання його результатів органами державної влади, галузевими асоціаціями та науковими установами для розроблення цільових стратегій розвитку цифрової інфраструктури, підвищення цифрової грамотності та прискорення сталого післявоєнного відновлення аграрного сектору України.

Ключові слова: сила; цифрова готовність; аграрні реформи; електронне врядування; інноваційна політика; післявоєнне відновлення; євроінтеграція; сталий розвиток