International Journal on Economics, Finance and Sustainable Development (IJEFSD)

e-ISSN: 2620 – 6269
p-ISSN: 2615 - 4021

Volume: 7 Issue: 1 | January 2025

https://journals.researchparks.org/index.php/IJEFSD

Article

Solutions To Problems Arising In Agriculture In Uzbekistan In The Context Of The Digital Economy

Shavqiev Erkin[1], Ulugmurodov Farkhod Fakhriddinovich[2], Karshiev Avazbek Sadullaevich[3], Rashidov Ziyodulla[4]

1. Professor Of The "Digital Economy" Department Samarkand Institute of Economics and Service
2. Assistant Of The Department Of "Digital Economy", Samarkand Institute Of Economics And Service
3. Student Of The Faculty Of Economics, Samarkand Institute Of Economics And Service
4. Student Of The Faculty Of Economics, Samarkand Institute Of Economics And Service

* Correspondence: erkinshavqiyev@sies.uz

Abstract: This article explores challenges faced by Uzbekistan's agricultural sector in the context of the growing digital economy and proposes innovative solutions. It examines both macro-level issues, such as outdated infrastructure, inefficient resource management, and limited access to technology, and micro-level problems, including farm-level productivity, insufficient data-driven decision-making, and inadequate farmer education. The study emphasizes the role of digital tools, such as precision agriculture, IoT-based monitoring systems, and blockchain for supply chain transparency, in addressing these challenges. Additionally, it highlights the necessity of government policies, private sector collaboration, and capacity-building initiatives to accelerate the adoption of digital technologies in agriculture. By leveraging digital advancements, Uzbekistan can achieve sustainable agricultural growth and contribute to national food security and economic development.

Keywords: Digital agriculture, Precision farming, LoT in agriculture, Sustainable agricultural technologies, Blockchain in agro-industry

1. Introduction

In today's era of digital technologies, it is difficult to imagine any sector or area of the economy without information technology and information technology. We are also witnessing that many problems can be solved through digitization and digitalization in the agricultural sector. In Uzbekistan, the necessary measures are being taken to use digital technologies in the development of the agro-industry and implement them in each region. In accordance with the Decree of the President of the Republic of Uzbekistan No. PF-6079 dated October 5, 2020 "On approval of the strategy "Digital Uzbekistan — 2030" and measures for its effective implementation" and the Resolution No. PQ-4699 dated April 28, 2020 "On measures for the widespread introduction of the digital economy and e-government", as well as in order to increase the efficiency of the use of digital and geoinformation technologies in agriculture and water management, a resolution was adopted by the Cabinet of Ministers. Based on the developed laws, the following main priority areas were identified:

1. Introduction of departmental and interdepartmental information systems for the effective use of agricultural land, water resources, and monitoring the condition of crops;
2. Fully electronic transfer of services provided by organizations in the agro-industrial complex, including government services;
3. Implementation of targeted projects based on public-private partnerships to introduce modern information and communication technologies in the agricultural sector;
4. Introduction of technologies for online monitoring of the use of water resources in reservoirs and irrigation systems;

Citation: Shafqiev, E. Solutions to problems arising in agriculture in uzbekistan in the context of the digital economy. International Journal on Economics, Finance and Sustainable Development (IJEFSD) 2025, 7(1), 47-53.

Received: 20th Dec 2024
Revised: 29th Dec 2024
Accepted: 29th Dec 2024
Published: 09th Jan 2025

5. Improving the water resources management system, maintaining records of water use and consumption, and forming a database;
6. Assisting entrepreneurs in the agricultural sector to implement business startup projects and commercialize the results of innovative activities [8].

Based on the above directions, it is possible to develop the agricultural economy and find effective solutions to the problems that arise in it.

Literature review

The digital economy is a paradigm of economic development through the exchange of information online using digital technologies, institutions, regulatory frameworks, skills and businesses in order to accelerate labor productivity and economic growth, improve the quality of life and the investment climate [1]. It is an economic activity in which the main factors of production are data in digital form, the use of large amounts of data and the use of analytical results that allow to increase the efficiency of the supply, storage and sale of various types of production activities, technologies, equipment, goods and services compared to traditional forms of business. Through the overlap, diffusion and penetration of digital infrastructure, data elements and digital technologies, the digital economy creates superposition, diffusion and penetration effects in traditional sectors, thereby increasing the efficiency of resource allocation and reducing production costs in these sectors. The integration and development of the digital economy with agriculture and agribusiness can effectively solve information asymmetry in traditional agriculture, allowing for optimal allocation of resources to achieve economic efficiency and reduce production and service costs.

Don Tapscott, in his book The Digital Economy: Promise and Peril in the Age of Networked Intelligence, did not provide a direct definition, but called it the "Age of Networked Intelligence," which he describes as " not just the networkedness of technologies… intelligent machines… but the networkedness of people through technologies," which " combines knowledge, intelligence, and creativity for breakthroughs in wealth creation and social development." He is credited with coining the term "digital economy." The digital economy explains the relationship between the new economy, new businesses, and new technologies, and emphasizes how they support each other [2].

Knickrehm et al. 2016 "Digital Disruption": "The digital economy represents a broad range of economic and social activities that combine several general purpose technologies (GPTs) and are carried out by people through the Internet and related technologies. It includes the physical infrastructure on which digital technologies are based (broadband lines, routers), the devices used for access (computers, smartphones), the software that powers them (Google, Salesforce), and the functions they provide (IoT, data analytics, cloud computing). It highlights the potential of the digital economy to provide inclusive and sustainable growth, but this can only be achieved if key enablers are implemented"[3].

To understand the relevance of agriculture in the economy, it is first necessary to understand what agriculture itself is.

"Agriculture is the complex of activities related to the production, cultivation, and cultivation of food, fodder, fiber, medicinal plants, and other agricultural products by humans," according to the Encyclopaedia Britannica: Agriculture, the science, art, and practice of cultivating plants and livestock [4].

Agriculture is the main source of food for the population, a part of the economy that satisfies consumer demand. At the same time, it supplies raw materials for several branches of industry that produce consumer goods. Agro-industry is the economic sector that is engaged in the cultivation, storage, processing and delivery of agricultural products to consumers [1,5].

As a result of the observations and surveys conducted so far, we can cite the following as examples of problems that arise in the implementation of agricultural activities:

1. Climate change. Extreme weather events: Extreme weather events such as droughts, floods, storms, and heat waves make it very difficult to predict the health of agricultural crops.
2. The spread of pests and diseases that are difficult for humans to detect. In such a situation, it is difficult to identify such problems unless they are diagnosed by experts.
3. Water scarcity and simple irrigation methods. Considering that 3 liters of water are lost for 1 calorie, we often encounter irrigation-related problems in agriculture.
4. Soil degradation and human failure to detect it. Nutrient depletion Intensive farming practices such as monoculture crops and excessive fertilization deplete soil nutrients, leading to soil degradation, reduced productivity, and increased dependence on chemicals [6,7].

Solving the above problems through traditional methods requires a long time, a lot of money and labor. If we equip agricultural production and services with digital technologies, we can solve the above-mentioned urgent problems quickly and easily. We can give the following examples:

1. PF (Precision Farming) Precision farming. That is, in the process of farming or animal husbandry, "GPS, Drones, Sensitive Sensors" make it possible to obtain high-resolution images of crops, study soil moisture and its composition, and locate livestock.
2. Through this, we can be aware of and prevent problems from excess labor, natural disasters, and wild animal attacks.
3. Creating digital platforms for farm management. Automatically assigned tasks allow for timely completion of required tasks, easy data collection and analysis, and remote access and management of the system.
4. It is known that humans are always prone to making mistakes. Sometimes, due to a small mistake, large companies and factories can stop operating. However, technologies that work with high precision and on command are an exception. The use of such technologies in agricultural conditions ensures that goods and products reach consumers in good quality and on time.
5. Creating smart irrigation systems. IoT (Internet of Things) sensors measure soil moisture and send commands to the sensor to turn on or off the water at the right time. This saves water and prevents crop loss.

   These types of sensor devices provide and store hourly, daily, weekly, monthly, and yearly data on the physical condition of the plant or animal they are monitoring. This creates a database for veterinarians and scientists, indicating when and what type of treatment or feeding should be given.
6. Market access. Digital trading platforms help agricultural entities find demand for their goods and products faster and easier. This ensures that goods reach the consumer from the producer quickly and without any damage.
7. Digital technology and its applications allow new entrepreneurs to enter the complex competition. Because in the traditional market, due to the oligopoly of large companies, the percentage of small businesses entering the market is very low. And it takes a long time to recognize your brand. Solving such problems through digital markets, that is, e-commerce platforms, allows you to enter the market without any obstacles.
8. Vertical farming. Indoor farming systems, vertical farms, use specially designed vertical plant racks stacked to grow crops in a controlled environment using artificial lighting, temperature control, and hydroponic or aeroponic growing methods. With this technology, lack of space is no longer a problem.

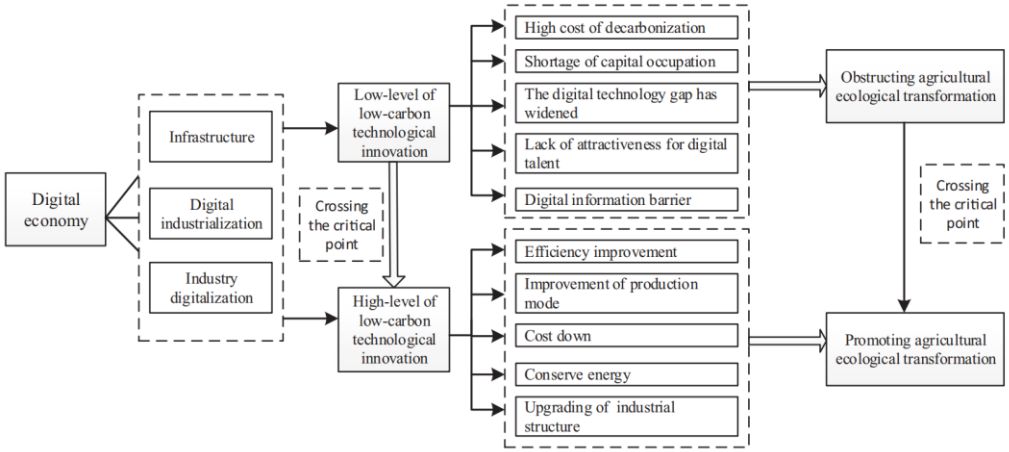

Figure 1. Process flow and theory of change. This shows how the digital economy is impacting the ecological transformation of agriculture.

Digital economy, low-carbon technological innovation and ecological transformation of agriculture. Through the digital economy and low-carbon technological innovation, it will promote the development of high-quality agriculture, accelerate the dissemination and the introduction of technology and information elements, and help the agricultural industry to reshape and transform traditional agricultural production methods. For areas with a high level of low-carbon technological innovation, green technological innovation can help farmers achieve technological and clean transformation, upgrade the agricultural industrial structure and optimize the energy structure, thereby increasing productivity. With the help of low-carbon and green technology, the digital economy can improve resource utilization efficiency and maintain balance. The introduction of such technologies can ensure agricultural production and its sustainability.

2. Materials and Methods

The study utilized a mixed-method approach to analyze the impact of digital technologies on solving agricultural challenges in Uzbekistan. Primary data were collected through structured interviews and surveys conducted with farmers, agro-industry stakeholders, and policymakers. Secondary data included statistical reports, government publications, and research papers on digital economy applications in agriculture. A purposive sampling method was used to select participants with direct involvement in agricultural practices or digital technology implementation. Data collection focused on understanding existing technological gaps, identifying opportunities for digital transformation, and assessing the socio-economic benefits of digital adoption. Analytical tools such as SPSS and NVivo were employed for quantitative and qualitative data analysis, respectively. This approach ensured a comprehensive understanding of the digital economy's role in addressing agriculture-related issues.

A pilot study was conducted to validate the data collection tools and refine the research methodology. Surveys were designed to capture specific challenges such as resource inefficiency, supply chain disruptions, and limited access to real-time agricultural data. In contrast, interviews provided deeper insights into the practical application of technologies like GPS, drones, and IoT-based sensors. To assess the impact of digital technologies, experimental trials were performed using precision agriculture tools on selected farms. The trials measured improvements in yield, resource efficiency, and cost reduction compared to traditional methods. Results from the pilot study were used to adjust the data collection instruments and optimize experimental protocols. This iterative process enhanced the study's reliability and validity.

The research framework was designed to address macro and micro challenges in agriculture systematically. For macro-level analysis, national-level agricultural data and policy reviews were conducted to identify overarching issues such as infrastructure

limitations and resource allocation. Micro-level studies focused on farm-specific challenges, analyzing the effectiveness of technologies in improving productivity and sustainability. Digital tools like drones for field monitoring and IoT devices for real-time data collection were integrated into the study design. Collaborations with local technology providers ensured access to advanced equipment and technical support. Data triangulation techniques were employed to cross-verify findings from multiple sources, ensuring robustness and accuracy. This structured methodology enabled the identification of practical, scalable solutions to enhance Uzbekistan's agricultural sector through digital transformation.

3. Results

The contribution of agriculture, forestry, and fisheries to GDP growth was 0.4% in 2020-2021, and 0.4% in 2022-2023. In January-March 2024, the agriculture, forestry, and fisheries sector made a positive contribution to GDP growth of 0.4 percentage points, the industrial sector - 1.8 percentage points, the construction sector - 0.4 percentage points, and the service sector - 3.4 percentage points.

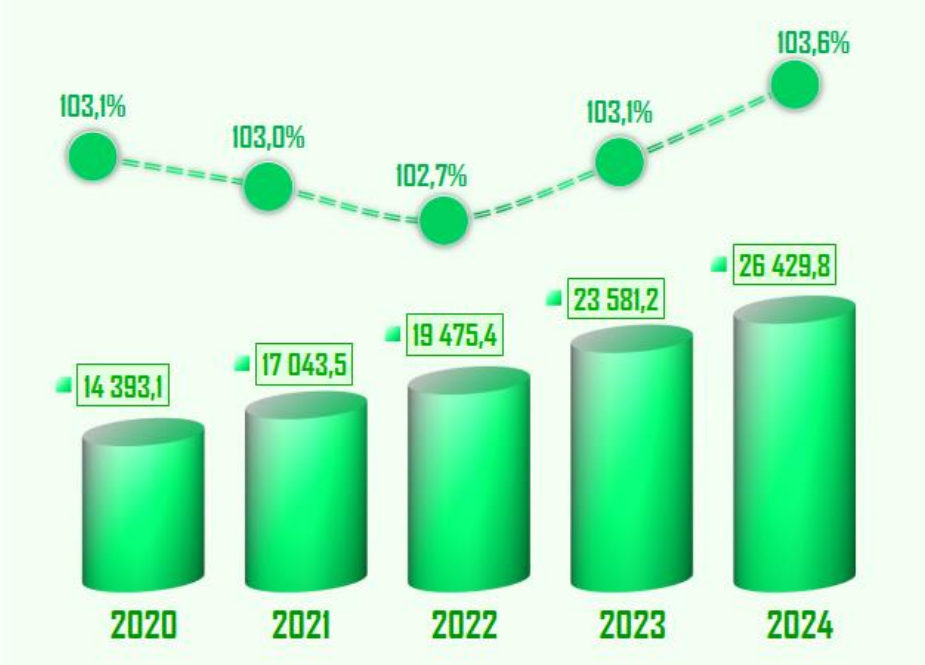

Figure 2. { **Volume** , billion soums}{ **Growth rate,** % compared to the same period last year}, Source: https://www.stat.uz

4. Discussion

According to the results of January-March 2024, a positive growth of 3.6% was recorded in agriculture, forestry and fisheries (January-March 2023 - 3.1%, January-March 2022 - 2.7%, January-March 2021 - 3.0%, January-March 2020 - 3.1%). These positive growth rates are associated with an increase in livestock production by 3.6% (January-March 2023 - 3.6%, January-March 2022 - 2.4%, January-March 2021 - 2.9%, January-March 2020 - 3.3%). At the same time, the production of agricultural products in the current period increased by 4.4% (in January-March 2023 - a decrease of 2.3%, in January-March 2022 - an increase of 8.5%, in January-March 2021 - an increase of 5.0%, in January-March 2020 - an increase of 2.5%). It is worth adding that in January-March 2024, the share of information and communication technology (ICT) services in the country's economy amounted to 2.2%. Using digital technologies, it is possible to increase the share of goods and products in agriculture.

5. Conclusion

From the above, we can conclude that the use of digital technologies in the production of agricultural goods and products allows for the effective organization of activities and their sustainable implementation. In the conditions of a digital economy, the share of agriculture in the country's GDP can be increased several times. Therefore, our country provides many incentives to businessmen and entrepreneurs engaged in entrepreneurship in the agro-industrial sector to open new types of enterprises and firms. Attention is also being paid to the digital organization of these activities.

In connection with the integration of our republic's economy into the world economic system, various measures are being taken to adapt agricultural products to international trade standards, develop them on a scientific basis, conduct personnel policy, and encourage startups and projects based on information and communication technologies for the development of agriculture.

Digitization and digital organization of agricultural activities generally reduce the cost of manufactured goods and products, improve the quantity and quality of products, reduce labor costs, and increase the net profit from these activities.

REFERENCES

[1] M. Samijonov, "Investitsiyaning iqtisodiy mohiyati va O'zbekiston iqtisodiyotida tutgan o'rni," *YASHIL IQTISODIYOT VA TARAQQIYOT*, vol. 1, no. 11–12, Dec. 2023, doi: 10.55439/ged/vol1_iss11-12/a372.

[2] O. Jayanagara and S. Watini, "The Role of Smart Automation in Tourism Industry Management using Smart PLS," *International Transactions on Artificial Intelligence (ITALIC)*, vol. 2, no. 1, pp. 7–23, Nov. 2023, doi: 10.33050/italic.v2i1.385.

[3] F. Xudoynazarov, "ISLOM MOLIYASI – MUAMMOLAR VA YECHIMLAR," *Iqtisodiy taraqqiyot va tahlil*, vol. 1, no. 8, pp. 109–114, Dec. 2023, doi: 10.60078/2992-877x-2023-vol1-iss8-pp109-114.

[4] N. Sherkuziyeva, "'O'ZBEKISTON – 2030' STRATEGIYASI DOIRASIDA MAMLAKATIMIZDA QIMMATLI QOG'OZLAR BOZORINI JADAL RIVOJLANTIRISH IMKONIYATLARI," *Nashrlar*, pp. 49–52, Mar. 2024, doi: 10.60078/2024-vol3-issm-pp49-52.

[5] L. Khatsieva, Z. Taymaskhanova, and A. Salamova, "Green Economy: Prospects for Sustainable Development," in *Proceedings of the 1st International Conference on Methods, Models, Technologies for Sustainable Development*, SCITEPRESS - Science and Technology Publications, 2022, pp. 68–72. doi: 10.5220/0011554800003524.

[6] B. Suvonov, "MEHNAT KO'RSATKICHLARI TAHLILINI RAQAMLI IQTISODIYOT SHAROITIDA AMALGA OSHIRISHNING O'ZIGA XOS XUSUSIYATLARI," *Iqtisodiy taraqqiyot va tahlil*, vol. 2, no. 3, pp. 136–144, Mar. 2024, doi: 10.60078/2992-877x-2024-vol2-iss3-pp136-144.

[7] I. Yusubov, "MINTAQADA RAQAMLI IQTISODIYOTNI BARQAROR RIVOJLANTIRISHNING ISTIQBOLLARI," *Iqtisodiy taraqqiyot va tahlil*, vol. 2, no. 10, pp. 286–291, Oct. 2024, doi: 10.60078/2992-877x-2024-vol2-iss10-pp286-291.

[8] K. Abdiyeva, "Global iqlimning O'zbekiston milliy iqtisodiyotiga salbiy ta'siri va ta'sir doirasining kamaytirish yechimidagi muammolar," *Общество и инновации*, vol. 4, no. 11/S, pp. 102–112, Dec. 2023, doi: 10.47689/2181-1415-vol4-iss11/s-pp102-112.

[9] I. Tuxliyev, "Yangi O'zbekistonda turizmning drayver sifatida barqaror rivojlanish yo'nalishlari," *YASHIL IQTISODIYOT VA TARAQQIYOT*, vol. 1, no. 1, Feb. 2024, doi: 10.55439/ged/vol1_iss1/a892.

[10] D. Dvir and A. Sadeh, "The Impact of Technological and Market Uncertainty on Innovative Development Processes," in *2017 Portland International Conference on Management of Engineering and Technology (PICMET)*, IEEE, Jul. 2017, pp. 1–5. doi: 10.23919/picmet.2017.8125360.

[11] G. K. Khanal, "ENSURING QUALITY IN SURVEY RESEARCH," *Journal of Management Value and Ethics*, vol. 7, no. 1, Jan. 2017, doi: 10.20994/jmve.v7i1.7359.

[12] U. Bolqiboyeva, "O'ZBEKISTONDA TURIZM SOHASIDA YANGI INNOVATSION YO'NALISHLARNI TASHKIL ETISHDA XORIJ TAJRIBASI," *Ilg'or iqtisodiyot va pedagogik texnologiyalar*, vol. 1, no. 1, pp. 69–75, Aug. 2024, doi: 10.60078/3060-4842-2024-vol1-iss1-pp69-75.

[13] G. Umarova, "O'ZBEKISTON MINTAQALARIDAGI DEMOGRAFIK VAZIYAT VA UNING MEHNAT BOZORIGA TA'SIRI," *Nashrlar*, pp. 302–306, May 2024, doi: 10.60078/2024-vol2-issd-pp302-306.

[14] S. Amirqulov, "O'ZBEKISTON QISHLOQ XO'JALIGINI IQTISODIY RIVOJLANTIRISH BOSQICHLARI VA UNING ISTITUTSIONAL SHART SHAROITLARI," *International Journal of Economics and Innovative Technologies*, vol. 12, no. 2, pp. 162–171, Apr. 2024, doi: 10.55439/eit/vol12_iss2/a18.

[15] D. Khalimova, "ISHLAB CHIQARISH SAMARADORLIGI VA ISHLAB CHIQARISH RESURSLARIDAN FOYDALANISH," *QO'QON UNIVERSITETI XABARNOMASI*, vol. 11, pp. 11–13, Jun. 2024, doi: 10.54613/ku.v11i11.941.

[16] J. Hou, M. Zhang, and Y. Li, "Can digital economy truly improve agricultural ecological transformation? New insights from China," *Humanit Soc Sci Commun*, vol. 11, no. 1, Jan. 2024, doi: 10.1057/s41599-023-02593-y.

[17] R. Marchenko, A. Dubgorn, A. Babyr, and B. Gerrits, "Implementation of Digital Approaches in Business Processes of Oil Refineries," in *Proceedings of the International Scientific Conference - Digital Transformation on Manufacturing, Infrastructure and Service*, in DTMIS '20. ACM, Nov. 2020, pp. 1–5. doi: 10.1145/3446434.3446477.

[18] D. Muntanyola-Saura, "Book Review: Erik Brynjolfsson and Andrew McAfee, The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies," *International Sociology*, vol. 31, no. 5, pp. 626–628, Sep. 2016, doi: 10.1177/0268580916655972.

[19] A. R. Turquette, "Max Black. Abstract and abstraction. Encyclopaedia Britannica, Encyclopaedia Britannica, Inc., Chicago-London-Toronto1956, Vol. 1, pp. 67–68; also Max Black. Abstract and abstraction. Encyclopaedia Britannica, Encyclopaedia Britannica, Inc., Chicago-London-Toronto 1957, Vol. 1, pp. 67–68.," *Journal of Symbolic Logic*, vol. 23, no. 1, pp. 22–29, Mar. 1958, doi: 10.2307/2964454.

[20] R. Frost, A. K. Fox, and T. Daugherty, *eMarketing: Digital Marketing Strategy*. Routledge, 2022. doi: 10.4324/9781003247319.

[21] S. B. Boboqulov and G. O. o'g'li Akramov, "O'ZBEKISTONDA RAQAMLI IQTISODIYOTI SHAROITIDA ELEKTRON BIZNESNI RIVOJLANTIRISH YO'LLARI," *YASHIL IQTISODIYOT VA TARAQQIYOT*, vol. 1, no. 10, pp. 524–529, Oct. 2023, doi: 10.55439/ged/vol1_iss10/a100.

[22] J. P. Bowman, "The Digital Economy: Promise and Peril in the Age of Networked IntelligenceBy TapscottDon, New York: McGraw-Hill, 1996. 342 pages, hard cover. 24.95.," *Academy of Management Perspectives*, vol. 10, no. 2, pp. 69–71, May 1996, doi: 10.5465/ame.1996.19198671.