

Problems of Application of Digital Technologies in Uzbekistan Agriculture and Development Opportunities

Ablazov Shohruh Abdulkakhhorovich

Basic Doctoral Student of Andijan Institute of Agriculture and Agrotechnologies

ABSTRACT

The purpose of this article is to study the features of the use and development of digital technologies in the agriculture of the Republic of Uzbekistan. In addition, the article discusses the main strategic directions of digital agriculture, explores approaches to the formation of a digital platform on the example of the agricultural sector of the economy, reveals the reasons for the slowdown of digital transformation, and clarifies the characteristics of information use. The main problems and solutions of innovative development are proposed.

KEYWORDS: digital economy, market economy, information, digitization strategy, transformation, network, digitization, Platform, wireless sensors, innovative technologies, scientific and technical development, intellectualization, GPS-navigation, integration, remote sensing, economic efficiency, agricultural robots, index agriculture consulting, agricultural education

INTRODUCTION

As the world's population and its demand for food grow, countries increasingly want to become independent of food imports. Many countries are trying to increase agricultural production effectively. Despite the fact that Uzbekistan is one of the leaders in the export of products such as fruits and vegetables and cotton fiber, due to the sharp increase in the population of our country at the present time, as a result of the limited arable land and desert occupying a large part of the landscape, it will not be enough to meet the demand for its agricultural products in the future.

Agriculture is one of the most important profitable sectors in Uzbekistan and 27% of the working population works in agriculture, old and outdated cultivation technologies are still used, which require manual labor, and they do not give the expected results due to insufficient provision of agricultural machinery or outdated technical equipment in each farm. The most common reason for the negative competitiveness of farmers is the old technology, because it has more disadvantages than advantages and lack of opportunity to invest in new mechanization. The level of provision of agricultural machinery and aggregates is low, and most of the existing machinery has been used for more than 15 years and is not suitable for modern requirements. Heavy, old farm machinery plowing through the fields compacts the soil and wastes a lot of fuel. On the one hand, this leads to environmental pollution, and on the other hand, the cost of production of agricultural products tends to increase.

Despite the positive results achieved in agriculture in recent years, there are a number of problems in realizing the opportunities available in the following sectors.

Including: in the use of agricultural land and cultivation of agricultural crops:

- the main part of the harvest of cotton and other agricultural crops is collected by manual labor;
- most producers of agricultural products do not have information about agrochemical soil analysis on their agricultural land and do not pay attention to it;
- there is no system for automatic detection of the development of pests and diseases in agricultural land;
- the quality of reproductive seed materials of agricultural crops has decreased;
- it is required to allocate financial funds for the wide introduction of information and communication technologies by the producers of agricultural products;
- it is necessary to develop infrastructures in rural areas to introduce digital technologies and platform solutions;

In livestock development:

- the average amount of milk produced by one dairy cow per year in the republic is 2,300 kilograms, and this indicator remains significantly lower than in Russia, Israel, and the Netherlands;
- due to the low quality of breeding in livestock breeding, the lack of areas for growing fodder crops, only 35 percent of the demand for livestock feed of farms is covered by internal capabilities, as a result of which the value of meat and dairy products is increasing year by year;
- Over the years, due to the increase in the salinity level of natural lakes on an area of 560 thousand hectares, the stock of fish has decreased, and the yield of fishing has decreased to 45-50 kilograms per hectare;¹
- in the organization of storage, logistics and sales systems of agricultural products:
- calls for the establishment and equipment of testing laboratories that research the safety and quality of soil, irrigation water, raw materials and products according to the requirements of international standardized agricultural practices (Organic, Global G.A.P.) and their wide use;
- it is necessary to improve the control system of the process from product production to its realization according to the requirements of international agricultural practice;
- due to underdeveloped logistics, product storage and consumer delivery systems, production costs are increasing;
- in the training of personnel for all areas of agriculture:

¹ <https://www.lex.uz> Cabinet of Ministers decision No. 794 of December 17, 2020 "On measures to develop the digitalization system of the agro-industrial complex and agriculture of the Republic of Uzbekistan" APPENDIX 1, page 5.

- agricultural land users and farm managers lack knowledge and skills on effective use of arable land, modern technology and advanced scientific achievements;
- there is no system for training personnel and improving the qualifications of specialists in "Smart Agriculture" technologies and digitization of agriculture in higher educational institutions in the field of agriculture;
- it is also necessary to develop a regulatory legal framework for the adoption of information technologies in agriculture.

It will have to spend more money on working capital expenses. Accordingly, the price of agricultural products in the market is very high due to the reason mentioned above. If it continues to develop in this way, it will disrupt the production chain in the future.

These problems can be solved by investing in new modern technologies and world-class production technologies. In our opinion, Uzbekistan should be an active participant not only in digital changes, but also in form. Adequate technology, well-paying jobs, strong companies and modern digital agriculture As a result of the change of government in Uzbekistan, there have been attempts to introduce its own mechanization in all farms in the last four years. But to survive economically, farmers must not only focus on production such as planting, fertilization, technology and feed, but also master the use of digital tools. Weather apps, online marketing and satellite data are an integral part of their daily lives as farmers. Millions of data from camera systems, satellites, sensors and robots form the basis of new smart programs designed to ease the work of farmers and optimize crops. New experiences and technologies help simplify life and serve people.

In countries with well-developed agriculture, digital technologies and robots are now doing much of the hard work. This means that the work in agriculture has not decreased, on the contrary, it has taken a completely different form. For example, drones provide effective chemical and biological control of diseases found in grain, corn and other crops, from field monitoring, smart sensor technology ensures that individual animals are fed according to their age and animals. Diseases can be detected early. The smartphone is used to monitor feed distribution in the barn, control high-tech machines that milk the cows and clean the barn. Equipment and milking robots monitor the health of the cows around the clock, and all the devices are connected to each other. If there is a problem, the sensors send a signal to the mobile phone, it is impossible to imagine working without digital tools in agriculture. Also, GPS-controlled agricultural machinery that distributes seeds accurately and cost-effectively to the field, automatically irrigates, removes weeds or harvests automatically. Technologies are digitizing agriculture in developed countries. is being used. Sensor and smart sensor technology is also used for individual monitoring of animals or for measuring climate, soil and vegetation data. Sensors also indicate when machines need repair or service. This saves fertilizers and pesticides, which account for a large part of CO₂ emissions in agriculture, which not only protects the environment and climate, but also saves money and resources."

LITERATURE REVIEW

To date, a number of studies have focused on the introduction of digital innovations to agricultural

enterprises, their development, and the effective organization of management processes. In particular, modern theories of the development of innovative management in agricultural enterprises and specific aspects of its management have been researched by foreign scientists such as V. Ryugemer, L. Frederikson, G. Kerein, K. Weber, F. Carrillo, K. Klinsevich, K. Miyazaki, etc. .

R.R.Aduk, M.A.Kaparova, M.E.Gureyeva, Ye.A.Ijmulkina, A.I.Bogachev, O.G.Noskova, V.S.Gorbunov, A.G.Glebova, V.Sh. It is reflected in the works of such scientists as Rasumov, S.V.Grinin, O.V.Lazko, N.A.Pojidaeva, M.M.Kandrokova, Y.V.Shidlovskaya, A.V.Platonov, I.M.Bortnikova.

In Uzbekistan, scientists such as SH.N.Zaynutdinov, M.A.Makhkamova, SH.I.Otajonov, N.M.Rasulov, B.A.Abdullaev, G.D.Khasanova, T.Z.Toshpulatov, I.I.Soliyev, G.B.Shonazarova, O.E.Ernazarov, etc. studies aimed at increasing the role of the human factor in the management of innovative activities have been conducted.

However, until now in the republic, the theoretical and practical issues of increasing the efficiency of management of innovative activities based on digital technologies in agricultural enterprises have not been analyzed in a comprehensive way, as a systematic, special research object. In the research work, the development of management based on digital innovative technologies in agricultural enterprises, its improvement, including the indicators of evaluating the effectiveness of innovative management, were taken into account, which creates ample opportunities to determine the relevance, purpose of the selected research topic, and the scope of the issues to be solved in it.

RESEARCH METHODOLOGY.

Development strategies, experiences and models of the digital economy of developed countries, the main indicators of digitization in agriculture and the essence of the digital economy, as well as the scientific research, conclusions and proposals carried out by scientists today on the further development of the digital economy. was studied. Practical studies aimed at the further development of agricultural digitalization and wide use of digital technologies, methods and scientific results, as well as the specific characteristics of agriculture and digitalization were conducted.

ANALYSIS AND RESULTS.

Currently, the development of the digital economy in Uzbekistan, like all economically developed countries, is one of the priorities of the state. Agriculture plays an important role in providing the economy with raw materials and food for the population. According to the State Statistics Committee, by the end of 2021, the share of agriculture, forestry and fisheries in the GDP of the Republic of Uzbekistan was 26.9%. the highest percentage was observed in Jizzakh (53.4%) and Surkhandarya (47.9%) regions. The smallest share of agriculture, forestry and fisheries is in Navoi (15.0%) and Tashkent (22.3%) regions noted².

² <https://stat.uz/uz/matbuot-markazi/qo-mita-yangiliklar/17703-yaim-yahm-ning-tarmoqlar-bo-yicha-tarkibida-qishloq-o-rmon-va-baliqchilik-xo-jaligining-ulushi-qanday>

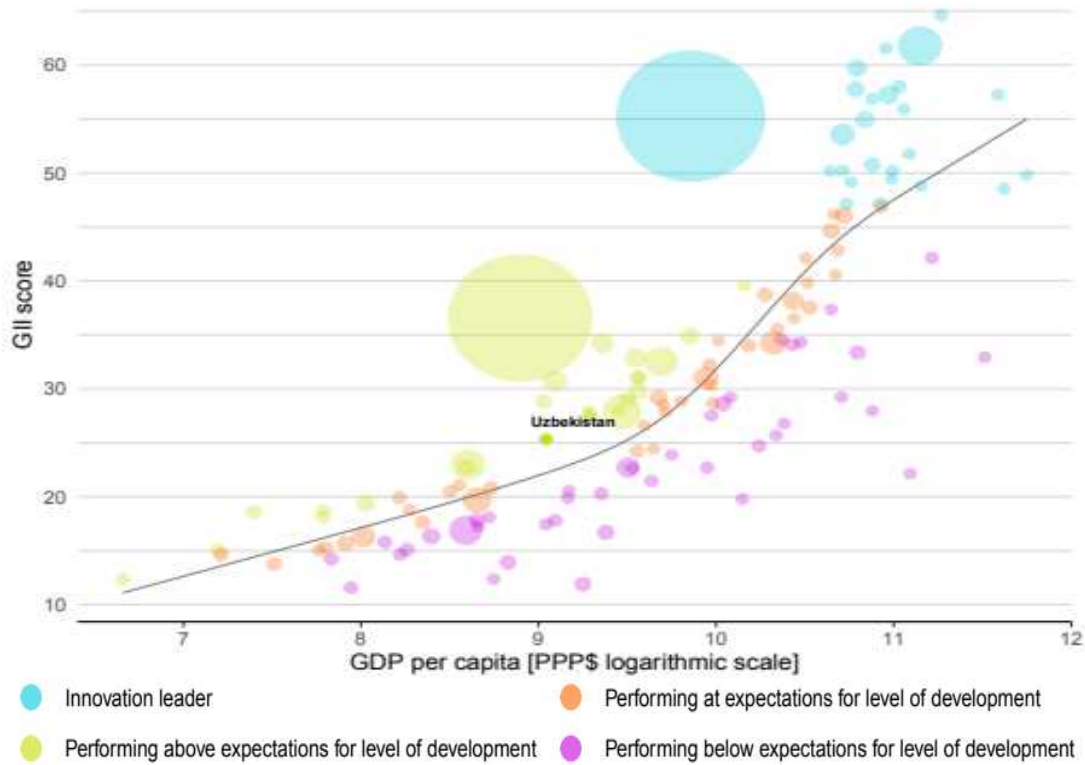


Figure 1 The positive relationship between innovation and development

Source: www.wipo.int

Although this year has not yet ended, according to the results of January-September 2022, the share of agriculture, forestry and fisheries in the GDP of the Republic of Uzbekistan was 24.8%.³ It can be seen that agriculture serves as one of the drivers of our country's economy.

On average, more than 50 percent of GDP in economically developed countries is created thanks to modern management based on innovations and technologies. In particular, according to the "Global Innovation Index-2022", 87.9 percent of Switzerland, 78.0 percent of Sweden, and 76.0 percent of the United States have a leading share in the implementation of innovations in national economic sectors in the world.⁴

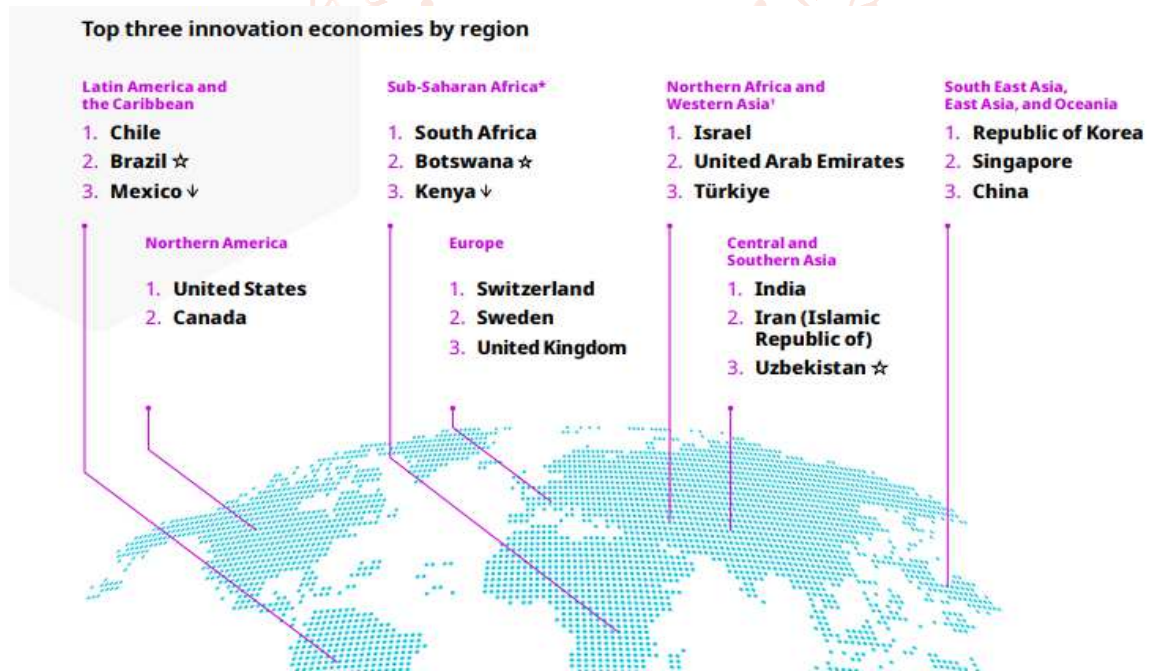


Figure 2. Global leaders in innovation in 2022

Source: www.wipo.int

³ <https://stat.uz/uz/matbuot-markazi/qo-mita-yangiliklar/29965-yaim-yahm-ning-tar45moqlar-bo-yicha-tarkibida-qishloq-ormon-va-baliqchilik-xo-jaligining-ulushi-qanday-4>

⁴ The Global Innovation Index 2022: Joint Research Centre (JRS) statistical audit of the 2022 Global Innovation Index. https://www.wipo.int/edoss/pubdoss/en/wipo_pub_gii_2022-appendix1.pdf

Uzbekistan took the 82nd place among 132 countries in the Global Innovation Index-2022 ranking. With this indicator, Uzbekistan rose to the 1st place among the Central Asian countries and the 3rd place among the South Asian countries. Before that, our country was ranked 86th in 2021, 93rd in 2020, and 122nd in 2015. It is determined that by 2030, our republic will be among the top 50 countries in the Global Innovation Index. The Global Innovation Index consists of 81 indicators and describes the innovative development of countries at different levels of economic development. The above-mentioned positive results in recent years indicate that the first elements of the digital infrastructure have been formed in the field and are bearing fruit.

Over the past 15 years, the population of Uzbekistan has increased from 27 million to 35 million, and the land area per person has decreased from 23 to 16 hectares. Water resources intended for irrigating 1 hectare of land decreased from 3048 m³ to 2889 m³. The solution to this problem is the transition to farming based on innovative digital technologies. In this case, digital agriculture, which is the main solution for effective use of limited land and water resources in agriculture, is of great importance.



Figure 3 The seven GII pillar scores for Uzbekistan

Source: www.wipo.int

In recent years, large-scale economic reforms have been implemented in Uzbekistan to create an innovative digital economy and develop it. In this regard, it is necessary to deepen scientific research in areas such as improving the principles and methods of organizing innovative management, evaluating the effectiveness of innovative management of agricultural enterprises, innovative management strategy and their state support.

As stated in the Address of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev to the Parliament of our country - the Supreme Council, which is a new stage of our development, the end of the main works carried out in 2017 and the most priority directions of socio-economic development of the Republic of Uzbekistan in 2018, "A state relying on new ideas, new ideas, innovation wins. Innovation is the future. "If we start building our great future today, we should start it on the basis of innovative ideas and an innovative approach," President Sh.M. Mirziyoyev, dated October 23, 2019, No. "On approving the planned strategy" and "On approving the strategy of Digital Uzbekistan-2030" dated October 5, 2020, No. PF-6079, all important tasks were defined, and there are no systematic works in this regard. It was put on .

This year, a preliminary agreement was reached between the World Bank and the Ministry of Agriculture of the Republic of Uzbekistan on the allocation of 20 million dollars by the World Bank within the framework of the project to develop a single integrated platform "Digital Agriculture". USD 5 million will be allocated to the land management system, and USD 5 million will be allocated to water resources management. Another \$6.8 million will be spent on equipment purchases, infrastructure preparation and technical support⁶.

⁵ <https://www.agro.uz> On December 28, 2021, the conference with the participation of representatives of the agro-industrial complex and mass media will be held at the Ministry of Agriculture of the Republic of Uzbekistan, according to the information of Maqsud Rozmetov, the deputy minister of agriculture for rational use of land.

⁶ <https://kun.uz/en/news/2022/04/16/wb-to-grant-uzbekistan-20-million-for-digitalization-of-agriculture>

In Uzbekistan, smart farming and the use of modern technologies and methods in agriculture are at the initial stage. The State Center for Digitization of Agribusiness and "Digital Farming" information centers were established under the Ministry of Agriculture. Its task is to establish and maintain an information system. The system should become a platform for cooperation between producers and processors of agricultural products, on the one hand, and service companies in the field, on the other. It is also planned to be integrated into the national state information system in cooperation with the Ministry of Information Technology Development.

Remote sensing of cropland is on the rise. The government's action plan lists several digitization projects, among which IT company RevoTech is developing an electronic platform for analyzing agricultural land using satellite images (Monterra) developed. After the successfully completed pilot project, it is planned to analyze the condition of 150 thousand hectares of cotton and grain fields in Andijan (Andijan) region based on this method. A similar project is being carried out in two districts of the Bukhara (Bukhara) region by the partner of the State Agency for Space Research and Technologies "Uzbekcosmos" and the Airbus company.⁸

By 2030, the digital geographic information system of agricultural land in Uzbekistan will be established consistently. In addition, the information system for the cultivation and harvesting of raw cotton will be radically modernized and digitized.

CONCLUSIONS AND OFFERS

In the next five years, an accelerated transition in the field of digitalization of agriculture will be a priority for Uzbekistan. Of course, agriculture requires adequate infrastructure, large capital and labor resources. In this regard, it is necessary to pay special attention to the points defined in the concept. In our opinion, the following provisions of the action plan can be noted among the priorities for the digitization of agriculture:

- Creation of legal basis for introduction of digital technologies in agriculture (including water supply and feed production).
- Adaptation of state standards for digital products and services to international standards
- Implementation of central information systems for effective use of agricultural land and water resources and control of planting
- Digital infrastructure must be scalable and future-proof (mobile broadband)
- Information flow between products of different manufacturers should be improved
- Adequate training and consulting services should also be introduced (farmers are not IT experts and therefore need well-informed -Consulting services to make decisions on purchasing technology)
- Digitization of a wide range of public and private services for agribusiness, including implementation in the form of public-private partnerships
- Introduction of digital tools for monitoring of used water resources, dams and irrigation systems

⁸<https://www.gtai.de/de/trade/usbekistan/branchen/usbekische-landwirtschaft-ruestet-auf-smart-farming-um-605068>

- Creation of a computerized management system in water management (including automated accounting of water use)
- It is necessary to encourage the start of business and the sale of newly developed products and services by the state through subsidies and benefits and to develop a material support system.

In addition, the reliability and effectiveness of the technology that is planned to be introduced in the agriculture of our country should be checked, and the advantages of digital farming should be studied more deeply. Data protection, data security, data sovereignty and other requirements (for example, for the use of drones air traffic rules) should be defined. The use of new technologies may lead to the loss of traditional jobs, but it may create new employment areas. In this regard, a system for improving the qualifications of personnel should be developed. Only then will all planned measures be effective.

REFERENCES

- [1] Resolution of the President of the Republic of Uzbekistan "On measures of developing the digital economy in the Republic of Uzbekistan" #PR-3822 dated 03.07.2018. //
- [2] National database of legislation, 04.07.2018, No. 07/18/3832/1452. Decree of the President of the Republic of Uzbekistan # PD-5853 dated 23.10.2019 "On approval of the strategy for the development of agriculture in the Republic of Uzbekistan for 2020–2030".
- [3] R. H. Ayupov, G. R. Boltaboeva. "Fundamentals of the digital economy." Textbook. T.: TFI, 2020. Pages 17-18.
- [4] I. A. Khasanshin, Regularity and trends in the development of innovative entrepreneurship. (Electronic resource) eLibrary.ru:download/elibrary-27523115-65690743.2016/
- [5] Vertical farms: in the future, everyone will be able to grow their own food at home (electronic resource) <https://hi-news.ru>
- [6] S. S. Gulyamov, R. H. Ayupov, O. M. Abdullayev, G. R. Baltabayeva. "Blockchain technologies in the digital economy." T.: "Iqtisod Moliya" Publishing House. 2019, 35 pages.
- [7] Vartanova M.L., Drobot E.V. Regulation of digital financial assets and the use of blockchain technologies in agriculture // Creative Economy.2019. – № 1. – 37-48.
- [8] Schumpeter J. Theory of economic development / J. Schumpeter. - M.: Taraqqiyot, 1982.-455.
- [9] <http://academy.uz/ru/news/77>. Innovative activities of the Academy
- [10] www.stat.uz Information of the Statistics Committee of the Republic of Uzbekistan
- [11] https://www.wipo.int/global_innovation_index/en/2022
- [12] <https://kun.uz/en/news/2022/04/16/wb-to-grant-uzbekistan-20-million-for-digitalization-of-agriculture>
- [13] <https://www.gtai.de/de/trade/usbekistan/branchen/usbekische-landwirtschaft-ruestet-auf-smart-farming-um-605068>
- [14] <https://www.agro.uz> Ministry of Agriculture of the Republic of Uzbekistan
- [15] <https://www.lex.uz>