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Information Technologies in the Digitalization of Agriculture in Uzbekistan

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Abstract: Currently, the use of digital technologies in almost all spheres of human activity is developing rapidly. Based on this, the monitoring of all the necessary Intellect technologies in statistical Integrity Intellect technologies is to assess them, assess all the necessary information, to comply with it in this direction. Practical measures are covered. We hope that the use of international experience and innovative ideas are included in the use of the innovation and offers in agovaia.

Key words: devices, drones, artistic intellect technologies, infrared cameras.

INTRODUCTION

Any person with a certain life experience has own idea of the effectiveness of economic activity in a particular one. And the question naturally arises: “How does he or she understand efficiency?”. The expected answer: "Efficiency is the level of practically achieved level of well-being, which he has ensured for himself by his own actions in the conditions of the existing rules of the economic game."

In the development of modern economic theory, first of all, the use of calculations of usefulness of the activities of business entities is required, which are also defined as the economic calculation of total happiness (felicific calculus) - when public interest is determined by the totality of individual interests, and thereby an increase in utility (individual happiness), which increases the total happiness of the whole society. [9]

The changes that are currently taking place are primarily associated with mining and circulation of digital virtual signs in online exchanges (Internet crypto platforms), which have some characteristics of money, which are widely discussed both in the media and in scientific circles. Recently, they are actively being introduced in the field of financial and banking activities and also the field of transactions related to market exchange operations, not only informational, but also physically existing goods and services, as well as world currencies. [9]

The digital economy has long gone beyond e-commerce, penetrating all spheres of life, including finance, government-society interaction, healthcare and education, not to mention industry and scientific research. In this light, the question arises of development of clearer boundaries of

"digital economy" concept. With regard to digital finance, in this area it is important to establish a transition from a vertical to a horizontal management structure. Traditional banking is becoming a thing of the past, giving way to electronic services.

Information technologies, which are usually understood as automation, informatization, digitalization, are now being actively implemented in all sectors of economy, including the agroindustrial sector. The purpose of developing a digital platform for the agricultural sector is to increase the productivity of agricultural and industrial enterprises by improving business processes using innovative services (platforms). [4]

In order to further improve the public administration system, to create conditions for the introduction and development of the digital economy, to improve the investment environment, as well as the implementation of the Action Strategy for five priority areas of development of the Republic of Uzbekistan in 2017-2021, on July 3, 2018, a special resolution of the President “On measures on development of the digital economy in the Republic of Uzbekistan” was adopted. The Resolution noted that one of the conditions for the further development of the digital economy is the introduction of block chain technology. And for the implementation of comprehensive measures for the active development of the digital economy and widespread introduction of modern information and communication technologies in all sectors, primarily in public administration, education, health care and agriculture, Presidential Decree No.UP-6079 from October 5, 2020 “On approval strategy “digital Uzbekistan-2030” and measures for its effective implementation” was adopted. In the clause 3 of the Decree, a task was given by the relevant government and government body “to consider and make decisions on the implementation of new projects in the digital economy, as well as to make, if necessary, amendments and additions to the programs for digital transformation of regions and industries, “road maps” on the basis of prepared and agreed project documentation”.

In the Republic of Uzbekistan, the priority areas for the implementation of comprehensive measures for the development of the digital economy and the introduction of modern information and communication technologies in agriculture are:

- strengthening the macroeconomic stability and maintaining the high rates of economic growth;
- increasing competitiveness, modernization and intensification of agriculture;
- institutional and structural reforms to decentralize the agricultural sector;
- digitalization of land use management in agriculture, as a way of influencing an object in a specific organizational, legal and social, ecological and economic form, taking into account the achievement of the goal and achievement of results inherent in agriculture in accordance with a specific program;
- integration of science, education and production, as well as training of personnel for the effective organization of development of agroindustrial clusters;
- development of the electronic system of agriculture as a new area focused on the development of not only agricultural production, but also rural areas based on the improvement of information and communication technologies: exchange and access of information for a wide range of agricultural producers, including in order to create value chains; the formation of efficient and balanced markets for food products based on reducing the transaction costs, information accessibility, transparency of markets, and reducing losses from field to counter; development of vertical and horizontal integration in terms of reducing the links of the intermediary chain and increasing awareness; reducing the individual and institutional risks based on avoiding the uncertainty in decision-making, improving preparedness for climate change, natural disasters; increasing investment in innovation, in ICT infrastructure, in human capital;

- widespread introduction of GIS technologies for assessing and monitoring the rational use of agricultural land and cluster management, as well as creation of information and analytical base for “precision farming” and a mobile application of digital electronic platform;
- in the digital economy of agriculture, possession of advanced digital skills (the ability to quickly master new IT tools and programming skills) becomes relevant, for example, for marketers (in order to optimize the advertising management and predict the emotional response of users to advertising), lawyers (to automate analysis materials, preparation for the trial, etc.), geologists (for mapping complex mineral deposits, analyzing seismic data) and many other specialists. [8]

To solve the above problems and to conduct research work on the basis of the “Agrologistics”department of the Tashkent State Agrarian University, a scientific school for young scientists "Digital economics of the agroindustrial complex" was opened in which the doctoral students, masters, researchers conduct their scientific research, work on dissertations, the patents and take part in joint projects. A significant part of these problems is due to the rather low investment in information and communication technologies in agriculture.

Modern agriculture is influenced by global trends: population growth; changing consumer food preferences; increasing urbanization; changing of the climate; trade globalization; development of bio- and nano-technologies; transition from a product to a service model (the number of services in addition to traditional ones provided by manufacturers of agricultural products is growing); an integrated production-distribution chain (improving varieties and breeds using genomics); strengthening the role of standards and government regulation (increasing requirements for product quality). The merger of technologies, changes in the chains of interaction between farmers and producers of products accelerate the transition to a new level of development in the context of digitalization. The main task of the digital transformation of agriculture is to integrate the streams of objective data of agricultural producers and government data into the digital agriculture platform to ensure global planning in the industry and provide accurate recommendations to market participants, including using the artificial intelligence, activating innovative processes using a modern innovative management apparatus.

The implementation of more than 220 priority projects providing for the improvement of the electronic government system, the further development of the domestic market of software products and information technologies, the digitalization of agriculture, is certainly taking into account the experience of developed countries of the world, including the USA, China and a number of European countries.

I would like to dwell on the experience of the Chinese economy. In the Celestial, digitalization in a matter of years has brought the country to the leadership in a number of indicators. The PRC has achieved an accelerated development of digital technologies in both business and government. The digital economy currently covers more than 30 percent of the country's GDP. The reforms in this direction have created nearly three million jobs. This is one of the prime examples of how effective digitalization can be. Thanks to it that the world saw the enormous potential and attractiveness of science and technology. The digital economy is designed not only to increase economic productivity in developing countries, but also to provide the population with an opportunity for positive change. Digitization actually unites the world, providing people with the necessary information and useful technologies.

It is obligatory to take into account the socio-economic and natural-ecological factors of the development of agriculture, current trends in the agroindustrial sector, and the demand of the population for products. In recent years, the agricultural sector in our country has transformed into a diversified complex. Appropriate measures are being taken to increase the export of agricultural

products and ensure the financial and economic stability of suppliers. A number of positive results have been achieved in the process of modernizing all sectors of industry, rational use of land and water resources, introduction of modern resource-saving agricultural technologies and further deepening of modern market relations. As a result of agricultural diversification, the share of this sector in GDP reached 17 percent, with an average annual growth rate of six to seven percent. The agricultural sector of the economy employs over 3.6 million people.

During the digital transformation of regions and industries in 2020-2022 an increase from 78 to 95 percent of the level of Internet connection of settlements is expected, including by increasing to 2.5 million broadband access ports, laying 20,000 km of fiber-optic communication lines and developing mobile communication networks; introduction of over 400 information systems, electronic services and other software products in various areas of socio-economic development of regions; training of 587,000 people in the basics of computer programming, including by attracting 500,000 young people in the framework of the project “One Million Programmers”; introduction of over 280 information systems and software products for automation of management, production and logistics processes at enterprises of the real sector of the economy, and much more.

The strategy provides for the creation of several digital platforms in key areas of activity: management, education, health care, agriculture, infrastructure, multi-modal passenger and freight transport, transport and logistics hubs, e-commerce and non-production processes. To form these platforms, it will be necessary to implement more than 80 projects using Big Data technology, the industrial Internet of things and quantum computing. Several pilot projects have already started this year. So, we have already started creating “digital twins” of infrastructure facilities, with their help it will be possible to predict and prevent failures based on Big Data. A pilot project for the implementation of software robots to automate the processes of the Main Computer Center of Transport and other industries will increase labor productivity by 20%. Despite the recent unstable dynamics of prices for sold agricultural products and the deterioration of price ratios in the agro-industrial complex, the competitiveness of products has grown in the world market. However, this fact was not due to production optimization and cost reduction. Devaluation of the national currency has become the main factor in increasing competitiveness. Also, the growth of competitiveness was facilitated by an increase in production and export of products.

The efficiency of agriculture in Uzbekistan (average) lags significantly behind the world's leading agrarian powers. The level of penetration of information technologies into agriculture is extremely low. According to the Ministry of Agriculture, only 2% of the cultivated area is processed using digital technologies.

In the world, the problem of development of digital technologies in the agricultural sector of economy has been dealt with for a long time. The Economic Commission for Europe of the United Nations has developed and implemented standards for electronic business, including for the agrifood sector. For example, electronic phytosanitary certificates, electronic exchange of laboratory test results, management and exchange of trade certificates, electronic notification on food and feed safety issues, etc. are already in force.

The Food and Agriculture Organization of the United Nations (FAO) is also paying close attention to the issue of e-agriculture and digital agriculture. Forums and webinars on e-agriculture are held annually. [6]

E-agriculture is seen as a new area focused on the development of not only agricultural production, but also rural areas through the improvement of information and communication technologies (ICT). The main advantages of the introduction of e-agriculture are the following:

• exchange of information and access to it for a wide range of agricultural commodity producers, including for the purpose of creating value chains;

• formation of efficient and balanced markets for food products, based on reducing transaction costs, information accessibility, transparency of markets, and reducing losses from field to counter;

• improving vertical and horizontal integration in terms of reducing links in the intermediary chain and increasing awareness;

• reducing individual and institutional risks based on avoiding uncertainty in decision-making, increasing preparedness for climate change, natural disasters;

• increasing investment in innovation, ICT infrastructure, and human capital.

Ultimately, e-agriculture is about improving food security and food quality. The result of the introduction of digital technologies will be a significant multiplier effect not only in agriculture, but also in the economy as a whole. In 2019, investments in agriculture, forestry and fisheries were contributed in fixed assets – 12,199,141,3 million soums; new construction – 2,701,142,1 million soums; expansion – 10,724.3 million soums.

In 2019, the Program "Digital Economy of Uzbekistan" was approved, while agriculture was not even named there, unlike, for example, Kazakhstan, where agriculture, along with other priority sectors of the economy, is included in the State Program "Digital Kazakhstan". Therefore, at the end of 2017, the Ministry of Agriculture of Russia came out with a proposal to develop the State Program "Digital Agriculture". According to the Ministry of Agriculture, the main objectives of the subprogram will be: creation of the unified information system for accounting for agricultural land; organization of the tracking system for the logistics movement of agricultural products from “field to counter”; formation of an interactive soil map of the country using robots to collect and analyze information on the state of soils.

The Republic of Uzbekistan needs to become a member of the Eurasian Economic Union, therefore, within the framework of the Eurasian Economic Commission, it is necessary to carry out joint work to create a single digital platform, including the management and promotion of agricultural products. On the digital agenda for the EAEU, the following areas have been proposed: digital industry and cross-industry transformation; digital markets for goods, services, capital and labor; digital transformation of management processes; digital infrastructure and security.

The main goals of introducing information technologies into agricultural production are productivity growth and loss reduction. As for reducing losses, this problem is very topical, since in the whole world about a third of agrifood products is lost along the entire chain of commodity distribution: from the field to the counter.

For further growth of competitiveness and efficiency of the agroindustrial complex, qualitative changes are required not only in agricultural production, but also in the food industry, and in organizations of the first sphere of the agroindustrial complex.

The most important area at present is the development of agricultural engineering on innovative basis. The main trends in the development of agricultural engineering are the introduction of technologies that minimize losses and reduce costs; the use of navigation systems and remote control of equipment; application of precision farming systems. In the future, we are talking about fully autonomous (unmanned) tractors, combines, which require the development and implementation of various types of sensors; creation of a software-hardware complex for equipping fields. To do this, it is necessary to provide broadband Internet access throughout the countryside.

An important direction in the development of digital technologies in agriculture in crop production is the remote sensing of the Earth based on the use of unmanned aerial systems, which will provide: agriculture with ultra-accurate and up-to-date soil maps; complex registration of objects for cadastral registration; creation of 30-model fields for optimal construction of irrigation and reclamation systems; determination of the index is vegetative.

In addition to monitoring tasks, in agriculture, stowaways can be used to treat crops and apply mineral fertilizers and plant protection chemicals. Another promising area of application of unmanned systems in agriculture is the assessment of the consequences of emergencies and for the purpose of car insurance.

The introduction of digital technologies in agriculture according to the "road map" contributes to: the transition to "smart" agriculture based on progressive technological solutions: automation, robotization, geo-positioning, artificial intelligence and "BIC DATA data"; broadband "5G" Internet, the emergence of ultra-productive varieties of crops and animal breeds, as well as solutions for accelerated selection; the emergence of new biological products and substances for agriculture, including high-quality feed and medicines; development of processing of new types of biological raw materials; development of the market for personalized food products, as well as innovative delivery services. With the development of digitalization, new jobs will naturally be created, but it is necessary to take into account how much it costs to create one job. For example, the service sector is $ 1,000, agriculture $ 5,000, industry $ 20,000 - $ 30,000. Each employee must be a highly qualified specialist and meet the investment costs. One of the basic principles of increasing labor productivity is the elimination of unreasonable expenditures of working time during the production process. At present, it is problematic to assess these losses objectively due to the human factor: the quality and accuracy of the data largely depend on the speed of the observer's reaction, his vision, and the ability to timely record all changes at different stages of the operation.

The growth in the competitiveness of agricultural and food products that has taken place in recent years was largely due to the depreciation of the national currency and market factors. Therefore, in order to create conditions for long-term 2030 - 2050. and qualitative changes in the development of the agricultural sector of the economy, its transition to the new technological structure, a whole range of measures is required.

The most important of them is the introduction of modern innovative technologies, the development of digitalization of agriculture. The share of households with access to the Internet in 2019 was 81.2%. With access to the Internet, labor productivity has increased and the loss of time has decreased. Currently, a certain experience has already been accumulated in the introduction of digital technologies in the agriculture of Uzbekistan, however, it should be noted that they are of point nature, they are mainly used in large agro-industrial holdings. Relatively small business firms, but the digitalization processes are practically not started there.

In order to increase the competitiveness of domestic products, it is necessary to reduce costs consistently, to reduce losses along the entire product chain, increase investments through the introduction of innovative technologies, and develop digitalization in agriculture.

In our country, for the first time, the results of digitalization in the agricultural sector of the economy are very modest, although the development of the innovative investment process and the solution of issues of import substitution and export orientation are gaining force.

The digitalization of the agricultural sector will lead to the creation of conditions: the development of various forms of ownership on the ground, the production of agricultural products to consumers and the reduction of the state's impact on export processes, favorable conditions for production, management, marketing and procurement, saturation of the domestic market with food products,formation of a foreign economic trade system, competitiveness of agricultural producers and their products, increasing labor productivity, improving the life of the rural population.

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