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DIGITAL TRANSFORMATION IN AGRICULTURE THE REPUBLIC OF UZBEKISTAN

KULDOSHEV ILYOS SHUKHRATOVICH,
ISAKHANOV MUSLIM MARIFJON OGLU,
YAKUBOV FARRUX KAMILJANOVICH
Assistants of the Department of Agribusiness and Investment Activity,
Tashkent State Agrarian University

ABSTRACT
The purpose of this article is to study the features of the application and development of digital technologies in agriculture in the Republic of Uzbekistan. In addition, the article discusses the main strategic guidelines of digital agriculture, explores approaches to the formation of a digital platform using the example of the agricultural sector of the economy, reveals the reasons for the slowdown in digital transformation, clarifies the features of using information resources. Creating a digital platform will improve the management of the agricultural sector. But, unfortunately, these processes are not sufficiently developed. A key trend in innovative development is the management of digital transformation processes based on the typification and integration of information resources and software using Internet technologies.

KEYWORDS: transformation, networking, digitalization of agribusiness, agricultural technologies, agricultural consulting, agricultural education.

INTRODUCTION

The efficiency of agriculture in developed countries is an order of magnitude higher than in the Republic of Uzbekistan, largely due to precisely digitalization. Recently, close attention has been paid to the development of digital agriculture by the state, due to the need to provide this industry with modern technologies, although national farmers are still in no hurry to switch to digital, and there are still too many gaps in the legislation. The author of the article notes that in our country this problem is most relevant if only because in the agricultural sector there has been a sharp decrease in its productivity in the process of transformation processes.

LITERATURE REVIEW

The problems of the modern development of agriculture in the digital economy are often raised in modern scientific research. The work of many experts is devoted to the study of agricultural development problems. So, according to the search queries “digital economy and industry”, “modernization”, “transformation”, “networking and digitalization of socio-economic systems”, “application of modern technologies in agriculture”, etc., the portal contains works by the following authors: Alenina K.A., Gribanova Yu.I., Babkina A.V., Chistyakova O.V., Staroverova V.I., Vartanova M.L., Drobot E.V. Durmanov A.Sh., Makarova I.N., Popova A.I., Ivanova S.A., Ryzhenko A.A., Kozlova L.V., Ushacheva I.G., Maslova V.V., Chekalina V. S., Chupakhina A.V., Chechina A.I., Konoplina A.N. and other authors.

MATERIALS AND METHODS

The materials were prepared on the basis of the Digital Uzbekistan-2030, National Technological Initiative, and On Measures for the Development of the Digital Economy in the Republic of Uzbekistan programs. The study used methods of system analysis, methods of applied mathematics. The solution of the tasks set in the work was carried out on the basis of the application of general scientific research methods in the framework of comparative, logical, statistical and system analysis. The theoretical aspects of the study are devoted to the issues of digitalization of agriculture and the application of end-to-end technologies in agricultural production in many works of domestic and foreign studies. The methods of empirical and theoretical research are applicable, as well as the economic principle of forming a digital portrait of agriculture.

ANALYSIS, DISCUSSION AND FINDINGS

The existing diversity in understanding the essential basis of the digital platform for agriculture leads to a more detailed study from the standpoint of a number of theoretical approaches available in science. In our opinion, the conceptual aspects in the definition of strategic guidelines characteristics digitalization of agriculture should be considered on the basis of systemic, institutional and structural - functional scientific approaches.

In the concept of a systematic approach, a different definition of the essence of a digital platform as a system is made. It can be identified with a certain amount of open information resources that are necessary for making managerial decisions, or with a specific complex organizational set of information resources, software and staffing, in which communications are of a stable internal nature. In our opinion, a second point of view should be taken, since just a certain amount of information resources does not constitute a system, but only a lot of elements related to it. Only with the integration of resources and the availability of functional compatible links and structure will a digital platform system be formed [6]. The exclusion of any element from the system will entail changes in its functioning.

According to the systematic approach, the platform solutions created through the modular platform appear as a subsystem inextricably linked with the end-to-end industry management platform, that is, it is part of a more complex system. The digital platform for the agro-industrial complex, as a complex system, includes a set of interdependent subsystems: directions and functions of the digital ecosystem of agricultural management; pilot project management structure, the formation and algorithmization of management scenarios; directly the management process that implements the created platform solutions, technologies and the relationships between them, focused on the implementation of the decisions of commodity producers in a changing external environment.

The work of IT specialists in this system is defined as the active element or platform of digitalization knowledge in general [4].

The digitalization system itself is a combination of integrated product and service systems. It is endowed with the goals, functions and principles of digital transformation in relation to a specific territory and industry, formed in the framework of legal and organizational norms and regulations, as well as in the range of methods, means, resources, connections between subjects and objects of management using digital models.

Like other complex systems, the digitalization of processes in the agricultural sector depends on factors of the external and internal environment, which are conditions that arise independently, objectively (external environment) and subjectively, as a result of activities (internal environment) and have a significant impact on the system.

The digital transformation of agriculture is influenced by environmental factors such as the characteristics of rural entities, significantly differing in the size of the territory, the number and composition of the population, the position of the territorial division of labor, economic and production potential, the state of the municipal economy, and the level of development of social and engineering infrastructure. Rural territories are being formed with a different composition of tasks to be solved and, accordingly, management functions, the necessary amount of managerial work. Therefore, they differ in the number of competencies and the opportunities for their formation.

The factors of the internal environment affecting the digitalization of processes in the agricultural sector include: labor organization (organization of jobs, regulation); management technology; automated control systems (technical information tools); professionalism, efficiency and personal qualities of specialists (qualifications, organizational skills, leadership skills, interest in accelerating digitalization processes). These factors not only affect the creation of a digital platform, but also directly determine it. It is especially necessary to note the influence of the work style of the head of the unit or local government. In turn, the management entities themselves, which include IT experts, introduce elements of the uncertainty and subjectivity of decisions made and implemented into the management system [1, 4].

Thus, from the perspective of the theory of a systems approach, the digital platform for agriculture is a special kind of formalized managerial activity of specialists whose professional training allows them to successfully implement functions taking into account the uncertainty and risks of the organizational environment.

Of particular importance to understanding the process of formation and development of a digital platform for agriculture is the institutional approach, according to which economic, public and legal relations are formed

in such a way that they ensure a social order and a balance of interests of different population groups. The consolidation of such relations is based on satisfying the urgent needs of the population, where global forecasting of supply and demand, providing state support to agricultural producers, and assistance in banking and insurance provision are decisive [2, 3].

As an institute, the digital platform in the agro-industrial complex is a system of software, technical, staffing, as well as legal, organizational, moral and other norms and rules that define the boundaries of the participants in the process of implementation of their direct functions in the field of digital agriculture management. It should also be added here universities, research institutes, innovative enterprises, administrative organizations and institutions owned by a group of officials working in the formation and algorithmization of management scenarios (equipment, devices, things, processes, finances) for major, preparatory, production and marketing projects.

The institute for creating a digital platform for the agro-industrial complex affects various groups of relations: service, forming between state bodies of administration at different levels and state municipal employees; partnerships expected to be formed between business and the state in five basic areas of the program: “Information Infrastructure”, “Normative Legal Regulation”, “Transport and Logistics”, “Personnel and Education”, “Formation of Research Competencies and Technical Groundwork”; international cooperation, priority between the EAEU member countries on specific projects of joint activities “Electronic Customs”, “Payment and Payments, Electronic Commerce”, “Transport and Logistics”, “Information Technologies”; public, forming between an official and a citizen.

In such relations, interaction is carried out on the implementation of digital transformation scenarios, the formation of supporting subsystems for the digital platform.

Let us single out the main features of a digital platform aimed at creating an automated agro-industrial complex management system (ACS AIC) as a social institution:

1. Regulation of managerial work aimed at its rationalization and effectiveness, a clear distribution of rights, duties and responsibilities, increasing the effectiveness of interaction between participants and the state;
2. Depersonized, impersonal distribution of powers to create a generally accessible structured bank of knowledge and technologies broken down by sectors of agriculture and regions;
3. The division of managerial work according to hierarchy levels and functional units, professional training and specialization in the performance of functions in order to increase the efficiency of managerial work;
4. Fixing the necessary funds and resources for the implementation of power in the system of forming automated workplaces (AWSs);
5. Building not only rational relations of subordination (subordination), but also coordination (coordination), which are relations of the same hierarchy level and are aimed at closer cooperation in the subject of management.

The revealed signs of a digital platform for the agro-industrial complex as a social institution help to build the framework of social interaction of participants for the implementation of managerial functions, giving official and public relations a self-renewing regular character.

For innovative development in the system of digital agriculture (TSA), we define the forms that accumulate financial resources for the purpose of investing in innovation, and improve the interaction between science and production.

Through research on this issue, it is possible for you to do the waters that the creation of digital models of standard production processes in agriculture will increase the efficiency of business farmers. But this requires universal open agricultural production management systems with hundreds of input conditions (pairs of meters) and big data analysis with AI elements, which includes the formation and algorithmization of control scenarios (equipment, devices, things, processes, finances) according to the main cases - preparatory, mfr odst -governmental and to sales (Figure 1).

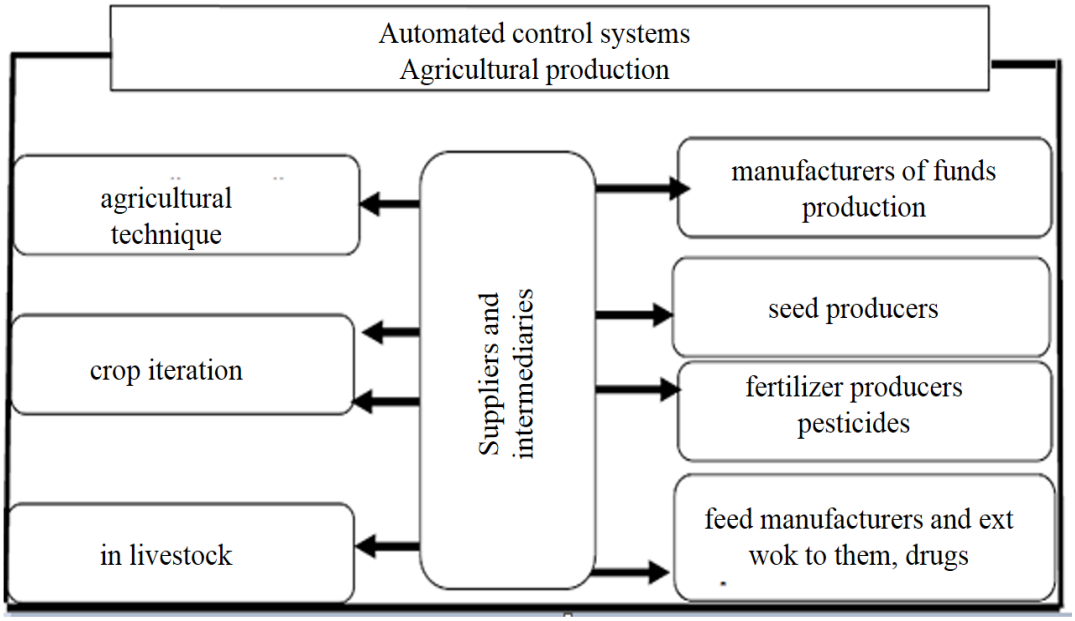

Figure 1. The main uses of digital technologies in agricultural production

Each management decision platform is built on an open platform for the management of plant growing, livestock production, supply and marketing logistics, including a traceable system, the formation of a seed and genetic fund platform, management of fertilizer application and chemistry. The main platform being created is the knowledge platform, which reflects the presence of professionals in creating the necessary programs and providing farmers with new IT opportunities to increase added value.

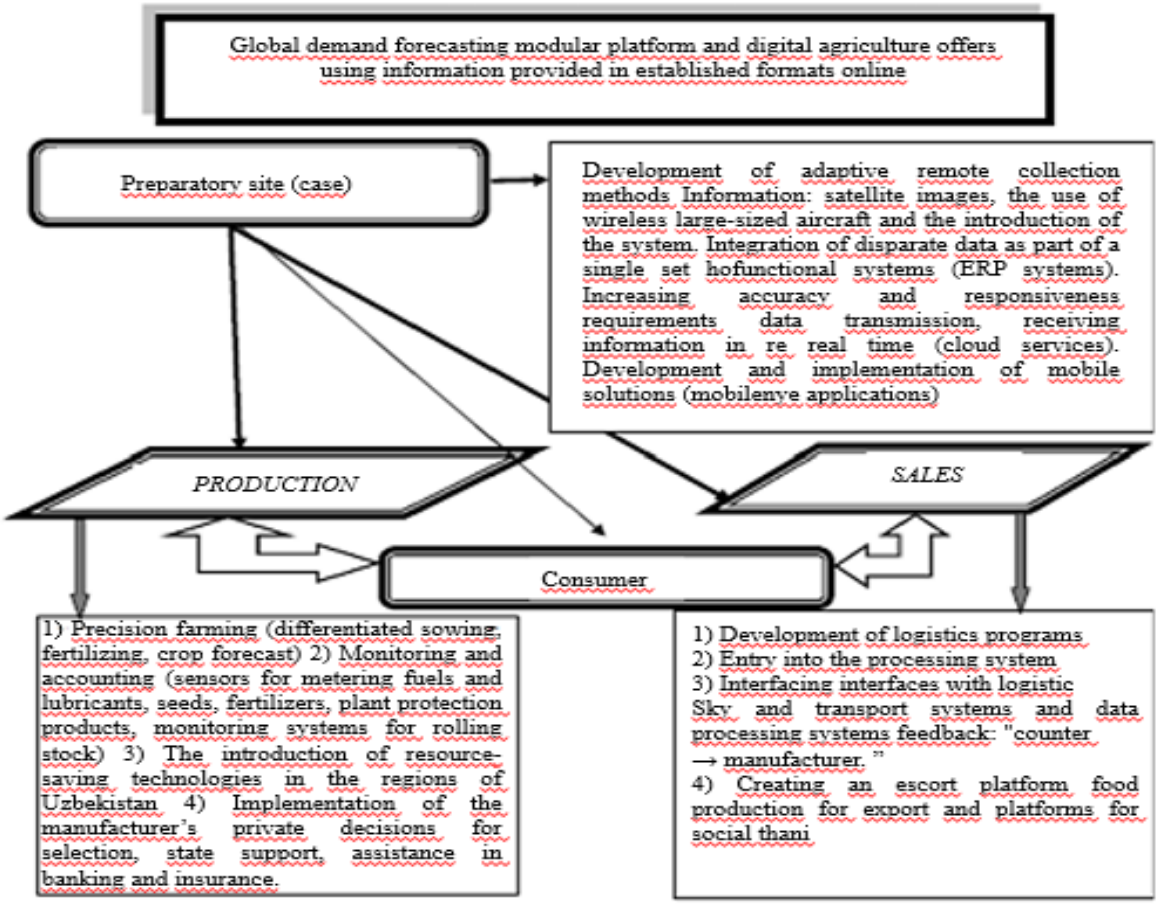

Figure 2.2 - The algorithm of digitalization of agriculture

The transition from the management of the agro-industrial complex of the Republic of Uzbekistan "in the fire command mode" to the management based on planning and forecasting risks.

To maintain effective with Yale economy in the on board digital Transformer rmatsii necessary interfaces with conjugation logistic - transportation systems and processing feedback data "counter → manufacturer ', to take account of consumer preferences.

This factor leads to the growing role of nonprofit unions (associations) in the scenario of digital transformation of a particular field of activity, in the risk system for the adoption and implementation of innovative solutions in the context of the formation of integration entities, which leads to the need to create an honest state digital ecosystem for agricultural management of the Republic of Uzbekistan.

Using the system allows you to: maintain directories regarding the creation, editing, storage and retrieval of records; accept and consider applications for the provision of services provided by the Ministry of Agriculture of the Republic of Uzbekistan in electronic form; integrate registers, registers and NSIs with information systems and databases of the Ministry of Agriculture of the Republic of Uzbekistan ; increase the efficiency of access to information necessary to ensure the performance of employees; eliminate the risks of loss of documents due to the storage of data in electronic format in databases having backup, regularly updated copies.

Through the digital transformation of agriculture, the following tasks are possible: increasing labor productivity; integration of information resources of the Ministry of Agriculture of the Republic of Uzbekistan and regions to ensure global planning in the industry and provide accurate recommendations to market participants, including using artificial intelligence; the provision of government services and portals for agricultural producers in order to formulate mechanisms and support measures for the implementation of digital technologies in regional (local) agribusiness; the integration of the functionality of the digital agriculture platform (DSA), to ensure the access of agricultural enterprises to state, banking and insurance products and the development of the reverse interaction scheme (access of these structures to productive enterprises with their own offers; creation of conditions (environments) to increase the transparency of agricultural markets for farms and consumers based on traceability of both agricultural raw materials and final products (goods) (tags, chips, identifiers, technologies, devices, systems); stimulating domestic development and providing access to various digital open platforms (digital field, herd, management of equipment, greenhouses, etc.) to agricultural producers and developers; providing a package of personal data (matrix) and new IT - technological solutions for market participants; the introduction of online trading platforms and systems for the promotion of agricultural products (raw materials, semi-finished products, processed products), taking into account the size of the enterprise (peasant and personal economy unable to compete for profitable trading platform); creation of a platform for the processes of formation of proposals on the adjustment of regulatory legal acts and regulatory technical requirements for the transition to the digital economy; the formation of educational and methodological platforms (standards, methodologies, training programs); increasing the export potential of agricultural products, ensuring compatibility of processes and production standards with global standards.

RECOMMENDATIONS

Currently, there is a rapid increase in the use of the digital economy on a global scale in almost all sectors of human activity. Agriculture is not an exception, including in the Republic of Uzbekistan, where in recent years a number of resolutions and decrees of the President have been adopted in the field of digital economy development [1-3]. The problem of the digital economy and digital transformation, as well as its development in various fields of human activity are reflected in books [4] and articles [5].

It should be noted that agricultural technology - **AgTech** (Agronomic technolog) - is, by definition, a holistic ecosystem in the value chain of agricultural products. This is a kind of convergence or junction of biology, biochemistry, agronomy, plant and animal science, and in this case, the digitalization process is real

A turning point that provides a solid foundation for the future of agriculture, **PwC** says. Moreover, the **ROI** (Return of Investment) in **AgTech** projects can be much higher than in traditional investments in agriculture.

It should be noted that only in 2017, financing in the field of agricultural technologies through investments or the acquisition of such companies increased by almost 32% or in monetary terms to $ 2.6 billion, and more

than half of the 20 largest transactions in this area exceeded $ 50 million (**Forbes**). The reasons for this situation are understandable without explanation - the number of people on planet Earth continues to grow, and all of them need to be provided with appropriate nutrition. According to the forecast of the United Nations, by 2025 the world population can exceed 8.1 billion people, and by the middle of the 21st century it can reach almost 9.6 billion. Industry experts believe that thanks to digital transformation, the aggregate productivity of the agricultural industry should increase by almost 60% by 2030, so food scarcity is hardly threatening us. In connection with these trends and innovations in the field of digital agricultural technologies in the portal of regulatory and reference documents of the Cabinet of Ministers of the Republic of Uzbekistan. for general consideration and discussion, a draft Concept for the implementation of "Smart Agriculture" in the conditions of agriculture in Uzbekistan was published.

The main goal of this concept is to increase crop yields, increasing livestock productivity, protecting crops and land from pests and various insects, to eliminate the influence of external adverse factors on the productivity of various crops, as well as introducing modern methods of farming and improving the culture of production. Particular attention is paid to the introduction of high technology and the digital method of management in agriculture of the Republic of Uzbekistan.

From our point of view, the following provisions can be noted among the priority tasks for introducing the concept of smart agriculture: Use of water-, energy- and material-saving technologies that allow efficient use of existing water, material, energy and mineral resources; Widespread use of drip irrigation systems and open and closed land plots using modern farming technologies and related digital information and communication management systems; The widespread use of methods and methods of growing local and tropical crops in enclosed spaces, shelters and greenhouses using technologies developed in various developed countries;

Implementation of methods for growing various local and tropical crops using artificial substrates, including perlite and aeron; Development of crop cultivation methods using modern aeroponics and hydroponics methods in smart greenhouses with digital program control; Increasing the quantity and quality of promising digital technologies for agricultural management through internal and external investment of significant funds in this sphere vital for the republic to ensure food safety; The introduction of a variety of modern resource-saving technologies in agriculture, including the use of precision sowing mechanisms, eliminating the loss of mineral fertilizers by accurately calculating their consumption per unit of sown area; The use of agricultural mechanisms and technological equipment provided with GPS navigation equipment in order to accurately account for the organization and conduct of a variety of agricultural work; The introduction of robotics to care for agricultural machinery and equipment, animals, milking and cutting meat; The use of drones to monitor the status of agricultural land,

accounting for the use of land resources and monitoring the state of the herd of animals in the fields; Training and attracting modern specialists in the field of high technology to work in various fields of agriculture of the republic; Introduction of advanced innovative technologies and best foreign experience in various areas of agriculture of the Republic of Uzbekistan; The transition to a digital method of exchanging information at first at the level of regional centers with a further transition to the republican scale; Reducing the number of paper accounting and reporting forms with the subsequent transition to electronic storage media and electronic paperwork; To improve the efficiency of interaction between agricultural workers, farmers and private producers with government bodies; Creation of a public electronic data bank on the methods of competent cultivation of various crops in local conditions and convey to the consciousness of each agricultural representative the scientific basis for achieving high productivity of various crops; Creation of a mechanism for continuous monitoring and assessment of the condition of crops and land in order to provide an effective mechanism for their management; Development and implementation of methods, tools and relevant consulting companies to advise agricultural workers and farmers on the cultivation, processing, storage, marketing and marketing of agricultural crops; Creation of a digital platform for the effective management, consultation and monitoring of agriculture at the republican and regional levels; - Creation of a publicly accessible and open knowledge bank on agricultural engineering, a culture of growing various crops, techniques and technologies used in agriculture, followed by training in working with this system for all agricultural workers and managers. At the same time, he is referring to the constant replenishment of this databank by agricultural experts like the well-known Wikileaks system; To develop technologies for growing crops that are able to adapt to changes in climate and the environment based on modern advances in digital

technology and thereby achieve the stability of crops to external influences; To develop genetic engineering work to develop new varieties of crops resistant to local climatic conditions;
To develop new methods, technologies, equipment and automation devices for long-term storage and transportation of vegetables, fruits, flowers and herbs over long distances; Formation of a market-oriented agricultural structure for export and for ensuring the competitiveness of agricultural products on a global scale; To expand the production and use of clean energy, agricultural products and poultry products, fisheries and livestock; Based on the use of digital technologies, increase the efficiency of allocated public funds, land plots and material costs; On a planned basis, ensure the implementation of Smart Agriculture technologies based on the most advanced foreign analogues; Based on the introduction of innovative solutions, increase the efficiency of the logistics infrastructure of agricultural producers.
For the successful implementation of this concept, widespread use of digital technologies and methods in agriculture of Uzbekistan is necessary. And you also need to provide effective planning for the implementation of the above provisions on a temporal and spatial scale.
It is also planned to use artificial intelligence (**AI**) technologies, **big data** for collecting, processing, transmitting and storing agricultural data in Uzbekistan, as well as virtual (**VR**) and augmented reality (**AR**) technologies for modeling and managing the state and development of crops in various conditions. Implementation of the Internet of things (Internet of things - **IoT**) is also required to ensure timely information on the state of farmland at the regional or republican level for the purpose of optimal agricultural management.
All information about manufacturers, suppliers and state organizations is supposed to be placed in a special integrated digital platform "Smart Agriculture". To ensure the openness of this platform, its functions will be integrated with data from state, banking, tax, insurance and financial organizations. The introduction of digital technologies in agriculture requires the preparation and support of an appropriate infrastructure. And this without the appropriate organization of mobile communications will be impossible or very difficult.
Thus, based on the foregoing, in order to ensure reliable marketing of agricultural products, it is necessary to ensure the observability of these products in places of storage and in transit using signs, chips, identifiers, digital technologies and systems. In some cases, many personal technological solutions may be needed for certain categories of market relations entities.
It also requires the organization of online platforms and systems for the sale of agricultural products. Of course, the need and timeliness of the relevant regulatory documents, technical documentation, standards and legislative acts in this area does not raise any doubts. Moreover, all these documents must strictly comply with international standards and high requirements for the quality of the supplied products. Also, with the widespread use of digital technologies, it is necessary to develop remote sensing systems for the plant world, navigation of farmland and livestock. But first, digital systems and platforms must be installed and tested within the same territory or region, or a dedicated community. Given the fact that in our country there is not a very high degree of modern agricultural literacy, it is necessary to pay special attention to digital distance education on problems and new trends in agriculture with the involvement of agricultural consulting firms and organizations. The increase in the number of students at agricultural institutes and universities, as well as targeted training for teachers of agricultural educational institutions on problems of the digital economy and digital technologies in agriculture, is not without meaning.

CONCLUSIONS

It is a well-known fact that the timing and quality of work in the field depend on the level of service and technical service, which is why global manufacturers use the most modern technologies to optimize service and improve its quality. Along with the possibilities of remote service support, augmented reality technologies began to be applied for the first time in the field of service and maintenance. Indeed, the compatibility factor of different hardware and software within one solution is the most important task of the digital era. Most households have a mixed fleet of equipment, and therefore prefer universal digital solutions. A progressive approach to the process of agricultural automation will help to remove the industry from stagnation and get the most out of the fertility of our soils [4].
With such an arsenal of digital solutions world producers of agricultural equipment today ahead of their time in many ways and set on the board, which would be a wasp fected digital transformation of rural the economy

in the next ten years of. And among the agrarians there is traditionally great interest and demand for such technologies, but it is important that the evolution of external catering keep up with the development of digital technologies and provide a favorable soil for their application in Uzbekistan (regulatory framework, infrastructure development, issues of ownership and data security and etc.).

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