

INNOVATIVE AND DIGITAL APPROACHES TO DEVELOPMENT OF THE AGRO-INDUSTRIAL COMPLEX

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Abstract. *The development of information technologies has a significant impact on almost all sectors of the agro-industrial complex: production, trade, finance, etc. Today, many countries around the world are introducing the possibilities of using digital technologies to accelerate and multiply innovative ideas with a high potential impact on food and agriculture, turning digital solutions and services into global public goods. Much attention has paid to the introduction of existing and advanced technologies, the development and expansion of new services, tools and approaches to empower rural households and stimulate youth entrepreneurship in the field of food and agriculture. According to the analysis conducted by FAO, agriculture and food production are undergoing transformations under the influence of digital technologies, their ubiquity, portability and mobility. In the agricultural and food sectors, the spread of mobile technologies improves access to information for small farms, which allows increasing production and productivity, optimizing the supply chain and reducing transaction costs. The research results demonstrate the positive digital changes and transformations in the national agro-industrial complex, and, at the same time, the absolute values of the considered indicators are at a low level. The introduction of digital technologies in the agricultural sector is possible only through the application of a program-target approach, as well as by improving the efficiency of industry management at the state level.*

Keywords: *agro-industrial complex, digital technologies, food and agriculture, innovation, development.*

INTRODUCTION

Today, many countries around the world are introducing the possibilities of using digital technologies to accelerate and multiply innovative ideas with a high potential impact on food and agriculture, turning digital solutions and services into global public goods. Much attention has paid to the introduction of existing and advanced technologies, the development and expansion of new services, tools and approaches to empower rural households and stimulate youth entrepreneurship in the field of food and agriculture (A.E.NEMTSOV, 2015, B.D.DOKIN, 2015).

Table 1.

Potential economic impact in 2025 from the implementation of disruptive technologies

Disruptive technologies	Economic effect
Mobile Internet	3.7—10.8
Artificial intelligence	5.2—6.7
Internet of things	2.7—6.2
Cloud	1.7—6.2
Advanced robotics	1.7—4.5
Autonomous and semi-autonomous vehicles	0.2—1.9
Next-generation genomics	0.7—1.6
Energy storage	0.1—0.6
3D printing	0.2—0.6

Advanced materials	0.2—0.5
Advanced oil and gas exploration and recovery	0.1—0.5
Renewable electricity (wind and solar)	0.2—0.3

High-tech production and modernization of the agro industrial complex with the help of information, communication and digital technologies, the scale and rate of digital transformations should become a priority of the economic development of the agricultural sector (A.N.ANANEV, 2016, J. MANYIKA, 2013).

Technological progress has led to the emergence of new disruptive technologies: mobile Internet, artificial intelligence, Internet of things, cloud technology, advanced robotics, autonomous and semi-autonomous vehicles, next-generation genomics, energy storage, 3D printing, advanced materials, renewable energy, exploration, advanced oil and gas exploration and recovery. In the author's opinion, implementing most of them in the agro-industrial complex (AIC) should be considered promising. These technologies will provide a way out of crisis in the cluster, as well as innovative development, radically transforming the agricultural sector. They are expected to contribute to the increment of scientific, labor, environmental, information, communication, and social potentials. They are also supposed to contribute to the saving of natural resources (M.S.BUNIN, 2006).

The agro-industrial complex (AIC) is a system-forming cluster of the economies of Tajikistan and Romania, which forms the agricultural market, economic, social potential and employment of rural areas, ensuring food and economic security (ALEKSANDROVA A.V., 2014).

MATERIAL AND METHODS

The theoretical, methodological and informational basis of the study has made up of scientific works of Tajikistan and foreign scientists, recommendations on digitalization of the UN, FAO, OECD, the World Economic Forum and the international consulting company PwC, as well as regulatory planning documents and digitalization strategies in countries.

The study has based on the application of scientific methods of analysis, synthesis and generalization, statistical analysis.

As part of the study, the authors used the methods of statistical and comparative analysis, rationale. Over the past decade, the main problem for small and medium-sized agricultural enterprises has become increasing competition.

RESULTS AND DISCUSSIONS

Digital agriculture is an industry based on modern methods of production of agricultural products and food using digital technologies (Internet of Things, robotics, artificial intelligence, big data analysis, e-commerce, etc.), which provide an increase in labor productivity and reduce production costs. Agriculture in modern conditions should become consistently efficient and environmentally friendly, i.e. help to purpose fully use production resources with minimal waste to produce food with high quality and minimal impact on the environment.

Digitalization strategy involves analyzing the existing business model and identifying digital solutions that accelerate transformation. Consider key technologies and their role in improving the sustainability and efficiency of agriculture. These technologies will largely determine the competitiveness and adaptability of the enterprise.

Agricultural production, whether it is a livestock farm, a field with sown crops or a greenhouse, uses all kinds of sensors, drones and unmanned aerial vehicles (UAVs), robotic equipment, unmanned tractors and other technologies that are digitalization hardware. The

software allows you to "revive" technical devices, update and adjust their efficiency. In the future the agro-industrial cluster is seen as innovative and high-tech, capable of ensuring food and national security.

Table 2.

Main effects of introducing disruptive technologies in AIC

№	Potentials for innovative development	Effect from introducing new technologies
1	Scientific potential	Demand for scientists and specialists of new professions emerging at the intersection of different scientific fields Diffusion of knowledge Development and creation of new research and experimental design centers and laboratories
2	Labor potential	Decrease in the number of employees Disappearance of a number of professions such as mechanic, milker, etc. Precarization of low qualified personnel labor Growing requirements for employees competences Use of various forms of smart education Employees having a good command of ICT skills Better working conditions Growth of labor productivity
3	Technical equipment	Automation and intellectualization of technological processes Good technical equipment not only for individual operations but also for all technological cycles
4	Environmental and ecological potentials	Resource conservation Less impact (mechanical, chemical, etc.) on the environment Less space needed for economic activities Conservation of animals and plants population
5	Infrastructure development	Emergence of smart infrastructures of production and the social sphere, smart settlements
6	Information and communications potential	Creating a unified network of information support of management Development of various forms of network interaction Increase of information literacy of the population Growth of information security threats
7	Social potential	Meting the needs of the population Hunger problem solution Improvement of the quality of life

People change the vision of the future. There are growing threats of climate change, hunger, threats to national security, danger of environmental pollution, energy collapse, as well as unwanted side effects of technology development. The process of globalization is never-ending. The only way to solve these problems is through innovations. In our opinion, they should be associated with the introduction of disruptive technologies: mobile Internet, artificial intelligence, Internet of things, cloud technology, advanced robotics, autonomous and semi-autonomous vehicles, advanced genomics, energy storage, 3D printing, advanced materials, renewable energy, advanced oil and gas exploration and recovery.

The introduction of disruptive technologies in the agricultural sector cannot be done only by efforts of agricultural producers. There is a need of highlevel information and communication support for organizations and households to create a single well-developed information and communication system of the agro-industrial complex, including subsystems for remote control of all structural subdivisions of the AIC, logistics, smart settlements, consulting and public services.

The research results demonstrate the positive digital changes and transformations in the national agro-industrial complex, and, at the same time, the absolute values of the

considered indicators are at a low level, which requires more active use of tools and methods to stimulate the intensification of the use of digital technologies in the agroindustry, which in turn can be ensured by the implementation of the following priority tasks:

- development of digital software platforms, scientific and methodological and innovative support of production and sales processes at all levels of management of the business entity;
- development of a methodology for forecasting the volumes of production and sales of products and, on the basis of this, forecasting the level of food security at the state level;
- optimal location of production, taking into account the requirements of rational nature management;
- predictive analytics and monitoring based on large databases with instrumental and methodological complex of a distributed registry, artificial intelligence;
- program-target sectoral planning;
- professional development and provision of digital competencies for specialists in the agroindustry.

CONCLUSIONS

Thus, e-agriculture is a powerful tool to stimulate food production and income growth for agricultural producers by increasing agricultural efficiency, improving living conditions and developing the value chain. It can also play an important role in addressing some of the most pressing agricultural problems, including climate change, biodiversity loss, drought, desertification, etc.

The direction for further research is seen in the assessment of the contribution that disruptive technologies make to scientific, labor, environmental, natural, information and communication potentials; to the new production, technical, and social infrastructure which form the innovative development of the agro-industrial complex.

The digitalization of the agroindustry contributes to a significant reduction in production and transaction costs and a significant increase in the level of financial affordability of food, ensuring the rational use of the potential of natural resources and efficient nature management. The introduction of digital technologies in the agricultural sector is possible only through the application of a program-target approach, as well as by improving the efficiency of industry management at the state level.

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