ADAPTATION OF THE INTERNATIONAL EXPERIENCE OF DIGITALIZATION OF THE AIC
АПС ЦИФРЛАНДЫРУДЫҢ ХАЛЫҚАРАЛЫҚ ТӘЖІРИБЕСІН БЕЙІМДЕУ
РАЗВИТИЕ АПК НА ОСНОВЕ ЦИФРОВИЗАЦИИ: ЗАРУБЕЖНЫЙ ОПЫТ

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Abstract. The goal is to reveal the need to adapt international experience to create a digital platform for the commodity distribution system of the EAEU and other countries. To show potential ways of development, methods and approaches used in the creation of similar platforms in other countries in order to further borrow best practices. Methods used: content analysis, economic and statistical, evaluation and comparison, analytical. Results: technologies and blocks of the

Platform of the Commodity Distribution System of the EAEU, the Republic of Tajikistan and the Republic of Uzbekistan are proposed. The sectors and directions of digitalization of the economy of foreign countries, the benefits and risks of this process, which should be taken into account when developing e-agriculture of countries, are considered. The article discusses the directions, characteristics, areas of application and dissemination of digital technologies in agriculture in different countries, which make it possible to ensure an increase in added value. An analysis of the directions of digitalization of the agro-industrial complex in other countries confirms that foreign experience can be successfully used in the development of the Digital Platform for the agro-industrial complex of the EAEU countries, the Republic of Tajikistan (RT) and the Republic of Uzbekistan (RU). The study carried out allowed us to conclude that the level of development of Digital Platforms of Commodity Distribution Systems (hereinafter referred to as CPTS) is still in its infancy. A fully formed supra-country and effectively operating supra-state Platform has not been identified. Under the condition of deep economic and political integration of the participating countries, namely the countries of the EAEU, the Republic of Tajikistan (RT), and the Republic of Uzbekistan (RU), the project of the Digital Platform of the Agro-Industrial Commodity Distribution Systems can be developed and implemented, which will improve the efficiency of its functioning, the food security of the countries.

Андатпа. Мақсаты - ЕАЭО және басқа да елдердің тауар өткізу жүйесінің цифрлық платформасын құру үшін халықаралық тәжірибені бейімдеу қажеттілігін ашу. Үздік тәжірибелерді одан әрі қарызға алу мақсатында басқа елдерде ұқсас платформаларды құру кезінде пайдаланылған әлеуетті даму жолдарын, әдістері мен тәсілдерін көрсету. Әдістер - мазмұнды талдау, экономикалық-статистикалық, бағалау және салыстыру, аналитикалық. Нәтижелер: ЕАЭО, Тәжікстан Республикасы және Өзбекстан Республикасының тауарларды өткізу жүйесінің платформа технологиялары мен блоктары ұсынылды. Шет елдердің экономикасын цифрландырудың секторлары мен бағыттары, елдердің электронды ауыл шаруашылығын дамыту кезінде ескерілуі тиіс осы процестің пайдасы мен тәуекелдері қарастырылған. Мақалада қосымша құнның ұлғаюын қамтамасыз етуге мүмкіндік беретін әртүрлі елдердегі ауыл шаруашылығында цифрлық технологияларды қолдану және тарату бағыттары, сипаттамалары, салалары талқыланады. Басқа елдердегі агроөнеркәсіптік кешенді цифрландыру бағыттарын талдау шетелдік тәжірибені ЕАЭО елдерінің, Тәжікстан Республикасының (ТР) және АӨК үшін Цифрлық платформаны әзірлеуде сәтті пайдалануға болатынын растайды. Өзбекстан Республикасы (RU). Жүргізілген зерттеу Тауарды тарату жүйелерінің цифрлық платформаларын (бұдан әрі - CPTS) дамыту деңгейі әлі де бастапқы сатыда деп қорытынды жасауға мүмкіндік берді. Толық қалыптасқан елден тыс және тиімді жұмыс істейтін мемлекеттен жоғары платформа анықталған жоқ. Қатысушы елдердің, атап айтқанда ЕАЭО, Тәжікстан Республикасы (ТР) және Өзбекстан Республикасының (РУ) елдерінің терең экономикалық және саяси интеграциясы жағдайында

агроөнеркәсіптік тауарды таратудың цифрлық платформасының жобасы. Оның жұмыс істеу тиімділігін, елдердің азық-түлік қауіпсіздігін арттыруға мүмкіндік беретін жүйелерді әзірлеуге және енгізуге болады.

Аннотация. *Цель* – раскрыть необходимость адаптации международного опыта для создания цифровой платформы товаропроводящей системы ЕАЭС и др. стран. Показать потенциальные пути развития, методы и подходы, использованные при создании аналогичных платформ в других странах с целью дальнейшего заимствования лучших практик. *Методы*- контент-анализ, экономико-статистический, оценки и сравнения, аналитический. *Результаты* - предложены технологии и блоки Платформы Товаропроводящей Системы ЕАЭС, Республики Таджикистан и Республики Узбекистан. Рассмотрены сектора и направления цифровизации экономики зарубежных стран, выгоды и риски этого процесса, что должно учитываться при разработке электронного сельского хозяйства стран. Рассмотрены направления, характеристики, области применения и распространения цифровых технологий в сельском хозяйстве разных стран, позволяющих обеспечить увеличение добавленной стоимости. Анализ направлений цифровизации АПК в других странах подтверждает, что зарубежный опыт может быть с успехом использоваться при разработке Цифровой Платформы АПК стран ЕАЭС, Республики Таджикистан (РТ) и Республики Узбекистан (РУ*). Выводы*- уровень развития Цифровых Платформ Товаропроводящих Систем (далее ЦПТС) все еще находится на этапе становления. Полностью сформированной надстрановой и эффективно действующей надгосударственной Платформы не выявлено. При условии глубокой экономической и политической интеграции стран-участниц, а именно стран ЕАЭС, Республики Таджикистан (РТ) и Республики Узбекистан (РУ) может быть разработан и реализован проект Цифровой Платформы Товаропроводящих Систем АПК, что позволит повысить эффективность функционирования его участников, продовольственную безопасность стран.

Keywords: agriculture, agro-industrial complex, digitalization, effective management, business processes, digital platform, digital transformation, EAEU countries, world experience of digitalization.

Түйінді сөздер: ауыл шаруашылығы, агроөнеркәсіптік кешен, цифрландыру, тиімді басқару, бизнес-процестер, цифрлық платформа, цифрлық трансформация, ЕАЭО елдері, цифрландырудың әлемдік тәжірибесі.

Ключевые слова: сельское хозяйство, агропромышленный комплекс, цифровизация, эффективное управление, бизнес-процессы, цифровая платформа, цифровая трансформация, страны ЕАЭС, мировой опыт цифровизации.

Introduction. Digitalization is the transformation of the management system by revising the strategy, models, operations, products, marketing approach and goals, provided by the use of digital technologies [1].

The direction of "digital economy" originated in the field of digitalization in 1995, when Nicholas Negroponte formulated the idea of the transition of participants in economic systems from processing atoms to processing bits [2]. In the modern interpretation, the digital economy is the result of the transformational effects of new general-purpose technologies in the field of information and communication [3].

By 2021, digitalization has penetrated into most sectors of the economy and social activity: retail trade, transport and logistics system, financial services, manufacturing, education, healthcare, mass media. The main directions of the digital economy are e-commerce, Internet banking, electronic payments, online advertising and electronic access to public services.

The World Bank's report on the state of the digital economy "Digital Dividends", made in 2016, identified the following benefits of digitalization [4]:
●labor productivity growth;
●improving the competitiveness of companies;
●reduction of production costs;
●creation of new jobs;
●increasing the degree of satisfaction of human needs;
● overcoming poverty and social inequality.

Separately, in the context of the EAEU countries, it is worth noting the role of digitalization in increasing the availability of public services and subsidies for small farms and personal subsidiary farms. If the production of crop production is concentrated in agricultural enterprises and larger farms, then livestock products are produced in peasant and personal subsidiary farms (up to 70%). At the same time, the recipients of state support are not covered by the latter [5].* The introduction of digital accounting systems and traceability of goods, the provision of subsidies is already gradually leveling this inequality.

At the same time, digitalization also carries potential risks:
*unauthorized access to information and other cybersecurity threats;
* mass unemployment;
* digital inequality – gaps in the level of education and conditions of access to digital services and products between citizens and businesses within countries, as well as between states. Therefore, it is important to note separately the significant contribution of digitalization to the socio-economic development of the society of the countries studied. In subsequent studies, it is important to focus on: the concept of socio-cyber-physical-ecological systems of the agro-industrial complex; the impact of digitalization on political processes; methods of digitalization and implementation of digitalization and the global geography of digitalization development in the agro-industrial complex [6].

The lowest rates of digitalization are observed in such a traditional branch of the economy as agriculture. The inefficient information environment in the agricultural sector causes an increase in production costs, which, in turn, reduces

the level of financial accessibility of food products and the competitiveness of agricultural products in comparison with foreign analogues [7].

To achieve the greatest effect, following the example of advanced countries, development should be carried out in two directions. Both from central state bodies through local executive bodies through the development and implementation of strategic decisions, and from farmers themselves who solve practical requests. At the same time, it should be borne in mind that the owners and staff of agricultural enterprises are very conservative, which, on the one hand, protects against some production and financial risks, on the other hand, they miss significant preferences from the introduction of innovations. One way or another, the implementation of digitalization in the agro-industrial complex intensifies standard methods of adaptation to climate change, reduces environmental damage and contributes to food security [8].

On an ongoing basis, new participants appear in the market of digitalization of the agro-industrial complex, interacting with existing leaders, they strengthen the asymmetry of monopoly influence and increase competitive advantages. Despite the fact that farmers continue to be the main source of data, only a few of them are directly integrated into digital platforms that can facilitate more effective decision-making [9].

Thus, in the 21st century, the field of agricultural research has affected the entire chain from the farmer and distributor to research institutes and state, international organizations related to agriculture. Despite significant investments, systematic attempts to create a digital platform for commodity distribution systems have not achieved final success in meeting the needs of farmers [10].

Material and methods of research. The materials of the Agricultural and Food Organization (Food Agriculture Organization – FAO) served as an information base UN, representing the directions, characteristics, areas of application and dissemination of digital technologies such as: ■ *Process transformation■ Process transformation■ Investment.* ■ *Efficient markets* ■ *Improved vertical and horizontal connections* ■ *Assistance to information exchange networks* ■ *Value-added services■ Risk mitigation■ Improved food safety and nutrition security* ■ *Product quality control■ Digital identity system.*

The benefits and drawbacks of the systems, as well as difficulties in implementing platforms, were found through interviews with representatives of firms in each of these fields.

Domestic and foreign publications, information resources in open access, information materials of the Ministry of Agriculture of the Republic of Kazakhstan were used. In preparing the materials of this article, the following methods were used: economic and statistical (in determining the parameters of the use of information and communication technologies), analytical (in analyzing the digitalization of agriculture in different countries and drawing conclusions).

Results and their discussion. Digitalization processes in the modern world are integrated into all types of activities. In 2016, the volume of the digital economy was estimated at 11.5 trillion USD [12]. Due to the ongoing active development of digitalization, the positive impact on trade and agriculture, the creation of a Digital

Platform of the Unified Commodity Distribution System of the EAEU countries, RT, RU can potentially have a positive socio-economic effect.

Digitalization acts as a tool for optimizing existing processes in various types of activities. In the case of creating a digital platform, the optimization algorithm by digitalization provides for the following stages:

■ the process (production, trade, logistics, etc.) should be analyzed and presented as system input data;

■ all systematized input data is digitized and entered into the system;

■ the system processes input data into output data and the result (trading operations, logistics calculations, taxes, analysis of commodity flows, etc.).

Digital platforms of commodity distribution systems are based on digital technologies and solutions already implemented in countries. Therefore, it is important to assess the existing level of digitalization of countries.

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The degree of accessibility and active use of digitalization is determined by the digitalization index of the state Digital Evolution Index (Further DEI). According to the results of the calculation of DEI in 2017, conducted by Mastercard together with the Fletcher School of Law and Diplomacy at Tufts University, Norway, Sweden and Switzerland are leading in the digital ranking. The USA, Great Britain, Denmark, Finland, Singapore, South Korea and Hong Kong are in the top 10 (figure) [13].
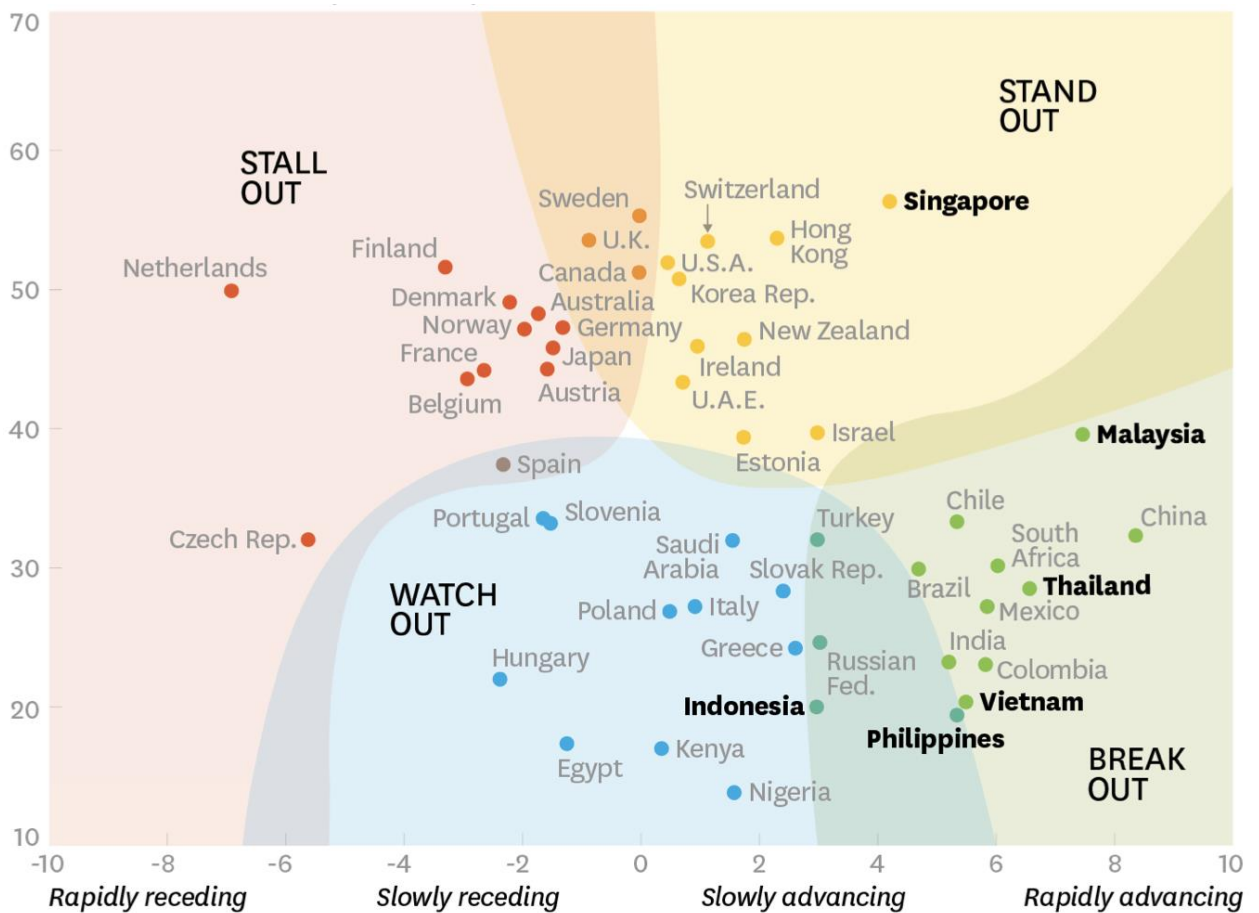
Figure – The level and pace of digitalization of the Digital Evolution Index (out of 100) countries

In the field of agriculture, the level of Internet availability in rural regions is important for maximum user coverage.

A specialized agency of the United Nations, the International Telecommunication Union, in 2017 released a report on the development of information and communication technologies in the countries of the world. It defines an integral index by country based on 11 indicators (access to the Internet, cellular communications, telesystems, radio systems, operation technology infrastructure development, etc.) (table) [14].

Table - Assessment of countries on access to Information and Communication Technologies

Country	% of the population with Internet access	% of the population with a computer
South Korea	99,2%	75,3%
Bahrain	98,0%	94,8%
Japan	97,2%	81,0%

Norway	97,1%	97,6%
Iceland	97,0%	98,5%
…	...	...
Kazakhstan	84,4%	76,2%
Uzbekistan	75,4%	43,9%
Russia	74,8%	74,3%
Belarus	62,5%	67,0%
Armenia	60,5%	64,7%
Kyrgyzstan	18,8%	21,4%
Tadjikistan	Unspecified	unspecified

The difference in the indices of the EAEU countries, RT, RU indicates a different level of readiness of the seven countries to implement the Digital Platform of the Unified Commodity Distribution System. At the first stages, this can lead to inequality in the following aspects:
- collection and presentation of information on a digital platform;
- integration of databases for cross-country trade and logistics operations;
- provision of services and services in digital format;
- the level of use of the digital platform in % of the population.

At the same time, the development of technologies tends to increase the growth rate. The directions of digitalization development are particularly flexible and are set by the needs of the market. Within a few years after the successful launch of the Digital Platform of the Unified Commodity Distribution System, parity among the participating countries can be achieved in the above positions.

The digital platform of the Unified Commodity Distribution System of the EAEU countries, RT, RU at the first stages will relate to applied digital platforms. In the future, such infrastructure tools as the development of solutions for online marketing, production automation, IT services of private and public structures, machine learning for the development of recommendations for the distribution of goods and automatic calculation of optimal logistics routes may appear on this platform.

The present study has shown that despite the high rates of digitalization of various industries, social and economic spheres, the level of development of Digital Platforms of Commodity Distribution Systems is still at the stage of formation. A fully formed supranational and effectively functioning supranational Platform has not been found.

The existence of a supranational Digital Platforms of Commodity Distribution Systems seems to be a project that penetrates into many spheres of activity of citizens, business and the state. Hence, it can be concluded that its creation is possible only under the condition of deep economic and political integration of the participating countries.

An overview of the world experience was made on the study of initiatives of inter-country unions and associations of countries:

Process transformation. E-agriculture is transforming the process by which the subjects of the agricultural value chain collect, analyze, store and exchange information for decision-making in their daily activities. Example: The Grameen Foundation's Community Knowledge Worker program in Uganda uses mobile apps to use information to improve decision-making.

Investment. The development of e-agriculture stimulates investments in Information and Communication Technologies infrastructure and human capital. Taobao.com, China's largest online store platform, has launched an agricultural channel.

Efficient markets. E-agriculture leads to an increase in the efficiency of rural markets: due to lower transaction costs, reduced information asymmetry, increased market coordination and transparency of rural markets. E-agriculture reduces losses at various stages of the distribution chain, from production to consumption. According to statistics, about a third of the food in the distribution chain is lost either in the field, during storage and redistribution, or in households. By facilitating the exchange of information in real time, e-agriculture can increase the efficiency of the distribution chain, which in turn can significantly reduce food waste. Example: Esoko offers a wide range of mobile tools for monitoring, marketing decision-making and consulting services aimed at making agriculture profitable for small farmers.

Improved vertical and horizontal connections. E-agriculture leads to the development of trusting relationships between participants in the value chain. In traditional agricultural value chains, intermediaries can add surplus value to the value of the product due to low transparency, and thereby manipulating price increases, and thus reducing trust. E-agriculture helps to reduce intermediaries and increase the impartiality and transparency of transactions, thus improving the confidence factor. Example: The e-Choupal platform connects rural farmers directly through the Internet for the procurement of agricultural products and aquaculture.
It also solves the problems of rural farms with weak infrastructure, and helps them to contact customers.

Assistance to information exchange networks. E-agriculture promotes the development of networks for the exchange of agricultural information and the exchange of knowledge. Example: Online community e-agriculture.org allows practitioners from all over the world to share information with each other.

Value-added services. E-agriculture leads to the development of value-added services for farmers and other participants in the agricultural value chain. Example: The potential number of Agri VAS users is estimated at 80 million users by 2020.

Approximately 50 million users will be in South Asia, and the remaining 30 million in Africa.

Risk mitigation. E-agriculture can be used to reduce uncertainty and increase preparedness and response to climate change, natural disasters and other agricultural risks. Example: Agriculture and Climate Risk Enterprise Ltd. (ACRE) offers indexed crop insurance to farmers in East Africa using Information and Communication Technologies.

Improved food safety and nutrition security. E-agriculture can contribute to improving food management through efficient information flow, data collection and analysis, tracking, transactions and supply chain management. Example: Farmforce is a supply chain management tool that can be used to improve tracking, production and processing management, and compliance.

Product quality control. The use of computer vision to determine the quality of agricultural products. Example: Quality control of oil palm fruits using digitalization elements [11]. The analysis confirms a wide range of directions of digitalization of the agro-industrial complex in other countries, which can be successfully used in the development of the Digital Platform of the agro-industrial complex of the EAEU countries, the Republic of Tajikistan (RT) and the Republic of Uzbekistan (RU).

Digital identity system. *On June 3, 2021, the European Union (EU) announced only its intention to create a digital identity system for citizens,* residents and businesses by 2030 [15]. With the click of a button on the phone, people will be able to transmit digital documents from their wallets associated with their European Digital Identity and verify their identity. They will be able to use their universal digital identification, to be accepted all over Europe, to access online services. The usage of European Digital Identity wallets will be enforced by even more big platforms at user request, such as to verify the user's identity. The user will always have the option to utilize the European Digital Identity wallet. Brussels is negotiating with EU countries to define guidelines on technical standards for the implementation of this component. The EU's single digital wallet is expected to be fully operational in 2022. Such an application will allow EU citizens to gain secure access to a number of private and public services using a single network identifier. The digital wallet will store payment details and passwords and will allow citizens of all 27 EU countries to log in to the web portals of local municipal authorities or pay utility bills using a single verified identification data.

Based on the above, it is obvious that at the moment the EU has not yet implemented a platform for obtaining public services and, as a special case, customs and tax services, the exchange of identification data of animals and plants, food. These services are necessary when creating a Digital Platforms of Commodity Distribution Systems, as an important aspect of export-import relations. The situation is similar with other political and economic inter-country unions. As for countries with a low level of digitalization, Information and Communication Technologies tools are mainly used for farm management and product marketing.

Based on the study of existing platforms, the experience of companies, the technologies and approaches they use, the recommended technologies and platform blocks of the Commodity Distribution System of the EAEU, RT, RU are determined: trading platform; exchange; logistics; insurance; customs procedures; tax procedures; support measures from States and international organizations; lending; leasing; investments.

Due to the specifics of the agro-industrial sector, it is worth paying special attention to the veterinary and phytosanitary aspects of creating an intercountry trading platform.

Conclusion.

1.At the moment, the world community is at the initial stage of creating supranational commodity distribution systems.

2. At the same time, companies that have partially implemented digital trading and logistics platforms, or using other elements that can be used within the framework of this project, are represented on the international market. Therefore, the study of world experience also includes the study of individual, most successful practices and technologies.

3. Based on the study of the world experience of digitalization of agriculture, technologies and platform blocks of the Commodity Distribution System of the EAEU, RT, RU are formulated.

4. The creation of the Digital Platform of the Commodity Distribution System of the EAEU, RT, RU promises great benefits for participants and citizens.

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