

Digital Economy and Digitalization of AIC

E S Ustinovich¹, S V Mamontova¹, M V Kulikov¹

¹Southwestern State University

E-mail: fareastcon2019@gmail.com

Abstract. Today's buzzword is digitalization. It has been going on for several years and covered multiple sectors of economy and manufacturing, from media and tourism to agriculture and healthcare. In 2017, the Russian Federation adopted its Digital Economy State Program, which covers all the major industries.

Russia has always attached importance to researching and partially replicating the positive international experience in ICT, since Russia as a nation has sometimes been 'late to the party' due to social and political transformations that hindered that kind of development.

In this regard, world's leading nations' digitalization experience, in particular that in the agriculture, is of both theoretical and practical significance. This paper summarizes the digitalization of agriculture in the US and some European countries.

1. Introduction

According to Klaus Schwab, the founder and all-time President of the World Economic Forum in Davos, "We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. Or think about the staggering confluence of emerging technology breakthroughs, covering wide-ranging fields such as artificial intelligence (AI), robotics, the internet of things (IoT), autonomous vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage and quantum computing, to name a few." [1]

Global digitalization is indeed a relevant matter.[2,3] 'Smart' technology is everywhere around us, and most people cannot imagine living without the Internet and the various apps and devices they use. Economy has not avoided digitalization either. The leading sectors are IT, media, finance, and insurance. Naturally, digitalization unfolds in any other sector, too, albeit to a lesser extent, and agriculture is no exception. [4]

2. State of the art

This research builds upon the latest research papers of Russian scientists published over the past two years and tackling the problems of digitalization in Russia and worldwide.

3. Research methodology

This research mainly uses comparative analysis.

The agroindustrial complex has traditionally been lagging behind due to its specifics; however, in the context of the Fourth Industrial Revolution, the AIC acquires a new socioeconomic aspect to it. Digital agriculture has virtually eliminated all the risks related to climate, pests, and diseases; it collects readings from sensors and navigators installed in fields and at farms, which greatly cuts its costs; this

means that digital agriculture will soon be able to provide food to the entirety of the world's growing population.

The Russian Ministry of Agriculture has made digitalization of agriculture a separate point on the agenda set forth by the Digital Economy Program, a fact that only proves such digitalization important.[5,6]. Today, only 10% of Russia's arable land is cultivated using digital tech; neglecting it results in a 40% loss in harvest. Russia currently ranks 15th in terms of agricultural digitalization.[7]. This is why it is imperative to analyze the experience of other nations that have been successfully digitalizing their agriculture for years.

Digital farming programs are in place in many countries. Business Insider evaluates the Internet of Things in agriculture. In monetary terms, it alone is worth \$43 million, projected to reach \$75 million by 2020. Today, digitalization of the AIC grows by 22.5% per annum; in seven years, 'smart agriculture' will be worth \$2.6 billion.[8]

Analysis of how agricultural digitalization has unfolded in the world might shock. At the onset of this decade, there were only some 20 companies that supplied innovative products to automate agricultural management; today, the market is divided between 2,000 firms. There emerged AgTech, a special sector that for years has been successfully competing against FinTech for investment.

The United States lead in terms of agricultural digitalization, as nearly half of the country's farms are digitalized; it accounts for more than 40% of the global market. Such major players in the agricultural business as John Deere, Trimble, Iteris Inc. etc make extensive use of a variety of digital technologies, e.g. yield mapping, unmanned (aerial) vehicles, sensors, etc. [9,10]

Germany is Europe's leader in agricultural digitalization. Bundesministerium für Ernährung und Landwirtschaft (BMEL; eng. Federal Ministry for Food and Agriculture) makes a special emphasis on creating an environment that will enable a full digitalization of the agroindustrial complex. The Ministry prioritizes the sector-wide impact of digitalization as well as its equal benefit for farmers, consumers, and environment.

For about twenty years, Germany has been using precision agriculture and smart farm systems. Continuous hardware and software improvement has drastically enhanced the agricultural processes: think of more efficient tractor-to-implement connection or optimal supply chains from the means of production to the foods for the consumer.

In an attempt to analyze the profitability of digitalization for small and medium-sized agricultural enterprises, estimates may vary; this is why the BMEL has cooperated with experts to identify the key focus areas to support agriculture in its ambition to reach a whole new level of technology. The focus areas are: improvement in rural infrastructures; collecting data on geolocation, means of production, and climate; establishing an expert panel responsible for digitalization, which brings together people from the Ministry, entities, and research institutes; setting up experimental fields; and cooperation with the European Union.

Knowledge transfer and managing the available data are at the forefront of this effort. The state's engagement should maximize the useful output of digitalization while minimizing its risks. This will enable Germany's agricultural sector to prosper.[11,12]

An interesting project is taking place in Switzerland, where the state has funded and monitored setting up Europe's first show farm on 75 hectares of land. This is a test-and-trial farm that will experiment with cutting-edge agricultural management automation approaches and analyze how state-of-the-art technology affects the economy, the labor productivity, and the environment. The project will help find out which technologies are efficient and can find use in real-world agriculture and which might need refinement.

Smart Farming is a state program that has been in place in Ireland since 2014. Independent farmers are offered a variety of digital technologies and platforms to reduce costs and environmental damage. At the moment, the Program involves 1,900 farms. In 2017, each of them saved €5,000 on average and consumed 10% less fuel.[8]

The applied aspect of this research lies in a possible reproduction of Europe's positive results when adjusting Russia's digitalization roadmaps applicably to agriculture.

4. Conclusions

Thus, many countries have been rapidly digitalizing their agriculture, and not without success. However, the process might also pose some challenges. ‘Smart’ agriculture generates far less jobs. Thus, any country whose digitalization (including that of the AIC) is at infancy should duly analyze the existing experience.

References

- [1] Schwab K 2017 Fourth Industrial Revolution “Eksmo”
- [2] Ustinovich E S 2018 State policy for the development of the digital economy of Russia *Bulletin of the Southwestern State University Series: History and Law* T 8 **1(26)** pp 112-115
- [3] Ustinovich E S 2017 Digital economy and the new social doctrine *Social policy and social partnership* **7** pp 33-41
- [4] Explanatory note to the proposal on the implementation of the new direction of the program “Digital Economy of the Russian Federation” [https://iotas.ru/files/documents/ Explains the note%20eAGRO%20fin%20000.pdf](https://iotas.ru/files/documents/Explains%20the%20AGRO%20fin%20000.pdf)
- [5] Decree of the Government of the Russian Federation of July 28, 2017 No. 1632-r “Digital Economy of the Russian Federation” <http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf>
- [6] Official website of the Ministry of Agriculture of Russia Electronic Resource <http://mcx.ru/>
- [7] Bauer V P, Podvoisky G L, Kotova N E 2018 Strategies for adapting US companies to digitalize production areas *World of the New Economy* **2** URL: <https://cyberleninka.ru/article/n/strategii-adaptatsii-kompaniy-ssha-k-tsifrovizatsii-sfer-proizvodstva>