

# Digital Economy in Agribusiness

Bogomolova E.A.\*

Crimean Federal University named after V.I. Vernadsky  
Simferopol, Russia  
e-grozdeva@mail.ru

Egorchenko T.I.

Crimean Federal University named after V.I. Vernadsky  
Simferopol, Russia  
egortatyana@mail.ru

Bogdanova Z.A.

Crimean Federal University named after V.I. Vernadsky  
Simferopol, Russia  
janneta\_bogd@mail.ru

Klimenko O.P.

Sevastopol State University  
Sevastopol, Russia  
klimenko.ksu@mail.ru

**Abstract** — The article discusses the process of agriculture' digitalization and a set of tools with which you can significantly reduce the load and increase the efficiency of digitalization. The innovative digital technologies of the 21st century conceal a tremendous potential for economic growth due to accuracy, automation and new management capabilities. The potential of digitalization lies precisely in mitigating targeted conflicts with the possibility of efficient development of production, organization and management processes. This result is achieved on the basis of innovative technologies through the highly specialized and targeted use of appropriate individual resources. The task of the state should be to create the optimal regulatory framework for the development of digitalization and its application. This requires a stable and reliable legal framework, such as an effective and transparent data protection law, as well as patent law. In addition, services that only in the case of their centralized provision with state assistance make economic sense, and support are important state tasks. This includes measures such as stimulating enterprises that introduce innovations, creating a certain data infrastructure, or targeted state support for research and development of a training system for training personnel focused on practice.

**Keywords** — *digitalization, economics, automation, agriculture, agribusiness, AIC.*

## I. INTRODUCTION

Every year the demand for agricultural products increases. By 2025, according to United Nations forecasts, food production will need to increase by 70 %.

The domestic agricultural industry is faced with the task of increasing labor productivity and competitiveness through the application of the latest scientific achievements and best practices.

Developed countries are successfully modernizing their economies, developing innovative technologies at an accelerated pace, where artificial intelligence, automation and digital platforms dominate. By 2020, according to expert forecasts, 25 % of the global economy will switch to the introduction of digitalization technologies that enable the state, business and society to function efficiently.

By order of the Government of the Russian Federation of July 28, 2017 No. 1632-r, the State Program "Digital Economy of the Russian Federation" was approved, which

states: "... digital data is a key factor in production in all areas of socio-economic activity, which increases the country's competitiveness, quality life of citizens, provides economic growth and national sovereignty" [1].

## II. METHODS AND MATERIALS

The first strategic document that determined the direction of the development of the information society in Russia was the Strategy for the Development of the Information Society in the Russian Federation, approved by the President of the Russian Federation. It laid the foundation for the intensive use by government bodies of the Russian Federation, business and citizens of information and communication technologies [3].

Information and communication technologies have a significant impact on the development of traditional industries. The volume of sales of goods and services to Russians using the Internet in 2015 reached the equivalent of 2.3 percent of gross domestic product and has a tendency to increase.

According to the Decree of the President of the Russian Federation of 05/07/2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024", the government was tasked with ensuring the accelerated implementation of digital technologies in the economy and social sphere and creating in the basic sectors of the economy primarily in the manufacturing and agro-industrial complex (AIC), a highly productive sector that is developing on the basis of modern technologies and provided with highly qualified frames [2].

The research methodology is based on an analysis of the processes of digital modernization of the veterinary industry.

## III. RESULTS

In developed countries, more than two decades ago, the introduction of the knowledge economy began. The United Nations Economic Commission for Europe has developed and implemented standards for electronic business turnover, including for the agri-food sector [7].

The Food and Agriculture Organization of the United Nations (FAO) also pays close attention to e-agriculture and digital agriculture. Forums and webinars on e-agriculture are held annually. In 2016, the E-Agriculture Strategy Guide, Piloted in Asia-Pacific countries, was released for the

development of the E-Agriculture Strategy for the countries of the Asia-Pacific region [10].

The purpose of the development of the information and communication infrastructure of the Russian Federation is to provide free access for citizens and organizations, state authorities of the Russian Federation, local authorities to information at all stages of its creation and dissemination [5].

The main directions of development of Russian information and communication technologies, the list of which can be changed as new technologies appear, are:

- a) convergence of communication networks and the creation of new generation communication networks;
- b) processing of large amounts of data;
- c) artificial intelligence;
- d) trusted technologies of electronic identification and authentication, including in the credit and financial sector;
- e) cloud and fog computing;
- f) Internet of things and industrial Internet;
- g) robotics and biotechnology;
- h) radio engineering and electronic component base;
- i) information security [3].

One of the most popular international indices is the Information and Communication Technology (ICT) Development Index. It is a summary assessment of global progress in the development of telecommunications in individual states and regions of the scale of the “digital divide” between developed and developing countries, the potential for ICT development and the degree of their impact on the country's economic growth.

The Russian Federation in 2018 ranked 46th in the Global Innovation Index. [4]

ICT indicators in the structure of the Global Innovation Index for Russia in 2018 were as follows:

- Human capital and science – 22 place
- Business Development – 33rd place
- Development of technology and knowledge economy – 47th place
- Infrastructure – 63 place
- Development of creative activity – 72 place
- Institutes – 74 place [4].

The fundamental trend in the development of agriculture is digitalization, which allows us to increase agricultural production and ensure the profitability of the industry.

The world leaders in the implementation of digital technologies are IT companies, media, finance and insurance. In real production and logistics, the level of digitalization is much lower, and the lowest – in agriculture.

In Canada, the USA, and in the EU countries, a mechanism has been created that encourages enterprises to introduce digital innovations, thereby making it unprofitable [9].

According to the Ministry of Agriculture of the Russian Federation, our country occupies only 15th place in the world in terms of digitalization. [10].

Since Russia is somewhat behind in the pace of digitalization, the process of expanding services and digitalization itself are seen as a mechanism to overcome the digital divide. This is evidenced by the national program “Digital Economy of the Russian Federation”, the main purpose of which is to provide “close digital opportunities” to the population. [1].

The specifics of agriculture’ digitalization is such that information and communication technologies are often inaccessible to residents of small cities and rural areas in the country due to the lack of the same broadband Internet. Although according to the measurement results, in recent years 47 % of the world population has Internet access, in developed countries the number of regular users reaches 89 %, and in Russia this figure is 76 %. According to statistics, in 35 countries, the use of the Internet in rural and sparsely populated areas is significantly lower than in urban areas. It depends on the level of education, income, a high proportion of older people, communication interests, lack of skills in obtaining information services, etc. [5]

One of the directions of development of digitalization of the agro-industrial complex is “Smart Farms”, which can improve animal productivity and product quality. The use of automated systems for feeding, milking and monitoring animal health, according to market experts, can increase milk yield by 30–40 %.

With the introduction of digital technology in agricultural enterprises, real-time information on expenses and income will become available. It becomes possible to optimize administrative costs and staff costs. After the digitalization of the accounting of an agricultural enterprise, there is a significant reduction in the cost of fuel, chemicals, seeds, feed and other items.

It should be noted that different enterprises have their own indicators, but on average, savings are from 10 % and higher. This is due to operational control. Indeed, in agricultural enterprises there is a very large workflow, and given that, as a rule, one agricultural enterprise has several divisions, then the situation here regarding the timely exchange of information is difficult.

Software for accounting and analysis, in this case, a successful tool – this product is specially designed for the characteristics of agricultural enterprises. The program allows you to optimize the costs for three parts, which eliminates this problem – it becomes possible on the spot to find out what actions and which employees led to certain additional costs.

One of the directions of digitalization of agriculture is the automation and implementation of software systems in the veterinary industry.

In our opinion, the digitalization of the veterinary industry should include the following components:

- **Marking.** Physical binding to the animal of a visual or electronic marking tool, the number of which is used to create a unique identification number of the animal in the state accounting system. Basis of accounting and registration. Provides animal identification.
- **Accounting.** Entering into the system complete data on the animal (labeling, vaccinations, disease, productivity, origin, birth of offspring). Provides traceability of the animal from birth to slaughter or disposal, records movements, confirms death. Serves as the basis for monitoring.
- **Registration.** Registration is the basis of accounting. It means the appearance of an animal in a single information space. This is a guarantee of animal health and the possibility of preventing dangerous epizootics. A registered animal is primarily a safe animal. Entering into the system the number of marking means with the subsequent assignment of a unique animal identification number UIN. The concept of 2 codes allows the binding of several numbers of marking means to one UIN, which facilitates the process of re-marking in case of loss or damage of the primary marking means.
- **Identification.** The primary one compares the number of the marking means with the unique number of the animal and fixes the result in the system, the second one compares the number of the marking means with the credentials of the system. Allows you to obtain the necessary information about the animal by entering the number of the marking tool into the system. Identification tools – a pocket personal computer of a veterinarian with a UIN reading system from a visual tag, ear tag, chip; vacuum systems for blood sampling during research; Ultrasound scanners and remote systems for measuring body temperature; mobile printers for printing acts during vaccination and research.
- **Monitoring.** Tracking the state of animal health and well-being of objects of keeping, moving animals and monitoring the epizootic situation in real time. Monitoring the implementation of veterinary and sanitary measures and work processes of the veterinary industry.
- **Automation.** The basis of monitoring, the replacement of routine manual labor with computer technology by creating automated jobs. It ensures the efficiency of the work processes of specialists in the veterinary industry, saves time, effort and money spent on marking, recording, registration and identification of animals.

One of the software packages for digitalization of the veterinary industry, which includes all the above elements, is the RegAgro Automated System for the Registration and Registration of Animals (AS RegAgro). This complex allows you to register, identify and keep records of animals, as well

as use the registration and registration documents available in the system, VAP, veterinary passports and cards in electronic or printed form. Records the history of the animal from birth / purchase to slaughter / disposal. Allows you to automatically generate a single reporting form, sent to the subject veterinary service, higher organizations and departments. Summarizes and compiles summary reports for the district, region, republic, territory, ensures the transfer of veterinary reports.

The unified information space of the RegAgro AS allows you to combine all the subjects of the state veterinary service, agricultural management, agribusiness and animal owners.

Since the system captures all changes that occur with the animal throughout life, this information serves to form a picture of the epizootic situation of a particular region.

The software package, and provides 4 levels of access, designed for the heads of the veterinary service, epizootologists, veterinarians (stationary and mobile application of the veterinarian). This approach makes it possible to control the epizootic situation and respond quickly to its changes.

The main advantage of this system is that it reduces the load on veterinarians and the digitalization efficiency using RegAgro AS is quite high. Thanks to the use of the system, veterinarians, epizootologists, heads of veterinary departments, representatives of the agro-industrial complex, village councils are involved in the general information field. Digitalization helps to save hundreds of hours of work, which has become possible to redirect solving more pressing problems. An important factor for ensuring the success of digitalization is that from the end of 2019, the Bashkir State Agrarian University will begin to graduate veterinary specialists trained to work in the animal registration and registration system.

Bashkir State Agrarian University is one of the leading veterinary universities in the country, whose history spans nearly 90 years. Priority is given to innovative technologies introduced in veterinary medicine and agriculture.

Mastering modern digital technologies requires specialized knowledge and skills of general veterinarians, epizootologists and specialists involved in veterinary and sanitary expertise. This knowledge should be obtained by students during their studies at the university.

The automated system of registration and registration of farm animals "Regagro" is used in the educational process of students of the faculty of biotechnology and veterinary medicine, providing practical and theoretical training for working in a digitalized space.

The Republic of Bashkortostan is the leader and the first region in which the RegAgro AS with full functionality has been introduced. The region is a large agricultural subject, the number of cattle as of January 1, 2019 is about 1 million heads, small cattle – 850 thousand heads, 470 thousand heads of pigs and 125 thousand horses, the number of bee families is 335 thousand in volume Our gross agricultural output our republic takes 7th place in the Russian Federation. The basis of safety and the key to successful prevention of diseases and

their introduction into the territory of the region is accounting and registration of animals. The registration of animals implies labeling of animals and their registration in a single information system, which will allow veterinarians to track any movement of animals and register newly arrived animals on their territory. It is AS “RegAgro” that allows you to create a single information field for livestock accounting with rural settlements. Get away from the imbalance of actual and statistical data.

As of 12.01.2019, the RegAgro Automated System for Registration and Registration of Farm Animals was identified and entered into:

- Cattle – 771895 heads, which is – 78 %
- Small cattle – 485738 heads, which is – 62 %
- Pigs (personal subsidiary plot) – 32754 heads, which is – 78 %
- Horses – 52515 heads, which is – 44 %
- Bee families – 1801 – 0.5 %

As a result of the introduction of this system, it became possible to trace the origin of products from the manufacturer to the counter. It is possible to associate the animal code with the code on the product packaging, having scanned which you can see where the product was produced, where it came from, what events were carried out with these animals.

#### IV. CONCLUSION

AS “RegAgro” creates a single regional information space that provides quick access to accounting and registration data, planning and conducting veterinary measures, tracking the epizootic situation in each district and in the whole controlled territory. The software package provides for the use of visual, electronic and mixed marking tools that meet international requirements for registration and registration of farm and domestic animals, as well as issue registration numbers issued by the state authority in the field of veterinary medicine.

Digitalization tools for the veterinary service should be:

1. Pilot implementation in several active areas.
2. Approval of regional regulatory documents governing the implementation of digitalization in the region.

3. Conducting a round table with all the responsible departments, services of the Ministry of Agriculture, FSVPS and the Department of Veterinary Medicine for the integrated interagency integration of the provisions of the centralized laboratory.

4. Creating a unified technical support service and chat system.

5. Implementation of the KPI system and incentives for achieving digitalization indicators.

#### References

- [1] Order of the Government of the Russian Federation of 28 July 2017, no. 1632-r. State program “Digital Economy of the Russian Federation” of the economy. Retrieved from: <http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf>
- [2] Decree of the President of the Russian Federation of 05.07.2018, no. 204. “On national goals and strategic objectives of the development of the Russian Federation for the period until 2024” of the economy. Retrieved from: [https://www.gks.ru/free\\_doc/new\\_site/figure/ukaz\\_204.pdf](https://www.gks.ru/free_doc/new_site/figure/ukaz_204.pdf)
- [3] Decree of the President of the Russian Federation of 9 May 2017, no. 203. “On the Strategy for the Development of the Information Society in the Russian Federation for 2017–2030” of the economy. Retrieved from: <https://www.garant.ru/products/ipo/prime/doc/71570570/>
- [4] Digital economy: 2019: a brief statistical digest of the economy. Retrieved from: <https://www.tambov.gov.ru/site/it/files/doc/satisticheskij-sbornik.pdf>
- [5] Digitalization in small and medium-sized cities of Russia. Retrieved from: [www.hse.ru.2018-06-GSU-HSE-press\\_v6.pdf](http://www.hse.ru/2018-06-GSU-HSE-press_v6.pdf)
- [6] Innovative technologies for the future of agriculture. Retrieved from: <https://www.agritechnica.com/fileadmin/downloads/2017/>
- [7] Implementing UN/CEFACT e-Business standards in Agricultural Trade. Official Website of United Nations Economic Commission for Europe. Retrieved from: <https://www.unece.org>
- [8] Food and Agriculture Organization of the United Nations. Official Website of Food and Agricultural Organization of the United Nations. Retrieved from: <http://www.fao.org/3Za-i5564e.pdf>
- [9] L.V. Tyu, “The conceptual framework for effective investment in updating the fixed capital of agriculture in Siberia”, p. 381, 2013, Coll. of sci. reports Agricultural science – agricultural production in Mongolia, the Siberian region, Kazakhstan and Bulgaria [16th Int. Sci. and Pract. Conf.].
- [10] Digital technology comes into agriculture. Agricultural News. Retrieved from: <https://agri-news.ru/novosti/crifrovyye-texnologii-prixodyat-v-selskoe-kozyajstvo.html>