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Issues of Using Digital Technologies in Agro-Industrial Complex

Ildar Begishev[1,*], *Albina* Shutova[1], *Diana* Bersei[2], *Dmitry* Burkin[2], *Arsen* Zatikyan[2], and *Violetta* Gulakova[3]

[1]Institute of Digital Technologies and Law, Kazan Innovative University named after V.G. Timiryasov, Kazan, Russia
[2]Department of Criminal Law and Procedure, North-Caucasus Federal University, Stavropol, Russia
[3]Departments of Criminal Law, North-West Institute of Management of RANEPA, Saint Petersburg, Russia

Abstract. Digital technologies are actively used in the agro-industrial sector and their use will grow. However, at the moment there is a problematic situation when the term "digital technologies" is actively used in legislation but has no definition. This causes many problems and questions related to distinguishing them from information, information-telecommunication and other technologies, as well as their role and understanding in the system of social relations. This is what the presented publication is devoted to: the formation of conceptual and categorical apparatus in the field of digital technologies.

1 Introduction

The agro-industrial sector (hereinafter – AIS) in Russia has reached a certain maturity, as evidenced by the growth in the volume and quality of application of modern digital technologies, including artificial intelligence systems, robotics and other innovative solutions in the industry. Today, agriculture ranks fourth in terms of prospects for the introduction of new technologies, following construction, insurance, and trade [1]. In 2024, Russia announced the creation of a state information system of digital services in the agro-industrial complex [2]. In the Russian regions, companies already widely use the latest artificial intelligence technologies, monitoring crop with drones and satellites and creating digital twins of fields [3]. Hence, one may note that their introduction into the sector is continuing. At the moment, large scientific and representative events dedicated to the digitalization of the agro-industrial complex are being held. At the Kazan Digital Week forum (Republic of Tatarstan), about half of the exhibition was devoted to AgroTech [4], which also indicates the significance of the presented research topic and its prospects.

The degree of implementation of digital technologies in the agro-industrial sector determines, among other things, the national interests of the country, its place in the global political arena, and its national sovereignty and security in general. Under the sanctions pressure, import substitution of technologies is an important and promising area of the state

* Corresponding author: begishev.i.r@yandex.ru

activity. As a result of the sanctions pressure of Western countries there appeared a need for import substitution of certain types of digital technologies [5]. Restrictions on supplies of agricultural machinery from Western countries are an argument in support of the development of own technologies and innovations necessary to increase labor productivity [6].

However, at the moment there is a problematic situation due to the fact that the term “digital technologies” is actively used in legislation, but does not have a definition, which causes a lot of problems and questions related to distinguishing them from information, information-telecommunication and other technologies, their role and understanding in the system of social relations. Hence, the issues of formation of conceptual and categorical apparatus in the field of digital technologies should be given more importance and attention. That is why the studies devoted to the interpretation of concepts in the field of digital law seem very relevant [7].

2 Materials and Methods

Modern digital technologies are spreading rapidly, and today it is very difficult to find devices without built-in digital services. These technologies and artificial intelligence are used in solving various tasks, and the "digit" becomes an integral part of our daily life, especially in a situation where conditions push for more intensive use of it.

In Russia, not many digital technology experts work at agricultural enterprises. Large agricultural holdings are mainly engaged in digitalization, and small and medium-sized enterprises almost do not implement digital technologies. The focus is on the point-to-point implementation of ready-made solutions. In addition, innovations usually relate to production, and not to the processes of processing and selling products.

In the research, the general scientific (analysis, synthesis, induction, deduction, classification, concretization) and specific scientific methods of cognition were used.

3 Results and Discussion

The development of the digital economy has influenced the need for the development of digital technologies, which has become one of the most important areas of national security of the state [8, 9]. In this regard, a significant number of laws and bylaws were adopted, strategies and concepts for the development of certain digital innovations were approved [10, 11]. This demonstrates their importance and the fact that the legal foundations for the creation (development) and application (use) of digital technologies in Russia have already been established.

In the agro-industrial sector, digital technologies are implemented as follows:

digital innovations help to measure and communicate parameters of soil, plants, microclimate, etc.;

digital technologies help farmers to determine the best time for planting or harvesting, calculate fertilizing plan, and forecast the yield;

unmanned systems produced by Zala Aero, a company of the Kalashnikov Group, are used for aerial photography of agricultural lands.

The characteristic features of the new approach are:

– recognition of the public-legal nature of relations formed in the sphere of application of digital technologies;

– connection between digital technologies, digital rights, and the digital environment.

This is why we may state the fact that the recent progress of digital technologies is changing the concept of the traditional agro-industrial sector.

We believe that the existing digital technologies used in the agro-industrial complex should be divided into groups, based on the degree of their mastering and implementation:

– those being implemented now (artificial intelligence technologies, robotics, Internet of Things, etc.);

– those to be implemented in the foreseeable future (quantum computing, office robots, etc.).

One may state that the definition of the “digital technologies” concept is not registered in the current Russian legislation.

These technologies are called “cross-cutting” because:

– they have a significant impact on the market development;

– they have huge prospects;

– they cover several trends and industries (not related to a single sphere of human activity) due to their universality.

Having summarized the available literature regarding the technology concept and features, we may point out that it is characterized by:

– a set of methods and processes;

– the methods and processes are optimized;

– the methods and processes are applied repeatedly and therefore simplified.

Hence, despite the absence of a legal definition of digital technology, it is actively used in normative legal acts.

A similar interpretation which defines digital technologies as:

“the concept used in three main categories:

gradually implemented (digital education, digital platforms, marketing integration, smart assistants (chatbots), mobile payments);

breakthrough (wireless communication)

technologies of the nearest future (office robots, quantum computing, directive analytics, cryptocurrency).

Digital technologies are planned to be used in the Russian Federation in the following directions:

state regulation (legislative consolidation of the main concepts and principles of the digital economy regulation, responsibilities of the main participants of economic activity);

information infrastructure (increasing the growth in the number of patents for inventions in the field of information technologies)” .

In this case, we consider the validity of a limited list of technologies, some of which are essentially unclear.

The draft law dated March 28, 2018 04.02.03-18/00079428 makes an attempt to define the “digital platform” concept as the infrastructure for interaction between sellers and buyers located in the Internet information-communication network.

Legal doctrine has not developed an unambiguous approach to the correlation between “digital technologies” and “information”, “computer”, or “information and communication” ones.

At the same time, the first group of researchers believe that the concept of digital technologies is synonymous with the term “information technologies”. Undoubtedly, both digital and information technologies deal with information (data).

However, information technologies include all technologies related to information exchange, even the simplest ones, such as traffic lights that indicate when pedestrians may cross the road; in turn, the service that allows tracking if the road is blocked and how much time it will take to move from point A to point B is a full-fledged digital technology. At the same time, a type of information technology is computer technology, in which information processing and all information processes are carried out with the help of computer devices.

The second group of researchers consider the concept of “digital technologies” to be broader than the concept of “information and communication technologies”.

In turn, V. E. Burdin, Yu. N. Egorov, Yu. I. Somov and A. N. Yatsushko point out that digital technologies are broad in their content and include both information and information-communication ones [2].

We believe that it is necessary to distinguish between digital and information technologies, especially in light of the development and transformation of digital law and digitalization of all aspects of public life. At the same time, digital technologies are a broader sphere than information technologies, i.e. the former are a part of the latter. At the same time, any information technology is a part of digital technology, but not vice versa. Their difference is due to the technological evolutionary development of society and the universal digitalization of all aspects of society. The circulation of digital data is based on a different approach than information technologies: on the application of digital technologies rather than information ones. Digital technologies are characterized by the fact that they provide information in a digital form, that is, information is “digitized”. It is digital technologies that allow creating, distributing, storing and otherwise transforming data, and it is such methods that allow storing large amounts of data.

Whereas information technology is methods and techniques that are based specifically on the actions aimed at processing information using electronic computing machines, including computers, then digital technology is a field that includes both information and other technologies related to the digital processing of information.

In addition, information technologies include technologies such as software, databases, communication networks, and cloud technologies, while digital technologies may include areas such as digital manufacturing, digital design, digital medicine, digital engineering, etc. Digital technologies utilize a diverse range of products, including mobile applications, software, and online platforms that are designed to assist patients in the health care system.

At the same time, information technology can also process digital information, but unlike with digital technologies, it is more often transmitted via communication networks [8].

We believe that there is a need to form a separate regulatory framework dedicated to digital information and digital technologies, their typology, and conceptual and categorical apparatus. Such a proposal can be realized at the level of:

– a separate special normative legal act;

– advisory amendments to the legislation on information and information technologies;

– a Digital Code of the Russian Federation.

The closest to information technologies is the term information and communication technologies, which is understood as “a set of information technologies, information systems and information-telecommunication networks necessary for...”. Such technologies are part of information technologies that organize communication and access to it at any time in all spheres of life.

That is why one may state that the “information technology” concept is more general and includes both information and communication technologies and computer technologies.

In addition, the doctrine generally recognizes that blockchain, smart contracts, artificial intelligence and “big data” , robot-surgeons are new digital technologies .

The doctrine has developed the following definitions of “digital technologies”:

B. Blazheev and M. A. Egorova identify the types of digital technologies forming a set of the above-listed categories (robotics, artificial intelligence, the Internet of Things), while highlighting only one characteristic feature – the ability to process data.

The doctrine also makes attempts to interpret the definition of “digital technologies”, which is understood as:

– a certain set (of systems and devices);

– created with the help of computer technology;

– equipped with software;
– designed for data processing;
– used for a variety of functions;
– contributing to productivity;
– using electronic computer hardware to record code impulses;
– unlike analog ones, working with discrete rather than continuous signals (the way signals are transmitted).

M. K. Afanasyeva believes that digital information is a type of scientific and technical data required for the development, production or use of goods. At the same time, she believes that the difference between digital and non-digital technology is in the content.

Digital technologies have the following defining characteristics that make them unique and distinguish them from other technologies, including information ones:

digital technologies are a result of human intellectual activity;

digital technologies use special means and methods of innovation processes; they are a result of innovative activity (digital technology is innovative in relation to information technology). For example, unlike information technology, such digital technology as generative artificial intelligence may help to create new types of materials, chips and parts, using its functionality in order to create synthetic data;

digital technologies are based on the digital representation of data, which allows separating data from devices. The functioning of digital technologies is based on the processes of storage, processing and transmission of digital information, i.e. it realizes the entire functionality of computing devices.

4 Conclusion

The above allows concluding that the “digital technologies” concept is different in scope (compared to the categories of “information technologies” and derivatives thereof). However, the current legislation, including the recently adopted one, more often uses the “digital technologies” concept in documents of strategic nature.

We propose supplementing the current legislation with the definition of the “digital technologies” concept in the following wording:

“Digital technologies are systems, equipment and processes that utilize digital data to achieve a certain result”. Today, digitalization is a vector of development of the agro-industrial complex, the quality of which will determine the development of the entire industry.

In addition, the development and transformation of the agro-industrial sector is impossible without a proper conceptual and categorical apparatus, which contributes to the understanding of the legal nature of technology and distinguishing digital technologies from information ones.

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