About models of agriculture digital transformation

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Abstract. The task of agriculture digital transformation is one of the priority tasks for the development of the country's agri-food system. A significant level of agricultural producers’ differentiation in terms of the technical, technological and informational development level, in terms of financial capabilities and the resource quality provision give rise to the presence of many constraints on the mass use processes in the agricultural sector and the agriculture digital transformation as the branch of social production. In these conditions, there is an objective need to substantiate the agriculture digital transformation several models, which allow to take into account the level of individual economic entities readiness for digitalization, as well as the planned scale of their production systems transformation, the transformation processes speed and depth. The assessment of the economic entities readiness in the agricultural sector allows to talk about the complex and fragmented digitalization models, each of them will have several varieties due to differences in the digital transformation strategy.

1. Introduction
The evolution of economic systems is associated with the fact that at its individual stages new factors appear that determine not only new directions of their development, but also those changes in the productive forces of society and production relations, which necessitate the transformation of not only individual economic entities, but also the social production entire system. At the present stage of society development, digital technologies became such a factor.

The conditions necessary for initiating the economic systems digital transformation processes were formed, on the one hand, against the background of the increase in all human activity spheres informatization rate, the information infrastructure development and the information transformation into one of the production main factors, and on the other hand, as the result of the new digital technologies emergence, allowing to fundamentally change not only the process of production, exchange, distribution and consumption of economic benefits, but also the system of intersubjective interactions [1-11].

It became obvious that the transition to digital technologies allows to obtain sustainable competitive advantages and integrate into digital ecosystems, which are a new form of economic entities integration. At the same time, the subject's inability to master digital technologies can become a serious constraint on its development due to its exclusion from the system of digital interactions.
2. Materials and methods
The research is based on the generalization of methodological approaches to understanding the agriculture digital transformation processes and the study of the institutional conditions for the economic systems digital development.

3. Results and Discussion
In modern economic literature, discussions regarding the the category “digital economy” content continue. Some researchers regard the digital economy as the economy of digital interactions, while others consider it as a global market that is being formed within the framework of a single information space; third ones consider it as a set of digital technologies used to produce economic benefits, fourth ones - as a special digital environment that allows transforming productive forces and production relations, fifth ones - as a fundamentally new way of creating added value, sixth ones - as the way of organizing economic systems based on digitalization of all intrasystem processes, etc.

In our opinion, the digital economy should be considered as a special stage in the development of the economic system, characterized by the widespread use of digital technologies and the transition to new models of intersubjective interactions that determine fundamental changes in the entire paradigm of the social production system evolutionary transformations. It should be noted that digital transformation does not lead to the change in the essence of the economy itself as a set of production and production relations means, but at the same time the structure of production means, the subsystem of infrastructural support and the set of technologies for creating economic benefits change.

Agriculture is traditionally referred to as industries with a relatively low level of technological development. For a long time, the technological lack was manifested in a high proportion of manual labor used in agricultural production, and now it manifests itself in a low level of technological processes informatization and their management. In addition to the industry technical and technological development low level, the main factors limiting the agriculture digital transformation possibilities include factors related to the characteristics of the industry (the need for constant interaction with land and objects of biological nature, dependence on climatic conditions, long length of production cycles, their asynchrony and uneven flow, spatial dispersal of influence objects, etc.), with the peculiarities of the rural areas development (difficult demographic situation, relatively low level of entrepreneurial activity, certain conservatism of rural population thinking and radical changes fear, critically low level of IT training, etc.); with the peculiarities of information support for agriculture and rural areas (low level of information infrastructure development, agricultural production informatization and its management, lack of digital production technologies accessible use, low level of state support for agriculture digital modernization, etc.).

There is a significant differentiation of economic entities in the agricultural sector in terms of the readiness level to initiate digital transformation processes. If large producers of agricultural products, primarily integrated agro-industrial formations, already quite widely use individual digital technologies (precision farming systems, digital field maps, digital identification of animals, robotic farms, "smart" irrigation systems, the use of unmanned aerial vehicles, geographic information systems, satellite monitoring technologies, etc.), then digitalization is still inaccessible for representatives of small and medium agribusiness. At the same time, even large agribusiness entities face certain problems when developing a digital transformation strategy and choosing a model for its implementation.

It is proposed to understand the digital transformation model as the way of organizing the digital technologies introduction, integrating the economic system into a single information space and digitalizing intersubjective and intrasystem interactions. The model is the way of describing the methodology for implementing a digital development strategy and the action plan to achieve the digital transformation goals.

The study of the digital development processes essence suggests that there are two main types of models for agroeconomic systems digital transformation: a complex model and a fragmented transformation model.
The complex digital transformation model involves the massive digital technologies applimentation in all areas of economic systems and the new business development model formation that ensures the modernization of the agroeconomic system technical and technological basis, the mechanism of interaction with counterparties and integration into added value chains. This model can be applied by the agricultural sector financially stable economic entities with adequate resource potential (including personnel of the required qualifications), the necessary level of technological development and informatization, and a sufficiently developed information infrastructure. An indispensable condition for the comprehensive digital transformation model application is the availability of a universal digital platform that allows to provide a common integrated environment for the use of individual services and private digital solutions used to solve the agroeconomic systems development individual problems and their interaction with subjects of the agri-food complex.

As the basic functions of the universal digital platform and the services that form it, one can distinguish: the software systems base formation for solving typical and unique tasks of agricultural production, models and algorithms base for solving managerial problems, integration into a single information space and digital ecosystems, ensuring intra- and inter-platform interactions, maintaining the required level of information security, etc.

The fragmented digital transformation model is associated with the digitalization of individual industries, technological processes or operations, and the tasks of managing agricultural production. This model is based on the principle of a task-based solution to the problem of digital technologies application based on the economic entity financial capabilities and its readiness for digital transformation processes. It should be noted that this development model can be implemented both in the process of passive transformation (digital information processes are initiated, for example, by the state, and an economic entity is forced to apply digital technologies under the pressure from outside), and in the form of a perceived need due to the economic feasibility of digitalization of its activities. This model application does not require the use of a universal platform and allows the use of software products and digital solutions wide variety, but this raises the problem of information technology compatibility and data exchange between different applications. This model use can create additional difficulties in the transition to an integrated digital transformation model and the universal digital platform use.

The depth and speed of transformation processes can be singled out as the models and complex and digital transformation essential characteristics. The depth of transformation processes refers to the level of digital technologies penetration into individual production and management processes, and speed refers to the digital transformations intensity, reflecting the time during which it is planned to transform an individual process or a set of processes.

In addition, the possibility of implementing a specific model of digital transformation is determined by the quality of the institutional environment, which forms the regulatory framework and economic entities behavior rules in a single information space, mechanisms for ensuring information security and regulations for digital interactions of digital economy subjects.

4. Conclusion
The problem of choosing a digital transformation model belongs to the level of strategic management and requires a serious study of the economic entity digital development very strategy or a higher-level economic system.

The agriculture digitalization success is determined not only by the readiness of the agricultural sector economic entities themselves to initiate digital transformation processes, but also by the institutional environment quality, as well as the social production informatization achieved level, the staffing system development for digital transformations, the state interest and high-tech industries in eliminating digital inequality, goals commonality and all digital economy subjects interests.

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