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CONCEPTUAL APPROACHES TO INFORMATION TRANSFORMATION (DIGITALIZATION) OF AN AGRICULTURAL ENTERPRISE

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Abstract

In this article, we investigate classical and modern approaches to the formation of a scientifically grounded concept of information transformation based on the digitalization of a typical agricultural enterprise. In the context of weakening financial stability and a shortage of resources, the potential for lockdowns and quarantine restrictions, profitable operation of an agricultural enterprise is not possible without comprehensive automation and digitalization. In most cases, the introduction of digital technologies into real agricultural production is spontaneous and often intuitive, the "digital business model" in our view is a complex model of digital technological and management processes of an enterprise that characterizes the production, technological, innovation, financial and marketing strategies of the enterprise. in the process of creating added value of manufactured products, expressed in the form of a digital database and presented in the form of an information flow on a digital medium. We show that digitalization is not effective without full-fledged strategic planning and building a digital business model of an agricultural enterprise. Moreover, the classical approach to modeling may not be applicable, and the author's concept of building an integrated digital business model is preferable.

Key words**:** *agriculture, digitalization, full-fledged model, digital business model, concept*

INTRODUCTION

For a long time, traditional systems of social production have contained a specific set of elements that make up the essence of the process. For agriculture, the objects of production are land, production assets, means of production, farm animals. However, the stage of development of scientific and technological progress dictates new conditions in which information and information (digital) technologies become the key object [5]. Currently, it is impossible to imagine or simulate an economic entity in an information (digital) vacuum and conducting economic activities in a completely isolated and autonomous manner.

This is primarily due to the fact that information (digital) technologies over the past thirty years have become an integral part of all spheres of economic activity and are deeply integrated into each of their elements [1, 3]. And even the land, as the most traditional of the production facilities, gradually transformed into a “digital land.” For the first time, this concept was formed in 1998 and is an expanded concept of “point farming”, which is based on the digitalization of geodetic data and the formation of a full-fledged three-dimensional digital model of a specific territory. Digitization in this context is an important agricultural risk management tool that can help assess the risks associated with climate change, develop an income protection plan for producers, and ensure soil quality [2].

Technological processes in the sectors of the agro-industrial complex have also, in turn, been affected by digital technologies. Agricultural machinery is currently a complex

information technology system that combines colossal production capacities and sophisticated information and digital control modules, which has made it possible to increase labor productivity in agriculture several times over the past 30 years.

Speaking about the processes of informatization and digitalization, it is impossible to ignore the process of managing agro-industrial production. Currently, digital technologies have become mandatory for use and these norms are enshrined in the relevant regulatory legal acts. Digitalization through computerization of management has led to the introduction of dozens of computer programs into the process of economic management, facilitating and accelerating processes such as accounting and reporting, drawing up technological maps, monitoring of control and supervisory bodies, control of technological processes, GIS monitoring, etc.

In connection with the above, it is objective to assume that a modern agro-industrial enterprise is digital. Accordingly, the business model used in the strategic management process at the planning and organization stages will also be digital.

Therefore, the companies and clusters developing business in agriculture will benefit of digitalization and information technologies for strengthening agricultural production and its efficiency either in the classic system or organic agriculture [8, 11].

However, this raises the actual problem of the use of terminology. There is currently no generally accepted meaning of the digital business model. Accordingly, there are discrepancies and difficulties in the process of perception of information and implementation of scientific and technical support of the industry.

MATERIALS AND METHODS

In the course of our research, we studied various approaches to understanding the concept of "digital business model". Samuel Shen, Alan Bassist and Allan Howard [12] in the context of digital agriculture define a digital model as a set of digital databases (climatic, landscape, parametric, soil, etc.) that allow business entities to make better management, production and marketing decisions.

Linder and Cantrell [6], in the context of general business modeling, define the digital business model as a digitized system that defines the logic of an organization to create value and add value.

Venkatraman and Henderson [13], in turn, envision a digital business model as a digital strategy that reflects the architecture of a virtual organization in three main areas: customer interaction, asset configuration, and knowledge utilization.

Osterwalder [9, 10] believes that the digital business model is a conceptual tool that contains a set of digital elements and their interrelationships and allows you to express the business logic of a particular firm. It is a digital mapping of the value that a company offers to one or more customer segments, as well as the technology architecture of the firm and its network of partners to create, market and deliver that value relationship capital to generate profitable and sustainable revenue streams.

Medennikov V.I. [7] in his works defines the business model of the agro-industrial complex as a transformed digital model of databases within a specific digital platform.

Filonenko [4] offers an interpretation of the digital business model in the agro-industrial complex as a model of a digital platform, taking into account the structure of the agro-industrial complex of the region and contributing to the active introduction of advanced information technologies in the activities of small and medium-sized agricultural producers.

As a result, there is an objective uncertainty of perception and approaches to understanding the concept of “digital business model” of an agro-industrial complex enterprise. Domestic approaches are based on business digitalization and further modeling, while in foreign practice the concept of modeling business processes in a digital format is accepted.

The presented review confirms the existence of a significant segment of scientific literature devoted to the development of digital business modeling. Nevertheless, in various sources, there is often an objective uncertainty of perception and approaches to understanding the concept of a “digital business model” of an

agro-industrial complex enterprise. Russian approaches are based on business digitalization and further modeling, while in world practice the concept of modeling business processes in a digital format is accepted.

In preparing the article, the data of the Federal State Statistics Service (Rosstat), scientific works of Russian and world scientists on the topic under study, materials of research institutions were used. The objects of research are typical enterprises, the strategy of which is based on the principles of digital modeling and business digitalization. When studying the theoretical and methodological aspects of digitalization, monographic and logical methods were used. The development of a methodology for identifying methodological foundations was carried out using abstract-logical and computational-constructive methods, the method of paired comparisons.

RESULTS AND DISCUSSIONS

Having summarized and studied in detail the scientific experience, we propose the following definition: a digital business model is a complex model of digital technological and management processes of an enterprise that characterizes the production, technological, innovative, financial and marketing strategies of an enterprise in the process of creating added value for manufactured products, expressed in the form digital database and presented in the form of information flow on a digital medium.

Thus, the above definition removes the problem of terminological discrepancy, generalizes domestic and international experience and allows you to take into account various aspects of scientific, technical and digital progress in the process of enterprise modeling.

Based on the proposed definition, it becomes obvious the need to develop conceptual provisions for the digital modeling process, taking into account the prospects of digital solutions implemented in the process of managing an agro-industrial complex enterprise.

The formation of a digital business model provides for mechanisms for regulating the integration of production, management and digital technologies:

- definition of a long-term goal;
- development of a promising digital production program;
- substantiation of the organizational structure and management structure;
- establishing the form of inter-economic economic relations;
- introduction of an effective planning, accounting and control system;
- determination of the directions of marketing policy.

The methodological foundations for developing the concept of creating a digital business model are:

- the irreversible nature of evolutionary changes in the agrarian economy, since the evolution of productive forces and production relations excludes an absolute repetition of the path traveled;
- convergence associated with the need to converge agricultural production and digital technologies, due to the presence of common objective patterns of development;
- adaptation of agricultural production to the laws of a market economy based on taking into account the specific features of agricultural production, observing the laws and principles of its organization and creating conditions for their implementation;
- an integrated, systematic approach to digital integration with the aim of efficient use of land, labor, production, material and technical, financial, innovative and digital resources;
- gradual and phased development of the integration of participants in agro-industrial production into the digital environment for the full creation of an interconnected economic mechanism of management;
- the unity of the requirements of the laws of the market both at the level of the digital model and at the level of physical production, and at the level of enterprise management;
- maximum coverage of all areas of the enterprise with a digital model, ensuring its well-coordinated work, allowing to assess potential risks, critically assess promising results, and achieve high production indicators.

In practice, the implementation of the above methodological provisions depends on the well-coordinated interaction of the elements of the digital model. The system of internal and external factors influencing the formation of the model is shown in Fig. 1.

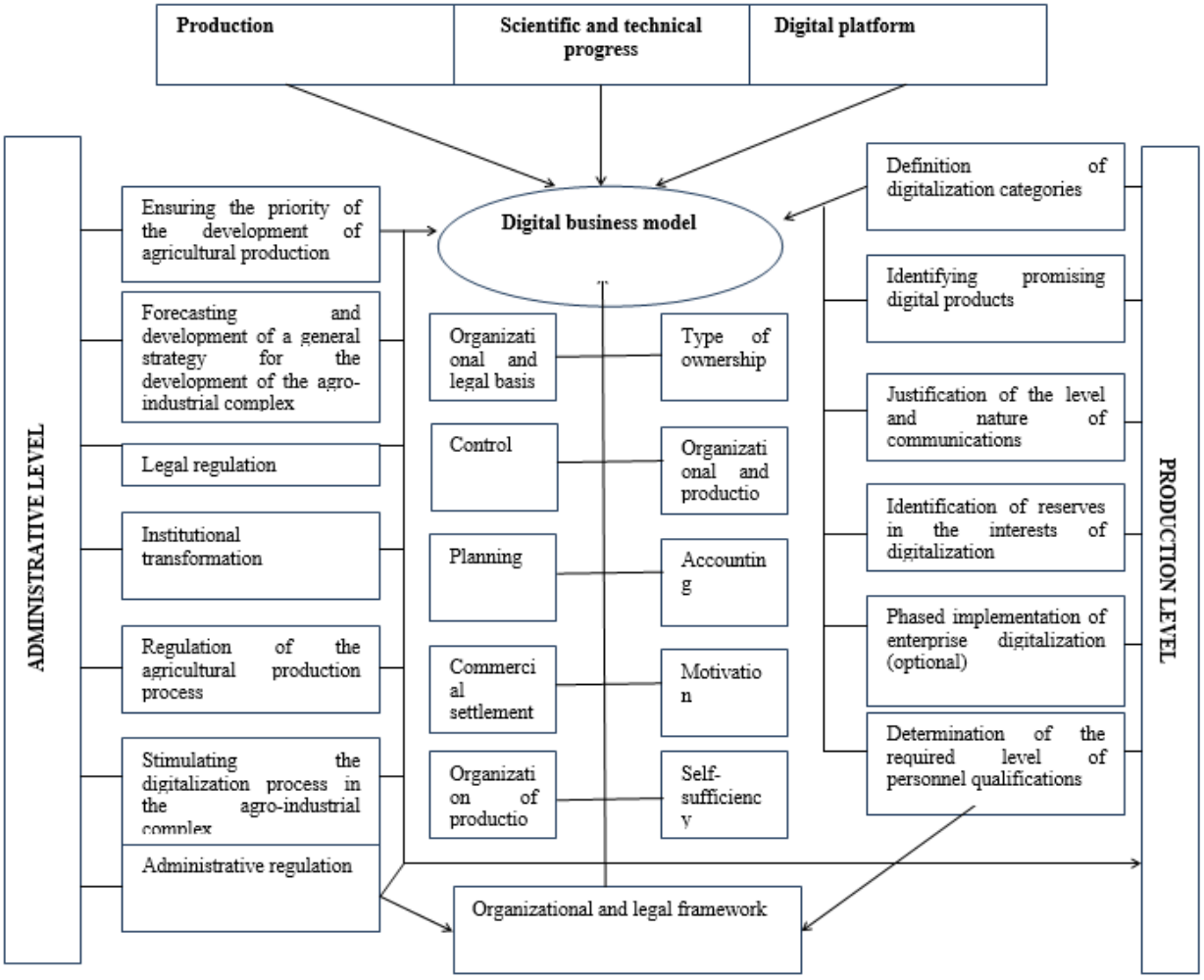

Fig. 1. Conceptual framework for the formation of a digital business model of an agro-industrial complex enterprise
Source: Developed by the authors.

External conditions act as objective factors of the digital business model. They are determined by specific measures implemented at the administrative and production levels. External conditions and the actions they define at the administrative level include:
- ensuring the priority of the development of agricultural production;
- forecasting and development of a general strategy for the development of the agro-industrial complex;
- legal regulation;
- institutional transformations;
- regulation of the process of agricultural production;
- stimulating the process of digitalization of the agro-industrial complex;
-administrative regulation.

At the production level, measures to shape the digital business model are:
- definition of categories of digitalization;
- identification of promising digital products;
- substantiation of the level and nature of communications;
- identification of reserves in the interests of digitalization;
- phased implementation of enterprise digitalization (optional);
- determination of the required level of personnel qualifications.

The formation of a digital business model will depend on the regulation of the level of digitalization within the enterprise, on the mechanism of integration into general economic

digital systems and the tools of the digital platform. In this regard, it is necessary to develop a step-by-step methodology for creating a digital business model of an agro-industrial complex enterprise.

The internal conditions include a set of measures of the microeconomic level, which is carried out directly by the enterprise, or among the founders (if the enterprise has not yet been created). In a crisis, financial deficit and a difficult market environment, well-coordinated interaction of the subjects of modeling and complete interrelationship will be the main and decisive factor in effective modeling.

Conceptual features of digital business modeling of an agro-industrial complex, in our opinion, should be as follows:

- total digitalization of production, land and property;
- the distribution of uniform principles for organizing digital interaction for all business processes;
- the need to constantly assess the effectiveness of the implementation of digital technologies by a set of indicators that characterize the enterprise as a whole;
- organizing the activities of each area of the enterprise on the basis of a general digital business plan;
- coordination and coordination of the work of the industries of the enterprise on the basis of a single digital platform;
- a high degree of independence and responsibility of the management bodies of the enterprise for the final results of activities and the level of proficiency in digital tools;
- creating an optimal level of digitalization for all industries, providing the necessary degree of technological and managerial consistency.

In this regard, it is necessary to develop a general digital model of the agro-industrial complex, taking into account the private models of all its industries. The model of each industry, in turn, should be justified in terms of its structure, composition of participants and level of digitalization.

The analysis of the above factors allowed us to formulate the main conceptual provisions of digital business modeling, which are shown in Fig. 2.

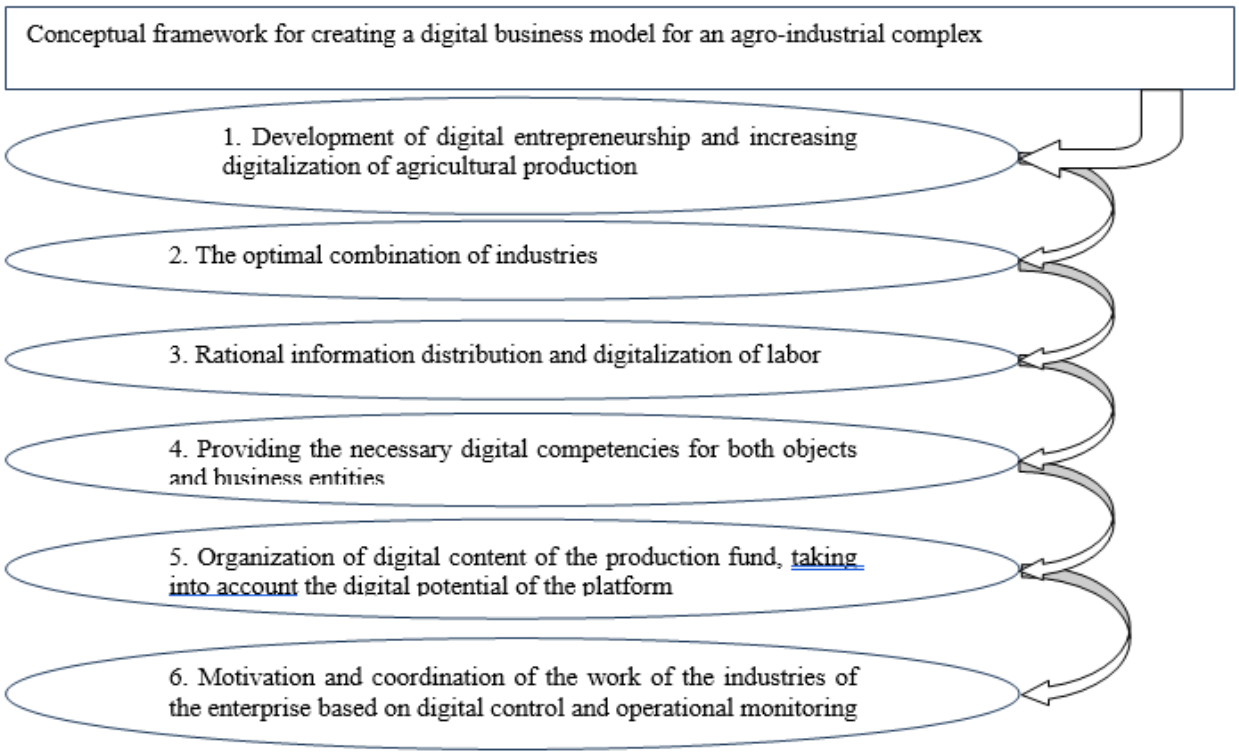

Fig. 2. Conceptual framework for creating a digital business model of an agro-industrial complex enterprise
Source: Developed by the authors.

The presented concept reflects the system of interrelated relations between the industries of the enterprise and within them, based on the level of digitalization of the latter. The concept is a set of organizational and economic principles for creating a digital business model of an agro-industrial complex enterprise, designed to create deep connections and relationships between production, management, service divisions, functional services and administrative control bodies.

The system of elements of the concept, the sequence of implementation of the conceptual provisions and the programmatic issues of their implementation are given in Table 1.

Table 1. The main elements of the concept of creating a digital business model of an agro-industrial complex enterprise

Concept element	Conceptual position	Concept implementation mechanism
1. Development of digital entrepreneurship and increasing digitalization of agricultural production	Creation of conditions in farms and at enterprises of the agro-industrial complex for testing and implementation of advanced digital technologies and developments, production using commercially successful digital technologies	Legal and legislative regulation of digital integration, creation of a legal basis for the implementation of digital regulation of production. Assistance to regional authorities in joining agricultural enterprises to a single information and digital environment
2.The optimal combination of industries	Creation of an optimal production structure that ensures high economic efficiency of activities through the use of digital production technologies. Development of intra-industry specialization, taking into account the requirements of the market and the digital and computing capacities of the enterprise	Determining the size of individual industries based on the digital potential available. The optimal combination and balance of the use of traditional and digital technologies of production and processing, the creation of a diversified digital structure of production in order to obtain the opportunity to compensate the losses of one industry with the profit of others
3.Rational information distribution and digitalization of labor	Formation of digital divisions within the framework of the model from the already created and functioning industries of the enterprise. Optimization of the technological process taking into account digital technologies and the establishment of interconnections between production, management, marketing and regulatory organizations based on a digital platform.	Depending on the specific availability of the digital technology industry, form digital subdivisions of the optimal composition in the model, ensuring the timely and uninterrupted implementation of the main production. Development of regulations on analog-digital interaction of enterprise employees
4. Providing the necessary digital competencies for both objects and business entities	Organization of staffing, taking into account the need for qualified labor in the framework of realizing the potential of digital technologies. Organization of training and retraining of personnel, implementation of modernization of production facilities	Establishment of qualification and competence requirements for employees of the enterprise, establishment of a range of tasks that must be solved without fail using digital technologies. Computerization and informatization of personnel Ensuring free decision-making on digitalization of land, landscape, climate, technological process, accounting, tax, financial and production accounting systems
5. Organization of digital content of the production fund, taking into account the digital potential of the platform	Development of a digital content plan reflected in the digital business model, indicating specific stages, deadlines and responsible persons. Regulating the use of digital technologies, modeling an enterprise with the maximum use of digital tools. Strategic enterprise management in accordance with a digital business model.	Development of an enterprise digitalization plan, ensuring the comparability of income and expenses for the implementation of digital technologies, substantiation of a system of indicators for assessing the effectiveness of digitalization. Development of provisions on production and economic compliance with the digital business model, creation of a roadmap for the implementation of the digitalization process. Development of conditions and registration of digital interaction of the enterprise with the external environment.
6.Motivation and coordination of the work of the industries of the enterprise based on digital control and operational monitoring	Motivation of the work of the industries of the enterprise and the strengthening of the material interest of its participants in the final results of production at the stage of formation of a digital business model	Development of progressive systems of digital interaction between the industries of the enterprise, stimulating the implementation of digital control and monitoring of production, taking into account the exact compliance with digital technologies, methods, norms.

Source: Developed by the authors.

Thus, based on the above concept, it is necessary to develop a digital business model of an agricultural enterprise in order to achieve its effective operation, self-sufficiency, interaction between industries and the interest of all participants in maximizing the potential of the digital technologies used.

The developed concept assumes a comprehensive integrated work of enterprise management in the modeling process, however, speaking about the digitalization of the industry as a whole, it is necessary to study in detail the objective prerequisites for increasing the level of digitalization, as well as consider the advantages and disadvantages of digital business modeling. At present, Russian agriculture is lagging behind in many areas. The level of technical support of the industry, provision of material and technical resources, digitalization of management, selection and genetic work are at a critically low level. The average age of agricultural machinery is on average 20 years or more, the largest hybrid breeding centers have been destroyed, the provision of feed, fertilizers and planting material is generally poorly controlled, which forces agricultural producers to carry out production activities using outdated, simplified extensive technologies.

Table 2. Benefits of digital business modeling for the world's leading economies

Digital business modeling element	**Digitalization of land**	**Digitalization of production**	**Digitalization of management**
USA	Systematization of lands and capitalization of the market for land resources, increasing the value of agricultural. land	Intensification of production, raising the technological level, robotization of production, development of agricultural aviation	Legalization of agricultural production, reducing the number of economic crimes in the industry, improving management efficiency, raising awareness and digital mobility of agricultural management. production
Canada	Systematization of the natural and climatic digital map, reducing risks, improving the quality of risk forecasting	The development of previously unsuitable for agricultural use. activities of land, intensification of production, implementation of concepts of resource-saving production (no-till, mini till)	Raising the level of management potential, reducing management costs, increasing the mobility of management, increasing and legalizing tax revenues.
EU	Creation of a Unified agricultural policy of land turnover and accounting, land cataloging, approval of uniform standards for land categorization	Capitalization of small businesses, development of farming, increasing the economic efficiency of private farming, increasing competition, reducing the cost of the final product	Improving the efficiency of the implementation of agricultural. state programs, legalization and openness of agricultural production, increasing the level of control over the investment turnover, the inflow of investments into the industry.
Brasil	Revealing promising land resources, building a national soil map, improving the efficiency of feed production and pasture cattle breeding	Reducing livestock costs, chipping livestock, digital management of pasture grazing, increasing the productivity of dairy and beef cattle.	Reducing transaction costs and increasing operational efficiency, increasing exports, increasing the volume of contract supplies, increasing the attractiveness of the industry due to an open contract system
China	State control over the turnover of land resources, the return to turnover of "shadow" lands, the totalization of land use	Stabilization of the agricultural market. products, implementation of programs of accelerated import substitution, rejection of manual labor, increasing the efficiency of large and medium agricultural. Entrepreneurship	"Digital transformation" of the industry, government subsidies and investment of digitalization, increasing the level of capital return on investment projects

Source: Summarized by the authors.

Negative market processes also, in turn, do not contribute to the redistribution of financial flows of enterprises for intensification, modernization and digitalization.

Separately, it is worth noting the high distrust of the management segment of agricultural business structures to the domestic scientific potential and the intuitive-proactive type of planning.

These negative trends, together with the high-risk nature of production activities, are ubiquitous in agriculture in most regions of Russia and the ex-USSR countries. However, if we consider the experience of leading enterprises in the leading industry areas, the situation changes radically. In the course of the research, the advantages of digitalization of business processes were studied using the example of the world's leading economies, as well as the leading industrial regions of Russia.

The capitalist nature of the market and the evolutionary processes of the development of social relations led to a significant breakthrough in the agricultural sectors of Europe, Canada, the United States, Brazil and China. The benefits of digital business modeling are detailed in Table 2.

The considered dynamics clearly demonstrates the advantage of using digital business solutions in agriculture, thus leveling the high cost of capital investments due to the potential growth of profits, efficiency and industry mobility. Separately, attention should be paid to increasing the investment attractiveness by increasing the reliability of business planning, the reality of the planned indicators of digital business models and the identification of production risks at the planning stage of the digital business model, which incorporates counter-risk measures and resources into the strategy.

The development of a high-quality and effective digital business model is impossible without a comprehensive analysis of modern digital solutions that maximize the usefulness of system implementation. In the course of our research, we studied advanced scientific and technological developments in the field of digitalization of the agro-industrial complex of Russia and identified the most promising of them. The studies were carried out by analogy with the experience of the leading world economies in three areas: digitalization of land, digitalization of production, digitalization of management.

Digitization of land is a process initiated by the Government of the Russian Federation and aimed at creating and implementing an intelligent system for planning and optimizing agricultural landscapes and land use in agricultural production at different levels of generalization (field, economy, municipality, constituent entity of the Russian Federation, country, foreign territories), operating on the basis of digital, remote, geoinformation technologies and methods of computer modeling. As a result, the following databases have been formed to date:

- database of satellite images of high spatial resolution;
- a database of vector layers of contours of arable land (arable land);
- a database of all agricultural producers of districts: agricultural organizations;
- a database of agricultural producers associated with the vector layer of the contours of arable land (arable land).

Formed expert databases, with the availability of resources and organizational work, allow us to solve the following tasks:

- Keeping a centralized record of arable land, their inventory, monitoring the condition and use, preparing the necessary analytical information;
- conducting regular remote satellite sensing of fields to monitor the state of crops and the actual use of arable land;
- registration of land plots from arable land and land used or provided for agriculture, as part of land of other categories, which is based on information obtained from various sources: cadastral registration, ground observations, remote sensing data of the Earth;
- aggregation and necessary processing of information on production, financial, economic, social and other indicators at various levels: field (site), enterprise or farm, rural municipality, municipal district, region as a constituent entity of the Russian Federation;

- information support for making management decisions related to the development of the agro-industrial complex and rural areas;
- monitoring: the effectiveness of the development of agriculture and rural areas, the implementation of investment projects, the effectiveness of the use of state support at the level of both individual economic entities and territorial entities;
- provision of state information resources on arable land to federal executive authorities, executive authorities of the constituent entities of the Russian Federation, local authorities, agricultural producers, as well as other interested parties.

Formed databases and software provide:
- access of registered users to data through a WEB-browser (via the Internet), without using additional software at the workplace;
- simultaneous connection of cadastre layers, digital space and aerial photographs, maps of soil types and other raster topographic maps. For the vector layers of databases, the following is provided: the function of displaying attributive information on the selected vector object, the function of requesting users to search for vector objects containing information entered by the user;
- integration of the database with vector maps of agricultural land, other areal objects available on the territory of the constituent entities of the Russian Federation;
- full integration of the database with thematic vector maps of agricultural land, other areal objects available on the territory of the constituent entities of the Russian Federation;
- the ability to place any point and area objects on the map: investment sites and projects, specialized objects and enterprises, etc.;
- the ability to connect to open services published by Rosreestr and other federal executive bodies of the Russian Federation.

The formed expert databases are the basis of the Geographic Information System (GIS), which can be an effective tool for managing the use of agricultural land.

The increase in the economic efficiency of agricultural production as a result of the digitalization of land resources made it possible in the USA, Germany, Canada and Brazil to reduce production costs by an average of 150 USD/hectare.

The next area of integrated digital business modeling is the digitalization of production. In this direction, precision farming systems and cattle breeding robotization systems proved to be the most effective.

The robotization of livestock breeding is aimed at automating feed distribution, the introduction of automatic feeding systems, automated systems for cleaning stalls, automation of machine milking, which makes it possible to increase milk yield by an average of 30-38% (Brazil, China, Finland), the use of modern transport control methods allows to reduce costs for fuel by 20% (USA, UK, Israel). The experience of using digital technologies at agricultural enterprises in the Belgorod region has shown that the vector towards automation and digitalization can help reduce costs even in the short term - with the introduction of a system of operational management of production at the meat processing plant for the first month, labor costs decreased by 30%, and general production costs decreased by ten%.

In turn, precision farming technologies significantly increase the economic efficiency of crop production. Experts from the MIT Media Lab Open Agriculture Initiative (OpenAg) assess the effectiveness of the use of innovative technologies in agriculture:

reliable information about the quality of cultivated land and the use of the required amount of fertilizers can increase efficiency by 30%;

the allocation of homogeneous zones within one field can increase productivity by 20%;

The technology of the changeable seeding rate and automatic seeding shutdown allows to increase the yield by 12% compared to using one seeding rate in the field.

According to MIT, the use of automatic section shutdown technology can reduce unproductive seed costs by 1-10%. In the United States, using this technology, farmers save from $ 4 to $ 62/ hectare, depending on the crop. The technology of differentiated fertilization allows you to save from 5 to 40% of fertilizers. "The overall economic effect is from 10% (use of one element) to 50% (full integrated implementation)." So, the saving of seed

material is from $ 6 to $ 16/hectare, differentiated fertilization - $ 36/hectare, local belt fertilization - from $ 40 to $ 70/hectare, and the increase in yield - from 0.5 to 1.5 tons/ hectare. Digitalization of management is a backbone element of digital business modeling. It is aimed at automating management processes, bringing together the results of digital monitoring of production activities, making operational and strategic management decisions aimed at increasing production efficiency and comprehensive implementation of digitalization processes. Digitalization of management in the agro-industrial complex is impossible without taking into account fully integrated internal accounting systems and a single digital back office in the business model. Both dashboarding (a dashboard reflecting the values of the most important business indicators in real time) and the accumulation of a database of production performance indicators should be used. The supply chains in such a production are built online, sales are omnichannel (both off-line and on-line). An example of the implementation of a digital management model is the Novokuban branch of the Federal State Budgetary Scientific Institution "Rosinformagrotech" (Krasnodar Territory), where an experiment was carried out using different information resources, guiding the process of differentiated fertilization: the data of nitrogen sensors and NDVI images give incomplete data, the main effect is obtained when working with maps fertility potentials (layered maps). Economic efficiency (profit growth) based on the results of this project was 0.4-0.8 thousand dollars / hectare, depending on the crops and the set of solutions used.

The study clearly confirms the increase in efficiency from the implementation of complex digital solutions, therefore, when developing an organizational and economic mechanism, it is necessary to take into account the lack of a synergistic effect from digitalization with partial implementation.

As a result, a complex digital business model will look like this Table 3.

Table 3. Three-stage ideal digital business model of agricultural enterprise activity in the region

Digitizing the earth	Digitalization of technologies	Digitalization of management	Key indicators
Stage I			
Installation of GIS markers, satellite determination of field boundaries, installation of digital sensors for soil appraisal	Equipping equipment with GPS, GLONASS equipment (crop production), installation of automatic feed dispensers (animal husbandry)	Equipping all computers of the control apparatus with Internet access, remote monitoring and control of the consumption of agricultural resources. technique	Reducing production costs by 10-25%, increasing the profitability of production, reducing costs by 10-15%, removing the position of a fuel and lubricants accountant from the staff.
Stage II			
Drawing up a detailed soil map of the company's fields, drawing up a climatic map, cataloging lands	Automation and robotization of sowing and harvesting works, equipping machinery, equipment for the precise distribution of fertilizers, planting material (crop production), automation and robotization of machine milking, chipping of livestock (animal husbandry)	Back office optimization and dashboarding, market price monitoring using digital platforms, stock indexing of products, marketing automation	Reducing costs by 10-13%, increasing the level of marketability of products by 30-50%, removing from the staff of auxiliary personnel (milkmaids, cattlemen), sales economists, redistribution of management functions
Stage III			
Robotic monitoring of soil conditions, aerial scanning, automated control of the level of moisture, minerals, digital zoo and phytocontrol	Full robotization of sowing and harvesting operations, robotization of post-processing agricultural raw materials, robotization and digitalization of storage of products (crop production), robotization of feeding and milking, quality control of raw materials, control of vital signs of livestock (livestock)	Adoption of strategic and operational management decisions based on omniak digital analysis, creation of a data bank, accumulation of arrays and the formation of a digital ecosystem of the enterprise.	Reduction of costs by 18-22%, removal from the staff of the position of economist, calculator, foremen of various levels, reduction of transaction costs by 17-23%, increase in profitability of sales by reducing administrative costs by 8-11%

Source: Developed by the authors.

In relation to the conditions of real production, the advantages of implementing a digital business model are most clearly reflected in Fig. 3.

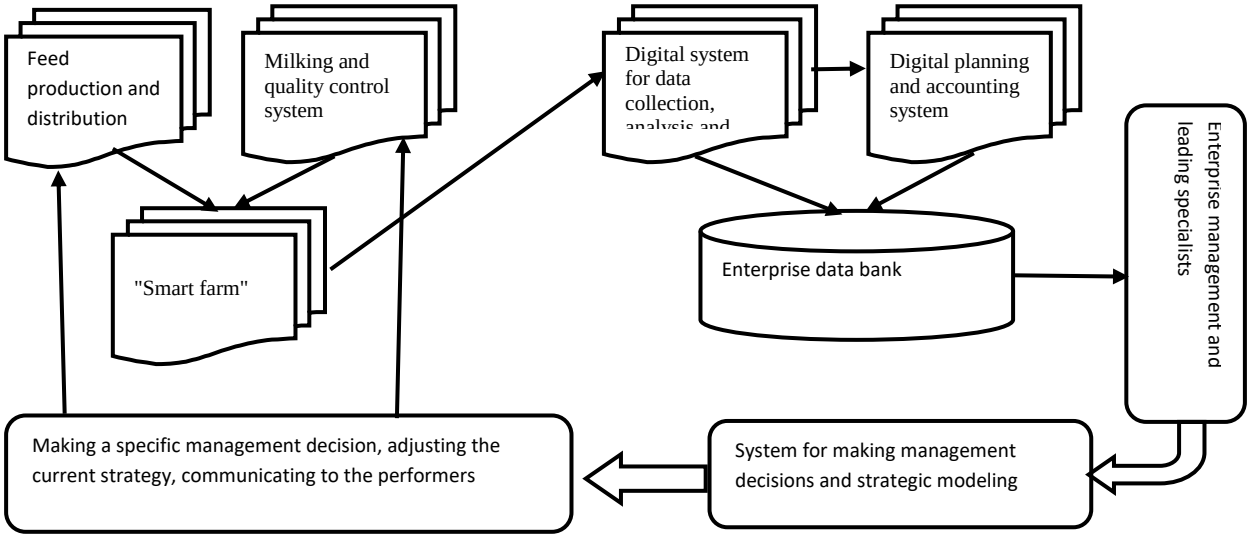

Fig. 4. Process model of the digital ecosystem of the dairy industry of the enterprise
Source: Developed by the authors.

CONCLUSIONS

The presented digital business model is demonstrated by examples of enterprises making the transition to digitalization at stages I-II. Using the example of the dairy industry of enterprises, we forecast an increase in production volumes and the mass of proceeds against the background of fixing the cost price and reducing personnel costs. These factors clearly emphasize the effectiveness of digital business models in terms of removing redundant and redundant personnel from staff, the savings due to which cover the costs of introducing digital technologies and complex system solutions.

Extrapolating the business processes of the enterprise in the Osterwalder-Pignet business model, we can see that before the systematic use of digital technologies, enterprises did not have breakthrough competitive advantages against the background of similar enterprises in the industry. The phased implementation of digitalization mechanisms will allow organizations to automate production, communication and management processes into a single digital multi-system that allows management entities to make more effective management decisions due to complete and comprehensive objective production information accumulated in the enterprise data bank and allowing the implementation and effective use of digital systems. decision making to help the management of the organization. The developed digital business model visualizes a complex digital system of interdependent elements that monitors and controls at all stages of the production and management process of the dairy industry of the enterprise. The resulting production, management, marketing and strategic decisions will benefit from greater objectivity and efficiency compared to the traditional, currently implemented intuitive management methods. As a result, the traditional average enterprise is evolving into a digital forefront business unit.

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