

# Information and Communication Technologies as a Trigger for the Development of Companies in the Agro-Industrial Complex

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**Keywords:** Agriculture, Agro-Industrial Complex, Intellectualization, Digital Technologies, Intensification.

**Abstract:** The article discusses the possibility of using digital technologies in the agro-industrial complex. Unfortunately, many enterprises still use obsolete means of production, simplified technologies, both in agriculture and in the processing, storage and sale of agricultural products, which reduces labor productivity. Wherein, the transfer of agriculture to a qualitatively new technical and technological basis that meets modern trends will have a fruitful effect on the development of the agro-industrial complex and competitiveness. Global changes in modern reality require the introduction of information and communication, digital technologies in human resource management processes, including the transfer of managerial competencies to a remote basis, the rapid development of artificial intelligence, the emergence of breakthrough innovations, the introduction of basic income concepts, as a result of which the profitability of production will increase. Reducing the costs of management, interaction with counterparties, receiving and processing information, the development of remote employment will become a significant reserve for increasing agricultural production and increasing its competitiveness. Wherein, it is necessary to consider the characteristics of each enterprise, its economic and natural conditions, specialization, the level of production intensity, the completeness of the use of the resource potential. The management paradigm is the intensification of production based on digitalization. The authors substantiate the need for a transition to information and communication, digital technologies as the basis for achieving effective results in agricultural production. The novelty of the study lies in the conceptual interest and effective use of cloud technologies, remote work to solve organizational and economic problems, an increase in labor productivity and an increase in the material interest of the enterprise team, an increase in profits, and an increase in production profitability.

## 1 INTRODUCTION

The purpose of this article is to theoretically substantiate and develop practical recommendations for the innovative development of enterprises in the agro-industrial complex using effective forms and methods of introducing digital information and communication technologies.


The author's hypothesis is that in the context of a pandemic, the problem of the operational implementation of digital technologies has become aggravated with the aim of a systematic approach to human resource management.


The methodological basis of the study was the works of Russian and foreign authors who publish

scientific works, the legal framework, and statistical information.

The study results can contribute to constructive use in the business process by managers, business founders.

Organizations of the agro-industrial complex systematically introduce digital technologies into their activities. As a result, resource management is changing and transforming significantly, which increases the efficiency of production processes. Use of technologies to increase the mobility of employees, speed up data processing, cloud databases, visualization of the results obtained, is considered a technological breakthrough, which is a new way of transferring information that erases the boundaries of distances. The intensification of the agro-industrial

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complex on the basis of scientific and technological progress is one of the most important conditions for accelerating the economic development of our country.

## 2 STUDY RESULTS

One of the main conditions for the successful implementation of a policy for the effective development of agriculture and rural areas is to ensure high rates of agricultural production, using the latest methods and tools for enhancing human potential and capital in the field of human resource management; create a communication environment that allows to effectively manage the innovative potential of the organization using the control and management system. Moreover, each enterprise has the opportunity to increase the efficiency of intensification through the use of organizational, economic and social reserves, and primarily through the activation of the human factor, ensuring that everyone in their place works conscientiously and with full dedication (Petrova, 2021). Along with scientific and technological progress, labor resources play a leading role in the development of social production and increasing its efficiency. The key in solving the problems of the successful functioning of an agricultural enterprise is the assessment of the effectiveness of management and personnel assessment. "A good economist, instead of trivial theses, will sit down to study facts, figures, data, analyze our own practical experience and say: a mistake is there, it must be corrected this way. A good administrator, on the basis of such a study, will offer or will carry out the relocation of persons, changes in reporting, restructuring of the apparatus, and etc.". Labor resources are undoubtedly the main element of

production and the main productive force, but only under the condition of digital transformation of the enterprise. The departmental project "Digital Agriculture" notes that the introduction of IT technologies will reduce costs, reduce production risks, and also increase labor productivity in agriculture by half by 2024.

According to the analytical agency in the field of IT study, CNews Analytics, according to the results of a traditional survey of managers of enterprises in various spheres of the Russian economy, the main preferences of heads of enterprises in the agro-industrial complex are visible when using modern IT solutions (Table 1).

Studies have shown that the priority areas for the introduction of advanced information technologies in agricultural enterprises are: autonomous systems, big data analytics, artificial intelligence, cloud technologies.

With the development of the digital economy, the efficiency of interaction between business entities begins to depend less and less on their physical location, the main transactions between which take place in the digital virtual environment of cloud technologies. The efficiency of information exchange is less and less dependent on the immediate proximity of the participants in the interaction. The influence of geographic location on the amount of access to resources and transport costs is reduced. Saving on use of common resources affects the reduction in the share of material costs in the cost of production (Petrova, 2020).

The increase in information intensity, the efficiency of the exchange of tangible goods has become less dependent on the proximity of the buyer and the supplier. As a result of automation, information and management processes are separated from material production: personnel engaged in intellectual work, as a rule, is located in an area with

Table 1: Rating "IT Trends - 2021": the most demanded technologies.

IT technologies	Agriculture	Industry	Financial sector	Trading	Real sector	Generally
Autonomous systems	64	65	2	26	65	29
Internet of things	57	62	12	48	57	63
Big data analytics	54	62	89	86	65	82
Artificial intelligence	45	60	73	61	53	69
Cloud solutions	38	54	61	55	47	79
5G networks	19	26	12	15	25	33
Digital twins	17	54	11	11	35	38
Virtual and Augmented Reality	15	35	5	46	25	33
Peripheral Computing	12	19	11	10	16	11
Blockchain	5	12	37	17	10	19
Quantum technologies	5	7	1	2	6	5

a high standard of living, and material production is arranged in a territory that provides it with cheap resources. Considering the seasonality of agricultural production and assessing the results of the employee's current activities, it became possible to identify and use its potential for the future, to motivate it to solve more complex, non-traditional tasks. The construct of the above changes will be the unification of economic entities living and located in different territories. Geographic proximity ceases to affect the long-term interactions of the subjects.

It is impossible to ignore the important fact that spatial concentration allows a person to be fully assessed in accordance with economic feasibility, and also makes it possible to obtain new knowledge and turn it into innovation. The unification of companies engaged in different types of activities, scientific and educational centers contributes to the development of each of them: enterprises receive the necessary knowledge and personnel that meet their needs. An additional argument in favor of the spatial concentration of production is the acceleration of the process of creation and exchange of implicit knowledge, which is transmitted only in conditions of frequent personal contacts between people (Nikitin, A.V., Antsiferova, O.Y., 2018). The communication exchange of tacit knowledge occurs quite effectively without interrupting the main work and contributes to the development of personal and professional qualities of personnel, taking into account objective economic indicators and the final result of work.

The result of the introduction of digital information and communication technologies into the company's activities will be to reduce the costs of interaction between its participants, which will positively affect the profitability of production. Profitability characterizes the economic viability of production. Profitability indicators are necessary to assess the economic efficiency of management and use of enterprise resources (Anciferova, O.YU., Sutormina, E.S., 2019). Analysis of profitability indicators allows managers and specialists of agricultural enterprises to determine which types of products are most profitable to produce on the farm, where the greatest opportunities to increase the profitability of production are laid. The higher the profitability of production, the more opportunities to carry out scientific and technological progress, comprehensive intensification of agriculture, solve social problems of the countryside and increase the amount of material incentives for workers of agricultural enterprises for the final results (Antsiferova, O.Y., Ivanova, E.V., Myagkova, E.A., Strelnikov, A.V., Petrov, L.M., 2021).

We offer formulas for calculating savings from use of digitalization.

The savings in living labor are calculated by the formulas:

$$E_t = (T_s - T_n) * V, \quad (1)$$

where  $E_t$  is the saving of living labor from the introduction of a new technique;  $T_s$  - labor costs for 1 unit.

products with old technologies without using a new technique;  $T_n$  - labor costs for 1 unit, when introducing a new technique;  $V$  - gross income when applying a new measure.

$$E_z = (Z_s - Z_n) * V, \quad (2)$$

where  $E_z$  is the saving of production costs;  $Z_s$  - production costs for 1 unit of

products with old technologies without using a new technique;  $Z_n$  - production costs per 1 unit, when introducing a new technique;  $V$  - gross income when applying a new measure.

The amount of production cost savings coincides with the amount of additional net income generated from the new digital trick.

Profit per man-hour characterizes the cost-effectiveness of human labor. It is calculated both for individual types of products and for the economy as a whole. It is advisable to analyze the amount of profit per 1 employee in dynamics.

The indicators used to assess the intensification process are divided into characterizing its level, effectiveness and economic efficiency. The indicators of each group, in turn, can be subdivided into main and additional (private) ones (Kastornov, N.P., 2020).

### 3 DISCUSSION OF STUDY RESULTS

Summarizing the study, it can be argued that agricultural organizations, showing constructivism in the development of digital technologies in business processes, will strengthen their competitiveness. Since what quite recently seemed to be the prerogative of advanced IT-companies, in a couple of years it has become an integral part of almost any modern organization. We offer, for example, to consider an information system - a Bitrix24 product, which supports the company's communication processes, unites the activities of employees within the organization, helps to build interaction outside – with customers, partners, suppliers, and etc. Large

companies in the agricultural sector add their employees to the information space.

The first key process within the company is communication. In the modern world, the opportunity to correspond with colleagues is provided using a variety of instant messengers. Bitrix24 makes it possible to conduct correspondence within the information portal, with reference to a specific process in the work of an employee. This means that all chats are indexed in the portal, and not a single important corporate correspondence will be lost when the employee leaves, nothing will be forgotten. Communication does not end only with chats with colleagues or video calls directly from the mobile, working through the simplest processes, the employee is connected to the information portal, works in a virtual office with colleagues from anywhere in the enterprise, country. The personnel mark the start and end of the working day, see the current task that is relevant to him/her, work on them, noting the time spent, attaching the results of activities for reports, for example, in the form of a photo. Figure 1.

The next important process is work on tasks and projects: from the workplace using a computer, laptop, mobile phone or tablet, work is carried out on a particular task, the comments indicate the necessary feedback, the result of the work, photographs are attached or another note is made about that the task is completed. A specialized virtual workplace is created for the employee, when there is nothing superfluous in it that distracts from his/her main process. The functionality of smart processes is possible; the creation of an employee's AMR is his/her virtual workplace.

The Projects and Groups functionality will allow to group tasks or plan work within individual projects. Extensive planning functionality within a project, various calendars in a project or views in a project from a list to a Gantt chart to modern milestone views such as Kanban, allow to conveniently work with tasks and projects.

An important component is the feeling of the employee's presence at his/her workplace, the understanding that from anywhere in the enterprise, even in an open field, it is possible to be at the workplace. Employee directories with phone numbers, e-mail, photos and a separate page for each employee, the visual structure of the company will show a person his/her presence in the organization. Bitrix24 allows to make decisions quickly and efficiently and ensure their implementation: unity and clarity of management; consistency of actions of performers; a clear system of relationships between the manager and the subordinate; quick response to directions; personal responsibility of the head for the results of the unit's actions. Figure 2.

A separate important component for any agricultural company is working with a base of customers, suppliers, partners. When the entire history of interaction with them, including calls, correspondence through all communication channels (mail, instant messengers, communication through social networks, and etc.) is saved in the system. This functionality is also solved within the framework of one Bitrix24 product, and is an integral part of it. Information is recorded in the Bitrix24 CRM system, CRM stands for customers relationship management that is, a program for building interaction with



Figure 1: Online office.

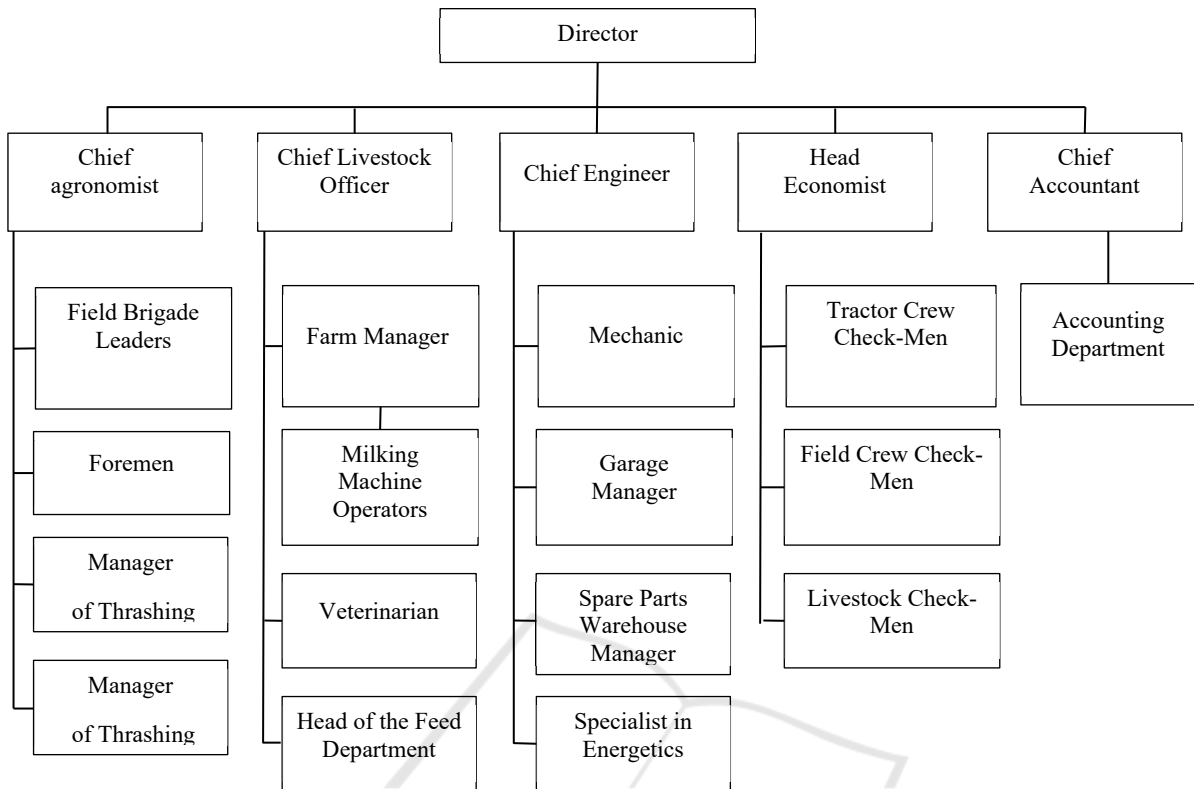


Figure 2: The structure of the management apparatus of an agricultural enterprise.

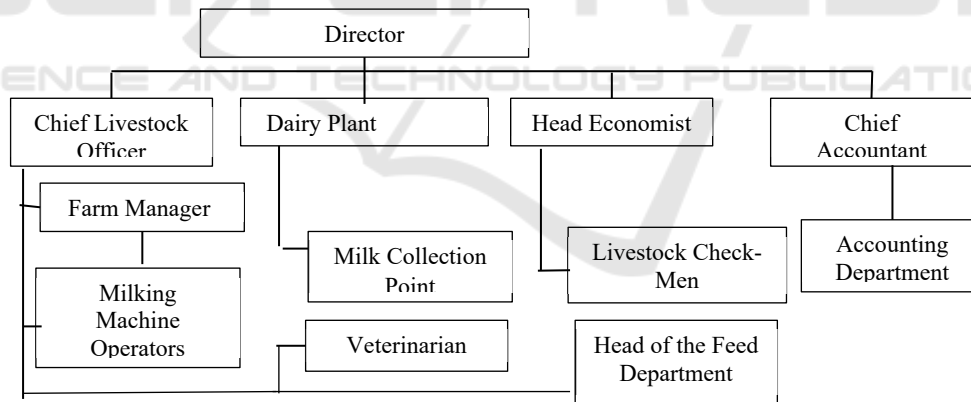


Figure 3: Management structure of the technological process of dairy production and sales.

customers, in fact, the program reflects the interaction with all participants external to the company: suppliers; customers; contractors; partners; other external organizations and individuals.

An information field is formed, data is accumulated in one place from different participants in production processes, production issues are quickly resolved, and the quality of management decisions is increasing. Figure 3.

Remote work is becoming a reality in modern organizations, which gives a serious increase in labor

productivity, an opportunity to improve the quality of ideas, create a new product (Petrova, L.M., 2020).

#### 4 CONCLUSION

All of the above gives reason to believe that the general level of willingness to cooperate and possession of digital technologies allows organizers of business processes and all participants to quite

successfully move to a new level of communication relations (Anciferova, O. Yu., Myagkova, E. A., Tolstoshein, K. V., 2018). It is important to understand that after a long crisis in Russian agriculture and with a low level of social infrastructure in the countryside, the process of introducing digital information and communication technologies will take place systematically, for a long time. Due to the existing peculiarities of the agricultural sector, its special role in the economy and politics of Russia, for a successful transition to digitalization of the agricultural sector, it is necessary to strengthen state support for agriculture and all its branches, the participation of investors and patrons. "The economic community, which consists of a set of interconnected organizations and individuals. The economic community produces goods and services of value to the consumer, which are also part of the ecosystem. Any enterprise ecosystem also includes suppliers, leading manufacturers, competitors, and other stakeholders. Over time, they co-evolve their capabilities and roles and strive to align with the directions set by one or more of the leading companies. Those companies that hold leadership roles can change over time, but the ecosystem leader function is valued by the community because it allows members to move towards shared visions in order to align their investments and find mutually supportive roles" (Moore, J. F., 1993). Therefore, it is advisable to use such digitalization techniques such as Bitrix 24 for large agro-industrial firms, holdings, and etc.

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