

THEORETICAL AND METHODOLOGICAL BASIS OF MANAGEMENT OF DIGITAL TECHNOLOGIES IN THE CONDITIONS OF THE DIGITAL ECONOMY

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ABSTRACT. This article studies the theoretical and methodological foundations of digital technology management in the digital economy. The study analyzes the transformation of management systems, the specific features of digital technology management, and modern management approaches in the process of the formation and development of the digital economy. Based on the scientific literature, the main concepts of digital technology management are systematized and their theoretical aspects are summarized.

The article develops a conceptual model of digital technology management using a systematic approach, logical analysis, and scientific generalization methods. Also, a system of integral indicators and mathematical expressions are proposed to assess the effectiveness of digital management. The results of the study show that effective digital technology management is inextricably linked with strategic management, technological infrastructure, data-based decision-making, and digital competencies of human capital.

At the end of the article, scientific conclusions and practical recommendations are developed to improve digital technology management in the digital economy. The results obtained can serve as a methodological basis in the process of forming and developing digital management systems in organizations.

Keywords: digital economy, digital technologies, digital transformation, digital governance, IT governance, data-driven governance, strategic governance, information systems, digital competencies, governance effectiveness

INTRODUCTION. The modern stage of economic development is characterized by the widespread introduction of digital technologies. The formation of a digital economy is fundamentally changing not only production processes, but also management mechanisms. Today, the competitiveness, efficiency and innovative potential of economic entities largely depend on how effectively they can manage digital technologies. Therefore, the issue of managing digital technologies in the digital economy is emerging as one of the urgent scientific and practical problems.

Digital transformation processes require a revision of management systems in organizations, the development of new methodological approaches and the improvement of existing management models. Traditional management methods in many cases cannot fully meet the requirements of the digital environment. The sharp increase in information flows, the large volume of data, the need for real-time decision-making require the organization of management processes based on scientifically based, systematic and innovative approaches.

Although the issues of managing digital technologies have been studied by many foreign and domestic scientists, a single methodological approach in this area has not been fully formed. Especially in developing countries, the specific features of managing digital technologies, the requirements of the national economy and the institutional environment have not been sufficiently studied. This creates the need for in-depth scientific research in this area.

Today, the widespread introduction of digital technologies such as artificial intelligence, big data (Big Data), cloud technologies, blockchain, and the Internet of Things (IoT) in the activities of organizations is leading to a radical renewal of management systems. Effective management of these technologies is not only a technical issue, but also an economic, organizational, and

strategic management problem. Therefore, the theoretical substantiation of the process of managing digital technologies and the development of its methodological foundation are considered urgent scientific tasks.

The main goal of this article is to systematically study the theoretical and methodological foundations of managing digital technologies in the digital economy, analyze existing scientific approaches, and develop conceptual conclusions based on their generalization.

The objectives of the research include:

- revealing the essence of the concepts of digital economy and digital technology management;
- analyzing theoretical approaches to digital technology management;
- determining the place of digital technologies in management processes;
- systematizing the methodological foundations of digital management.

The object of the research is the process of managing digital technologies in organizations in the digital economy. The subject of the research is the theoretical, methodological and organizational aspects of managing digital technologies.

The article uses such scientific research methods as analytical, logical generalization, systematic approach, scientific abstraction. The results obtained can serve as a theoretical and methodological basis for scientific research on the management of digital technologies.

LITERATURE REVIEW. Issues of managing digital technologies in the digital economy are one of the important areas of modern scientific research. Research in this area is mainly focused on issues of digital transformation, information technology management, and the formation of digital strategies in organizations.

The theoretical foundations of the concept of digital economy were first systematically studied by D. Tapscott, who substantiated that digital technologies fundamentally change economic processes and management systems (Tapscott, 1996). M. Castells, on the other hand, noted that a new - network - model of management is being formed in the information society and showed that digital technologies are a central element of management systems (Castells, 2010).

The methodological aspects of managing digital technologies were studied in depth by P. Weill and J. Ross, who developed effective models and principles of information technology governance (IT governance) (Weill & Ross, 2004). G. Vial's research substantiates that the digital transformation process requires complex organizational changes and the need to update management systems (Vial, 2019).

In the field of information systems management, K. Laudon and J. Laudon put forward the concept of managing information technologies as a strategic resource in organizations (Laudon & Laudon, 2021). T. Davenport and J. Harris also emphasized that data-driven management is an important factor in the effective management of digital technologies (Davenport & Harris, 2017).

National scientists have also studied the issues of digital economy and digital management. In particular, A. Abduganiyev analyzed the theoretical foundations of the digital economy (Abduganiyev, 2020), while S. Ganiyev studied the mechanisms for implementing digital management systems in enterprises (Ganiyev, 2021).

Literature analysis shows that although existing studies have widely covered the issues of introducing digital technologies, a single methodological system for their management has not been sufficiently developed. Therefore, an in-depth study of the theoretical and methodological foundations of managing digital technologies in the context of a digital economy is an urgent scientific task.

METHODOLOGY. In this study, a comprehensive scientific approach was used to study the theoretical and methodological foundations of managing digital technologies in the context of a digital economy. The research methodology is based on the principles of scientific analysis, a systematic approach and logical generalization.

In the research process, the method of studying and analyzing scientific literature was used first of all. The scientific works of foreign and domestic scientists on the digital economy, digital transformation and information technology management were studied, and their main ideas were systematized. This method made it possible to identify existing theoretical views in the field of managing digital technologies and critically evaluate them.

The method of a systematic approach was used as an important methodological basis in the study. The process of managing digital technologies was considered as a complex and multifaceted system, and its structural elements, interactions, and management mechanisms were analyzed as a whole. This approach made it possible to consider digital technology management not as a separate technical issue, but as an important part of strategic management.

The research also used methods of scientific abstraction and logical analysis. With the help of these methods, the theoretical concepts of digital technology management were clarified, the main categories and their interrelationships were analyzed. This served to form a conceptual model of the digital management process.

The research methodology also used the method of comparative analysis. The concepts put forward in different scientific schools and approaches for managing digital technologies were compared, their common and different aspects were identified. As a result, the strengths and weaknesses of existing approaches were assessed.

In addition, the basic principles and methodological approaches to managing digital technologies were brought into a single system using the methods of generalization and synthesis. These methods made it possible to theoretically substantiate the research results and draw scientific conclusions.

Although empirical data was not directly collected within the framework of the study, a conceptual analysis was carried out based on scientific sources, international experience and existing theoretical approaches. This approach was aimed at developing a general methodological framework for managing digital technologies.

Thus, the set of scientific methods used provided the necessary methodological foundation for achieving the research goal, namely, to systematically reveal the theoretical and methodological foundations of managing digital technologies in the digital economy.

RESULTS. The results of the study made it possible to systematically reveal the specific features and theoretical and methodological foundations of the process of managing digital technologies in the digital economy.

First of all, the analysis conducted showed that managing digital technologies differs from traditional management in the following main aspects:

- the data-based nature of management decisions;
- the possibility of implementing management in real time;
- automation of processes;
- the strategic importance of information resources;
- the transformation of technological innovations into a management center.

As part of the research, a conceptual model of the digital technology management process was developed. This model consists of three main components:

1. Strategic management;
2. Technological infrastructure;
3. Data-driven decision-making.

The relationship between these components is systematized in the table below.

1-Table

Structural elements of digital technology management

Management Direction	Main tasks	Performance indicators
Strategic Management	Development of a digital strategy	Digital maturity level
Technological Management	Implementation of information systems	Process automation
Information Management	Data-driven decisions	Decision quality
Human Resources	Digital competencies	Employee skills
Innovation Management	Integration of new technologies	Innovative efficiency

As can be seen from this table, digital technology management is a multifactorial and complex process, not limited to the implementation of technical tools. As a result of the study, a general theoretical formula was proposed for assessing the effectiveness of digital technology management:

$$RTB=f(S,T,D,H)$$

where:

RTB - digital technology management efficiency;

S - strategic management level;
T - technological infrastructure development;
D - data-driven management level;
H - human capital and digital competencies.

Based on this model, a formula was developed for assessing the efficiency of digital technology management using an integral indicator:

$$I_{rtb} = \alpha S + \beta T + \gamma D + \delta H$$

Here α , β , γ , δ are weight coefficients expressing the importance of each factor.

Also, as a result of the study, the stages of the digital management process were systematized as follows:

1. Determining the need for digital technologies;
2. Strategic planning;
3. Selection and implementation of technologies;
4. Integration and automation;
5. Monitoring and evaluation;
6. Continuous improvement.

The analysis showed that the main condition for effective management in the digital economy is the formation of a data-driven management system. The principle of “data-driven management” plays a central role in this.

The results also confirmed the following conclusion:

digital technology management is not only the task of the IT department, but is a strategic process that covers all levels of management of the organization. Based on these results, a theoretical and methodological model of digital technology management was developed and its main elements were systematized.

DISCUSSION AND CONCLUSIONS. The results of the study once again confirmed that the issue of managing digital technologies in the digital economy is one of the most important areas of modern management theory. Scientific conclusions based on the analysis of the literature and methodological approaches showed that the process of managing digital technologies is fundamentally different from traditional management systems and requires new conceptual approaches.

During the discussion, it was found that managing digital technologies is not limited to the implementation of technical infrastructure. This process includes many factors, such as strategic planning, organizational structure adaptation, data-based decision-making, and the development of digital competencies of human resources. Therefore, digital management should be considered as a complex, multi-level and systematic process.

The results of the study showed that it is consistent with the IT governance concept put forward by Weill and Ross and Vial's approaches to digital transformation. However, in this study, the issue of digital technology management was considered more broadly - in a combination of economic, organizational and methodological aspects. This justified the need to adapt existing theoretical views to the conditions of the national economy.

The analysis showed that effective management of digital technologies in organizations depends on the following main conditions:

- definition of clear strategic directions of digital development;
- sufficient development of technological infrastructure;
- data-based management decisions;
- digital knowledge and skills of employees;
- mutual integration of information systems.

The conceptual model and integral assessment formula developed during the study allow for a systematic assessment and improvement of digital technology management. The proposed methodological approach can serve to organize digital management processes in organizations on a scientific basis.

The results of the discussion also showed that the most important principle of management in the digital economy is the concept of “data-driven management”, that is, data-driven management. This approach is the main factor in improving the quality of decisions, reducing errors, and increasing management efficiency.

Key conclusions of the study:

1. In the digital economy, digital technology management is an independent scientific direction that requires the integration of strategic, technological, and organizational management elements.
2. The theoretical and methodological basis of digital technology management is a systematic approach, data-driven management, and innovative management concepts.
3. The effectiveness of digital management depends on a set of factors such as the level of strategic management, technological infrastructure, data management, and human capital.
4. The proposed integrated assessment model can serve as a theoretical basis for quantitatively assessing the effectiveness of digital technology management in organizations.
5. The process of managing digital technologies is not only the task of the IT department, but is an integral part of the organization's overall strategic management system.

Practical recommendations:

1. develop and implement a digital strategy in organizations;
2. development of data management systems;

3. increasing the digital competencies of employees;
4. integrated management of information systems;
5. widespread use of analytical technologies in making management decisions.

In general, the results of the study serve to systematize the theoretical and methodological foundations of managing digital technologies in the digital economy and create a scientific foundation for future applied research in this area.

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