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FEATURES OF THE USE OF DIGITAL TECHNOLOGIES IN INDUSTRIAL ENTERPRISES

Yusupova Dilbar Mirabidovna
Head Teacher Department Digital Economy
Tashkent State Economic University

Shoakhmedova Nozima Khairullaevna
Associate Professor Department Digital Economy
Tashkent State Economic University

Abstract
This article explores the concept of digitalization and its impact on economic development. The essence of the digital transformation process, the strategy of its implementation in the activities of enterprises, and ways to implement this strategy, the grouping of digital technologies, the advantages and potential disadvantages of the introduction of these technologies, stages and models of digital enterprise implementation are described, and practical recommendations are given.

Keywords: Digitalization, digital enterprise, digital transformation, cloud technology, big data, digital transformation models, process model, network model, technology model, matrix model.

Introduction

At a new stage of the global economy, modern digital technologies are considered the primary productive resource that drives the growth of social well-being. The use of modern computers and information systems by organizations, primarily enterprises in the real sector of the economy, is a crucial condition for their effective functioning in the digital economy.

The digitalization of the enterprise, based on modern production methods, significantly enhances the quality of managing technological processes and decision-making processes at all levels of management, and is one of the most critical factors in increasing the efficiency and sustainability of enterprise operations.

The process of digital transformation in industrial enterprises has several unique features, and the proper organization of this process, along with the development of a necessary strategy for the enterprise, is a key condition for the effective and continuous operation of its activities in many ways.

As a result of the reforms being implemented in Uzbekistan, openness and the development of international economic and political relations have created opportunities for modernization, as well as the technical and technological re-equipment of industrial sectors in our country. As is known, the digital economy is also gaining importance in creating added value today. As a result of the reforms being implemented in economic sectors, the processes influenced by digital information are gaining a decisive force in the strategic development of the real sector.

Therefore, great importance should be attached to the proper organization of digital production in our industrial enterprises and the correct choice of strategy for introducing this process into the enterprise.

Analysis of relevant literature

Several scholars have expressed their opinions on the issue of digitization in the production process. The term “digital economy” was first used in 1994 by Canadian economist Don Tapscott. In his work, the author spoke about the impact of digitization on the economy. He considered the reduction of transaction costs and the emergence of entirely new business models as one of the main advantages of digitization.

In his research, V.A. Plotnikov defined digitalization as "a modern stage in the development of informatization, characterized by the widespread use of digital technologies for the creation, processing, transmission, storage, and visualization of information, characterized by a combination of new hardware and software." In addition, he listed several advantages that enterprises achieve when using digital technologies:

- “The flexibility of production increases due to its rapid reconfiguration, dynamic changes in the characteristics of the production process, which creates a competitive advantage and leads to an increase in potential profits;
- Provides information on the integration of the stages of the product life cycle, from development to disposal, which enables us to effectively and comprehensively address not only production optimization but also quality, environmental safety, and the creation of new business opportunities, among others [1].

In 2001, Thomas Mesenburg more precisely formulated and identified five components of the digital economy, which, in his opinion, can be statistically assessed and measured:

- the electronic infrastructure of enterprises, including software and computers;
- e-commerce;
- increasing the value of traditional industries through the use of digital technologies;
- the difference in the value of the digital economy workforce compared to the traditional one;

- Changes in the added value of digital economy products and services. [3]

The digitalization of the economy was first promoted as a topic of discussion in the mid-1990s by Brynjolfsson and Kahinlar (2002), who provided the first definitions, recognizing it as a means of bringing businesses and consumers together in a virtual world [2].

With the development of digitalization, business models within enterprises are constantly evolving. Therefore, many authors interpret the definition of digitalization in different ways. For example, Alexander Kutsman defines the digital economy as "a modern type of economy characterized by the primary role of information and knowledge based on the active use of digital technologies for the identification, storage, and processing of resources in the production of material products and services." Aksanov R. K. emphasizes that the digital economy is based on the production of electronic products and e-commerce services. Under e-commerce, Aksanov R.K. refers to the electronic movement of capital, electronic products, as well as the process of exchanging electronic information [3].

Large-scale digitalization leads to the digital transformation of the enterprise. Kitova OV and Briskin SN, in their research, noted that digital transformation affects the strategy, operations, and technologies used by the enterprise according to the following logic:

1) "A digital enterprise strategy focuses on defining the best customer experience, managing a unique business model and ecosystem, and managing change;
2) operations involve creating a culture that encourages continuous improvement, the integration of physical and digital assets, and iterative innovation;
3) Technology involves flexibility and leveraging the full potential of modern technology, including analytics, perception, mobility, and more."

Arenkov IA examines the impact of digital transformation on an enterprise's competitiveness. As the author notes, "during the process of digital transformation, an enterprise goes through stages of qualitative change, which is manifested in the improvement of processes in the production, financial, material, and information spheres of its activities, which allows us to adapt to modern technologies" [5].

Issues such as the effective use of new information technologies in various sectors of the national economy, methods for introducing digitalization systems in them, principles of digital modeling based on new information systems, assessment of the effectiveness of the use of automated information systems in the process of corporate management, implementation of their control, and conditions for the development of the digital economy are reflected in the scientific research of Qobulov (1998) [6].

E. Muminova's research focuses on the effectiveness of utilizing blockchain technologies in the development of the country's industry, as well as the importance of electronic commerce and electronic contracts in enterprise cooperation. As a result of the reforms being implemented in Uzbekistan, openness and the development of international economic and political relations have created opportunities for modernization, as well as the technical and technological re-equipment of industrial sectors in our country. As is known, the digital economy is also gaining importance in creating added value today. As a result of the reforms being implemented in economic sectors, the processes influenced by digital information are gaining a decisive force in the strategic development of industrial enterprises [7].

Research Methodology

As a result of rational economic reforms aimed at developing, renewing, and modernizing our economy, the digital economy is being created today. In particular, great importance is attached to the effective implementation of digital technologies in the activities of business entities, as well as the sequence of actions that must be taken to implement the digital transformation process within them. The following methods were employed to investigate the features of digitization in real sector enterprises, as well as the role and importance of digital technologies.

1. Digital technologies implemented in today's practice are studied and classified based on the goals that businesses want to achieve.
2. The benefits and potential harms that can be achieved through the introduction of digital technologies have been analyzed.
3. Digitization stages have been developed to manage the digital transformation process within enterprises effectively.
4. Digital transformation models have been developed based on the analysis.

Analysis and discussion of results

In our opinion, the primary goal of an enterprise's digital transformation is to create conditions that enhance its competitiveness and improve the economic efficiency of production activities. For the digital transformation task, enterprises can be classified as follows:

- organization of competitive production;
- achieving high efficiency, harmonization of production and organizational processes;
- increasing the investment attractiveness of the enterprise;
- increasing the flexibility and transparency of the management system, which guarantees the economic efficiency of the enterprise, etc.

To design the digital transformation of the enterprise, it is necessary to develop a classification of digital technologies based on the criteria of their availability and implementation expediency within the enterprise. Thus, the main digital technologies are combined into three groups.

Table 1 Grouping of digital technologies

Naming of groups	Description of these groups
Key technologies	technologies that enable these enterprises to be digitally transformed (cloud technologies, wireless communication technologies, paperless technologies, etc.);
Important technologies	These are technologies that enable the complete digital transformation of the enterprise (big data, cloud computing, unmanned technologies, etc.);
Advanced technologies	technologies that enable the transition from an analog to a digital enterprise (artificial intelligence, neural networks, distributed data registers, machine learning, etc.)

Source: Developed by the author

Digital transformation has played a significant role in improving the profitability and investment attractiveness of enterprises. With its capabilities, including high-tech production, automation of production processes, and the rational use of databases in management, digital technologies are a significant factor that significantly affects the efficiency of any enterprise [8].

Additionally, companies that quickly adopted digital technologies during the COVID-19 pandemic were able to protect or even increase their profits during the crisis. However, as we have listed above, it is considered appropriate to initiate the digital transformation process, taking into account several key characteristics, such as the scale of the enterprise, product types, competitive environment, and financial resources. The digital transformation of industrial enterprises has both positive aspects and potential risks, as presented in Table 9.

Table 2 Positive aspects and potential risks of digital transformation

Positive aspects	Xatarlar
Digital technologies, artificial intelligence, the industrial Internet of Things, big data analytics, and unmanned air, water, and land transport.	Dependence on borrowed imported technologies, a decrease in one's competence, and the possibility of having hidden "bookmarks" in hardware and software.
New trade markets, business models, innovative productions, media services, and services	The opportunity for companies from economically developed countries to capture innovative markets early
Productivity growth, production efficiency, automation, and robotization	Job cuts, elimination of specific specialties, unemployment, and social tension
Increasing the efficiency and standardization of services, eliminating intermediaries, and decentralizing transportation, medicine, education, and the service sector	Legal uncertainty, increased fraud, ethical issues, and social stratification
Big data analytics, digital identity, and service customization	Loss of privacy, intrusive advertising, disclosure of confidential information of companies, and personal data of citizens
Investments, startups, digital money, new areas of activity, and a new technological order	Foreign economic governance, digital globalism, and digital colonialism

Source: Kodirov, S. (2020). Some issues of digitalization in the industrial sector of the economy. ISJ Theoretical & Applied Science, 12(92), 377-384.

After a thorough assessment of the risks and benefits that the digitalization process may bring, a plan is developed for implementing this process. Generally, the development of a digital enterprise's concept and strategy is carried out in the following stages. An enterprise's digital transformation goes through several stages (Figure 1).

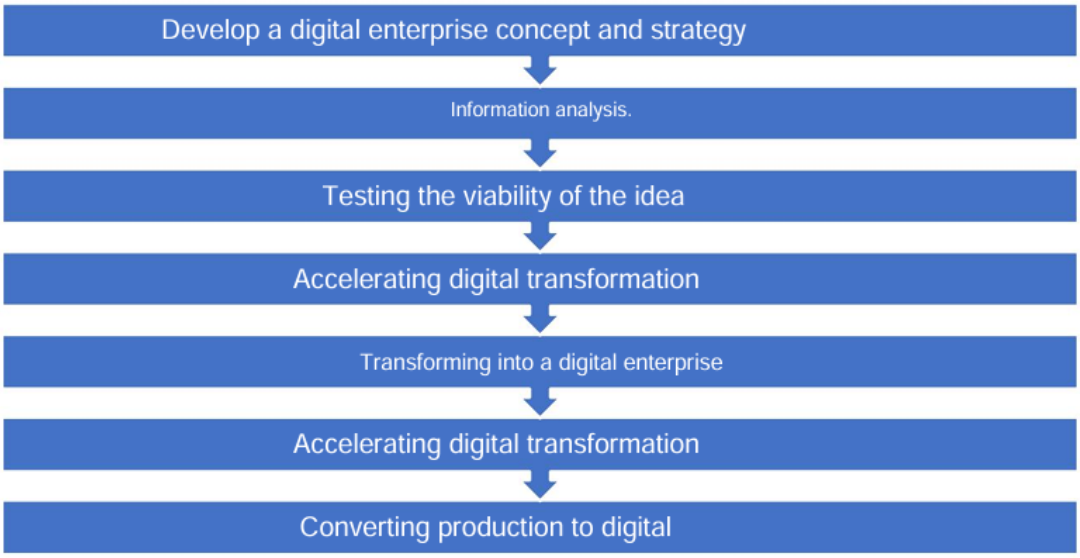

Figure 1. Stages of digital transformation of enterprises
Source: Developed by the author.

- Develop a digital enterprise concept and strategy. Assess the current level of digital technology use within the enterprise and establish specific goals. Develop a sequence of actions and a plan based on the set goals.
- Data analytics. Data analysis is the process of analyzing data with the help of a cross-functional team of experts, and then using the collected information to improve the organization's operations, inform decision-making, design intelligent systems, enhance products, and develop new offerings and services.
- Identifying the necessary resources - it is essential to identify in detail the resources required to achieve the goal, attract and train specialists to improve business processes, and develop strategies for introducing new technologies.
- Create initial pilot projects to test the viability of the idea and demonstrate business value. Develop digital replicas of products, processes, and businesses to enhance their representation and facilitate seamless integration and collaboration.

To accelerate digital transformation and ensure the profitability of ongoing projects, it is essential to collaborate with universities and leading companies in the field of digital technologies, as well as partner with digital startups. Based on the analysis of the experience gained, determine the finished concept of a digital enterprise.
- Transformation into a digital enterprise. To transform a traditional enterprise into a digital enterprise, a straightforward arrangement of the management structure and functions, clear leadership, responsibilities, and a shared vision among top

management are required, along with the development of an employee motivation system that eliminates the possibility of resistance to digital innovations. Digital culture should be encouraged, as all employees should be able to work in a digital industrial environment, be prepared to try new technologies, and learn new ways of working with equipment.

To implement the digital transformation of production, horizontal and vertical integration of production systems is necessary. A significant part of the currently used information systems can exchange information, but their compatibility must be ensured at all levels, both within the enterprise and between interacting enterprises. The creation of a single information space enables the rapid and timely exchange of information between automated enterprise management systems and industrial equipment, facilitating seamless integration. In digital production, products can be manufactured according to individual orders, making the consumer a direct participant in the interaction and, therefore, an integral part of the value chain.

Summarizing the main approaches to digital transformation of the industry based on the above technological trends and classifications, the following types of enterprise digital transformation models can be identified: process, network, technology, and matrix (Figure 2).

The process model of digital transformation, also known as the process approach, involves creating a series of digitized elements within the value chain. For example, this includes a digital research and development center, a digital factory, a digital warehouse, digital transportation, and e-commerce, among others.

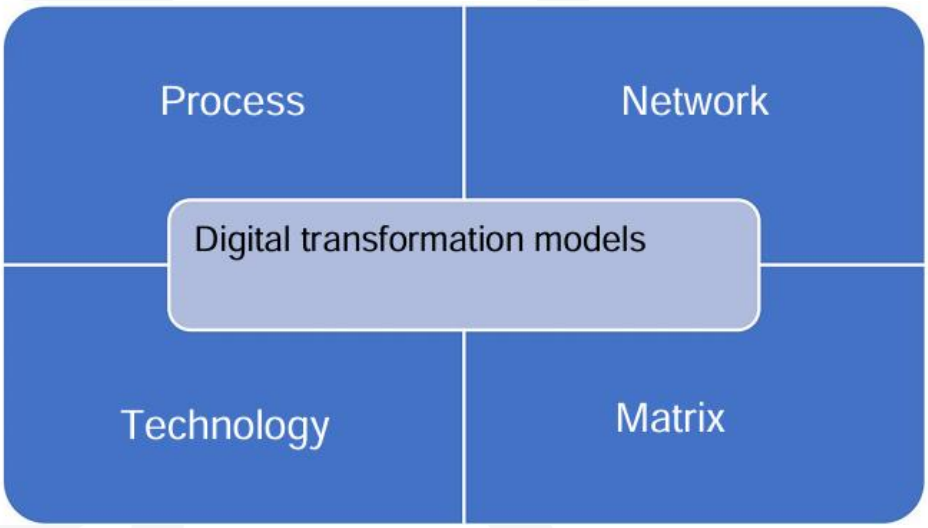

Figure 2. Models of digital transformation of enterprises
Source: Developed by the author

A digital factory is an integrated set of interconnected digital models, methods, and tools based on a single data management system. The primary goal of a digital factory is to comprehensively plan, evaluate, and continuously improve all the key structures, processes, and resources of an enterprise. With the decentralization and virtualization of resources, there is no need to establish specialized lines for the production of specific product categories.

The network model of digital transformation in enterprises is based on an industrial approach, focusing on the interaction between industrial enterprises and those from other sectors of the national economy. Within the framework of this model, the creation of digital infrastructure and its elements: digital production system, food and water supply, innovative energy production systems, smart factories, distributed energy systems, driverless car systems, uncrewed aerial vehicles, digital railways, telemedicine, digital medicine, smart homes, smart roads, digital financial technologies, digital security systems, e-commerce, digital culture interact with each other through functional relationships.

The construction of a technological model is based on the priority use of specific technical and technological tools that reflect global trends in the digital transformation of an enterprise. The rapid growth in the importance of innovative technologies in production, such as digital design and modeling of technological processes and objects, big data analysis, machine learning, and artificial intelligence, leads to the formation of a technological model of digital transformation, which is controlled by the introduction of these technologies into production—a specific set of digital transformation technologies of enterprises. In addition, the growing importance of these technologies enables the production system of an enterprise to adapt to changing conditions. The transition to digital sales of products, utilizing digital platforms for order placement, consumables, raw materials, and production equipment, as well as the timely delivery of finished goods to consumers, bypassing intermediary chains, leads to resource savings and an increase in the enterprise's income.

From an economic perspective, the technology model has advantages, including the introduction of a specific set of technical and technological production systems, such as the Industrial Internet and the Internet of Products, as well as computer platforms for the production and purchase of industrial products. The creation of a product market for the production of manufactured goods, the purchase of raw materials and components for production, and the optimization of the production of products for customers.

The enterprise editing matrix model is a system of "goals-means" matrices that allows you to correct redundancy and duplication in the objects of the model, or the scientific inadequacy of technological developments; grouping objects by goals and tasks, for example, the "Technology-Research" matrix, the "Tasks-Products" matrix, the "Products-Technologies" matrix, etc.

Based on matrices and models, a comprehensive integration model of all final processing transformations is developed, creating an integrated, interdisciplinary planning network with remote access to economic resources. These are software development centers for technological software, based on open-source outputs and operating in cooperation with each other, and are provided with coordinated support and access to supply in the integration space.

Conclusions and Suggestions

In conclusion, it should be noted that the introduction of digital technologies into economic sectors has several advantages, which are expressed in the following: as a result of the automation of the activities of enterprises and the achievement of complete digitalization of the process, competitive products are produced, production and labor resources are used efficiently and economically, the investment attractiveness of enterprises and the transparency of the production process are ensured.

Since the process of digitization in industrial enterprises has its characteristics, the need for financial resources and conditional infrastructure can lead to possible losses, especially in enterprises operating in a developing country like Uzbekistan, it is essential to properly plan this process, correctly formulate a digital transformation strategy, and plan this process by the state of the enterprise and the type of activity.

Selecting one of the relevant models of digital transformation, such as process, network, or technological models, enables you to specify the work to be performed in industrial enterprises, increase efficiency through consistency, and establish a clearly defined action plan.

Therefore, the following are proposed to implement digital transformation in enterprises:

1. having a team of highly qualified workers with the necessary competence in the work process;
2. developing a set of methods, techniques, and measures that allow for the most effective integration with innovative labor tools and objects, taking into account the current conditions and time;

3. Given the need to accelerate the digital transformation of production, it is essential to foster active cooperation with relevant organizations and enterprises, as well as specialized higher education institutions and vocational schools.

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