



WAYS TO INCREASE OPERATIONAL EFFICIENCY OF ENTERPRISES BASED ON DIGITAL TECHNOLOGIES

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Abstract

This article analyzes the role and importance of digital technologies in improving the operational efficiency of enterprises. The impact of modern digital technologies, including artificial intelligence, big data (Big Data), cloud technologies, Industrial Internet (IIoT), ERP and MES systems on enterprise activities is studied. Also, proposals and recommendations are developed to accelerate digital transformation processes and increase operational efficiency in Uzbek enterprises.

Keywords: digital technologies, operational efficiency, digital transformation, artificial intelligence, ERP, MES, Industry 4.0, Smart Manufacturing, enterprise management.

Introduction

The acceleration of digital transformation processes in the global economy is shaping new ways of managing the activities of enterprises. Digital technologies are an important tool for optimizing business processes, increasing production efficiency, reducing costs, and improving the quality of management decisions. Intensifying global competition, changing market demands, and increasing the complexity of consumer needs require enterprises to organize their operational activities more effectively.

Today, the success of enterprises largely depends on the level of implementation of digital technologies. Digital transformation allows not only to automate production processes, but also to improve management systems, effectively use resources and improve the quality of strategic decision-making. In modern conditions, enterprises have the opportunity to optimize business processes, reduce production costs, improve the quality of products and services, and quickly adapt to market requirements with the help of digital technologies. Therefore, the use of digital technologies to increase the operational efficiency of enterprises is one of the current scientific and practical issues.

Digital transformation processes are also recognized as one of the priority areas of state policy in the economy of Uzbekistan. In recent years, the country has been



implementing large-scale reforms to digitize economic sectors, introduce modern information and communication technologies, and develop the digital economy. In particular, within the framework of the “Digital Uzbekistan - 2030” strategy, a number of measures have been established for the widespread implementation of digital technologies in the fields of public administration, industry, transport, logistics, finance, and services. These reforms are aimed at increasing the operational efficiency of enterprises, improving the level of utilization of production capacities and strengthening the competitiveness of the economy.

One of the main tasks facing Uzbek industrial enterprises is to modernize production processes and transfer them to management based on modern digital technologies. Intensification of global competition, increasing demands on quality and efficiency in international markets require local enterprises to introduce innovative approaches. In this regard, the use of modern technologies such as artificial intelligence, big data (Big Data), cloud technologies, Industrial Internet (IIoT), ERP and MES systems can bring the operational activities of enterprises to a new level.

As a result of the introduction of digital technologies, enterprises will have the opportunity to monitor production processes in real time, control equipment operations, track resource movements, and make data-based management decisions. This will help reduce production losses, increase the efficiency of energy and raw material use, and increase labor productivity. In particular, the use of digital technologies in the leading sectors of the Uzbek industry, such as textile, metallurgy, chemistry, food, and construction materials, will allow achieving high economic efficiency.

In addition, digital transformation is also important in increasing the investment attractiveness of enterprises. Enterprises using modern management systems and digital platforms will appear as more open, transparent, and reliable entities for investors. This creates favorable conditions for attracting local and foreign investments, transferring new technologies, and increasing export potential.

Thus, in the conditions of Uzbekistan, the introduction of digital technologies to improve the operational efficiency of enterprises is one of the important factors not only in improving the economic results of enterprises, but also in modernizing the country's industry, accelerating innovative development and ensuring sustainable growth of the national economy. Therefore, accelerating the processes of digital transformation in enterprises, developing modern technological infrastructure and training specialists with digital competencies remain one of the urgent tasks.

Theoretical foundations of operational efficiency



Operational efficiency expresses the ability of an enterprise to achieve high results through the most efficient use of available resources. This concept is one of the important criteria for assessing the economic efficiency of an enterprise's activities, production productivity and management quality. Operational efficiency reflects the degree to which an enterprise achieves its goals with minimal costs and optimal resource consumption. In a modern market economy, the competitiveness of enterprises largely depends on the level of operational efficiency, and a high level of this indicator ensures the financial stability and long-term development of the enterprise. The main indicators of operational efficiency include labor productivity, production volume, product quality, cost level, production cycle duration, resource efficiency, and customer satisfaction. Labor productivity represents the volume of products or services created by the enterprise's employees over a certain period of time and is an important criterion for assessing the efficiency of the enterprise. Production volume, on the other hand, indicates the level of utilization of available capacities and characterizes the enterprise's ability to meet market demands.

Product quality is one of the most important indicators of operational efficiency, determining the level of consumer confidence and demand for the enterprise's products. High-quality products, while strengthening the enterprise's position in the market, also create the opportunity to obtain additional economic benefits. The level of costs represents the costs associated with the production of products and the provision of services. Cost optimization serves to increase the profitability of the enterprise and ensure competitive advantage.

The duration of the production cycle is the time interval from the beginning of the product creation process to the final result. Reducing this indicator allows the enterprise to fulfill orders faster, increase production volumes and flexibly respond to market demands. Resource efficiency reflects the level of rational use of raw materials, energy, financial and labor resources. Effective use of resources helps to reduce enterprise costs and improve overall economic results.

The level of satisfaction of customer needs is also one of the important indicators of operational efficiency. In the modern business environment, quickly identifying consumer demands and needs and offering them appropriate products and services is one of the main factors determining the success of enterprises. Enterprises that are able to meet customer needs at a high level will gain a strong position in the market and have a long-term competitive advantage.



Digital technologies directly affect the improvement of these indicators and serve to increase the efficiency of enterprises. In particular, artificial intelligence, big data (Big Data), cloud technologies, ERP and MES systems create the opportunity to automate production processes, monitor them in real time and make management decisions based on data. As a result, labor productivity increases, production losses decrease, product quality improves, and operating costs decrease.

The introduction of digital technologies in Uzbek enterprises is also considered an important means of increasing operational efficiency. Digitalization of production processes in industrial enterprises, introduction of automated management systems and transition to a data-based management model serve to strengthen the competitiveness of enterprises, increase export potential and increase economic efficiency. Therefore, the use of digital technologies to increase operational efficiency is one of the important strategic directions of development of modern enterprises.

Implementation of ERP systems

The implementation of ERP (Enterprise Resource Planning) systems is of great importance in increasing the operational efficiency of enterprises. The ERP system is a complex software solution that combines and manages all the main business processes of the enterprise on a single information platform. This system allows for integrated management of such areas of the enterprise's activities as finance, production, supply, logistics, warehousing, human resources management and sales.

ERP systems provide constant control over the movement of financial resources, improve budgeting and cost planning processes. They also create the opportunity to effectively manage production processes, determine the need for raw materials and materials, and optimize production capacity. Integration of warehouse and logistics systems with the ERP platform serves to track product movements, manage inventories, and optimize the supply chain. As a result, the accuracy and transparency of information in the enterprise is ensured, and the quality of management decisions is significantly increased.

The introduction of ERP systems at Uzbek enterprises is one of the important stages of digitizing production and management processes. These systems allow enterprises to use resources more efficiently, reduce operating costs, and increase competitiveness in market conditions.

Application of MES systems

Another important tool for increasing operational efficiency is the introduction of MES (Manufacturing Execution System) systems. The MES system is a software



platform designed to monitor, control, and manage production processes in real time. This system collects, processes and analyzes data on all processes occurring at the production site.

MES systems serve to increase production efficiency, monitor equipment performance, identify production disruptions and losses, and take prompt measures to eliminate them. In addition, product quality control processes are automated and compliance with quality standards is ensured. Since MES systems allow monitoring each stage of production, the transparency of the enterprise's activities increases and a reliable database is formed for making management decisions. The experience of developed countries shows that the use of MES systems in integration with ERP systems significantly increases the production efficiency of enterprises. The widespread introduction of these systems in industrial enterprises of Uzbekistan will also allow optimizing production processes and accelerating digital transformation.

Business process automation

Business process automation plays an important role in increasing the operational efficiency of enterprises. In modern enterprises, automation of many repetitive operations saves time and resources, reduces human errors, and increases labor productivity. Automation covers not only production processes, but also financial, organizational, and managerial activities.

Using digital platforms and automated management systems, document management, accounting, procurement, sales, customer service, and other business processes are effectively managed. Electronic document management systems reduce the volume of paper documents and ensure the rapid exchange and storage of information. CRM (Customer Relationship Management) systems allow you to manage customer relationships, analyze their needs, and improve the quality of service.

Business process automation allows enterprises to reduce operating costs, increase productivity, and improve management efficiency. In particular, automation of business processes based on digital technologies in Uzbek enterprises is becoming an important factor in increasing economic efficiency, improving the quality of service, and strengthening the competitiveness of enterprises in international markets.

Thus, the implementation of ERP and MES systems and the automation of business processes are one of the most important areas for increasing the operational efficiency of enterprises, which serves to ensure the sustainable development and competitiveness of enterprises in the digital economy.

Formation of a data-driven management system



In the digital economy, data is becoming one of the most important strategic resources of enterprises. During the activities of modern enterprises, a huge amount of data related to production, finance, marketing, logistics and customers is formed. Effective collection, processing and analysis of this data is an important factor in improving the quality of enterprise management and ensuring operational efficiency. Therefore, today, the formation of a data-driven management system (Data-Driven Management) in enterprises is considered one of the urgent tasks. The data-driven management approach involves making management decisions based not on intuitive or subjective opinions, but on real data and analytical results. This approach allows enterprises to quickly identify changes in the internal and external environment, eliminate existing problems in a timely manner and accurately assess development prospects. As a result, the quality and efficiency of management decisions increase.

One of the main advantages of a data-driven management system is the accurate and well-founded adoption of decisions. With the help of modern analytical tools and artificial intelligence technologies, data on the activities of the enterprise are deeply analyzed, certain trends and patterns are identified. This allows managers to use reliable sources of information when making strategic and operational decisions. As a result, the risk of making wrong decisions is reduced and management efficiency increases.

This approach also plays an important role in reducing business risks. It creates the opportunity to identify and forecast financial, production, logistics and market risks that affect the activities of the enterprise in advance. For example, with the help of artificial intelligence and Big Data technologies, it is possible to predict in advance a decrease in demand, changes in raw material prices or disruptions in the supply chain. This allows the enterprise to minimize possible negative consequences and effectively manage risks. Data-driven management also serves to effectively assess market opportunities. By analyzing information about consumer needs, competitor activities and market trends, enterprises have the opportunity to develop new products, enter new markets and improve marketing strategies. In particular, real-time data processing allows enterprises to quickly adapt to market changes and maintain a competitive advantage.

The introduction of data-driven management systems in Uzbek enterprises is also one of the important directions of digital transformation. Through the use of ERP, CRM, MES and Business Intelligence (BI) systems, enterprises are able to centrally manage data on their activities. This helps to increase production efficiency, optimize costs and ensure the accuracy of management decisions. Thus, the formation of a data-



driven management system is a modern management approach that increases the operational efficiency of enterprises, reduces business risks and effectively uses market opportunities. In the conditions of the digital economy, the introduction of these systems is one of the important factors in increasing the competitiveness of enterprises and ensuring their sustainable development.

Conclusion

In conclusion, digital technologies are one of the most important factors in increasing the operational efficiency of enterprises. In the modern economy, the competitiveness, production efficiency and financial stability of enterprises largely depend on the successful implementation of digital transformation processes. Digital technologies optimize production and management processes, rational use of resources, ensure transparency of business processes and expand the possibilities of making data-based management decisions.

The results of the study show that modern digital solutions such as artificial intelligence, Big Data, Industrial Internet of Things (IIoT), cloud technologies, ERP and MES systems are taking the operational activities of enterprises to a new level. These technologies allow for real-time control of production processes, early detection of technical failures, optimization of energy and raw material consumption and improvement of product quality. As a result, production costs are reduced, labor productivity increases and the overall economic efficiency of enterprises is improved. Digital technologies also play an important role in improving the strategic management system of enterprises. Through a data-driven management approach, enterprises will be able to accurately forecast market demands, reduce business risks and identify new development opportunities. This will increase the adaptability of enterprises to rapidly changing market conditions and ensure their long-term sustainable development.

The widespread introduction of digital technologies at Uzbek enterprises is an important factor in accelerating the technological modernization of the industry, increasing production efficiency and strengthening competitiveness in international markets. The policy for the development of the digital economy, programs for the modernization of industrial sectors and measures to support innovative activities implemented in the country are creating favorable conditions for further activation of digital transformation processes at enterprises.

In the future, in order to further increase the operational efficiency of enterprises, it will be important to develop modern digital infrastructure, widely introduce ERP, MES, CRM and Business Intelligence systems, expand the scope of use of artificial



intelligence and Big Data technologies, as well as train qualified specialists with digital competencies. At the same time, improving the mechanisms for financing innovative projects and supporting the introduction of digital technologies on the basis of public-private partnerships also remains one of the urgent tasks. In general, the consistent implementation of digital technologies in the activities of enterprises will help increase operational efficiency, reduce production costs, improve the quality of products and services, and develop the innovative potential of enterprises. This will not only improve the economic performance of individual enterprises, but will also make a significant contribution to increasing the competitiveness of Uzbek industry, expanding its export potential, and ensuring sustainable and long-term growth of the national economy. As a result, digital transformation will become one of the strategic factors in the country's economic development and strengthening its position in the global economic space.

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