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INDUSTRIAL MANAGEMENT AND DIGITAL TRANSFORMATION: STRATEGIC APPROACHES FOR MODERN MANUFACTURING ENTERPRISES

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Abstract. This article analyzes the importance of industrial management and digital transformation processes in modern manufacturing enterprises, the application of IIoT and artificial intelligence technologies, the development of sustainable and green manufacturing, and the effectiveness of data-driven decision-making systems. At the same time, green manufacturing and sustainable business models play an important role in ensuring environmental safety. Data-driven decision-making systems enable enterprises to make effective strategic decisions in real time. Modern industrial management and digital transformation are of paramount importance in increasing the competitiveness of enterprises, optimizing production processes, and ensuring sustainable development.

Keywords: Industrial management, digital transformation, smart manufacturing, Industrial Internet of Things (IIoT), artificial intelligence, green manufacturing, sustainable development, data-driven decisions.

In recent years, the industrial sector has been experiencing rapid changes globally. Traditional production systems are increasingly needing to integrate with modern technologies to maintain their competitiveness. Digital transformation, smart manufacturing and Industry 4.0 concepts are at the heart of these changes. This process includes not only the renewal of production technologies, but also the reorganization of enterprise management, strategic decision-making, training of qualified personnel and business processes.

Digital transformation allows you to increase efficiency in production systems, optimally manage production capacities and strengthen quality control. Through Industrial Internet of Things (IIoT) devices, it is possible to obtain information from production lines in real time, analyze it and integrate it into the decision-making process. At the same time, artificial intelligence technologies allow for predictive maintenance and early detection of failures in production processes. This helps to ensure the continuity of the production process in enterprises.

In addition, digital transformation also has a significant impact on human resources and management systems. Retraining employees in new technologies, upgrading skills and adapting strategic management processes are important for the successful transition of an enterprise to digital systems. Business process reengineering also helps to increase production efficiency and work in harmony with digital systems.

Sustainable and green production also allows enterprises to increase their environmental responsibility. Production systems that take into account the introduction of environmentally friendly technologies, energy efficiency, waste reduction and recycling are important trends in modern industry. The green production model is also based on optimizing the supply chain, selecting environmentally friendly raw materials and taking into account the life cycle of products.

This article analyzes the role of industrial management and digital transformation processes in modern manufacturing enterprises, the application of IIoT and artificial

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intelligence technologies, sustainable production and data-based decision-making systems. The introductory part is aimed at highlighting the essence of the digital transformation process and its impact on strategic management, production efficiency and environmental sustainability in enterprises.

Digital transformation in modern industrial enterprises is a key tool for increasing the competitiveness of the enterprise and effectively managing production processes. Traditional manufacturing systems often have limited capabilities for manual control of processes and efficient use of resources. In this context, digital transformation introduces intelligent systems that connect production lines, resources, and employees.

Industrial Internet of Things (IIoT) devices allow real-time data collection from the manufacturing process. This data is used to optimize production capacity, identify process delays, predict maintenance, and enhance quality control. At the same time, artificial intelligence algorithms analyze the manufacturing process, detect failures in advance, and make automated decisions.[6]

Digital transformation also has a significant impact on the strategic management system of enterprises. Data-driven decision-making systems provide managers with real-time allows you to monitor production processes in the mode, effectively allocate resources and develop competitive strategies.

The digital transformation process is not limited to updating technologies, but also requires adapting human resources and management systems. Training employees in new technologies, involving them in advanced training programs and developing training processes are important for the successful integration of an enterprise into digital systems.

In addition, business process reengineering (BPR) processes help to revise internal processes of enterprises and adapt them to digital systems. For example, processes such as production scheduling, raw material and material management, and integration of quality control systems become significantly more effective through digital transformation.

Digital transformation makes it possible to increase employee productivity, optimally allocate labor resources and introduce new business models. At the same time, it is also important to form a culture that is flexible to changes in the enterprise.

An integral part of digital transformation is data-driven decision-making systems. IIoT devices, sensors, and other data from the manufacturing process enable managers to make decisions in real time. For example, early detection of failures on production lines, optimization of production capacity, management of raw materials reserves, and product quality control systems are implemented through data-driven decisions.[5]

With the help of artificial intelligence algorithms, companies will be able to forecast production processes, plan maintenance, and reduce costs. At the same time, data visualization and analysis systems help managers make complex decisions quickly.

Modern industrial enterprises are striving to increase environmental responsibility. Green production and sustainable business models are based on the principles of energy efficiency, waste reduction, recycling, and environmental friendliness. Sustainable production allows

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companies to reduce their environmental impact, strengthen reliable relationships with customers and partners, and adapt to global environmental requirements.

Supply chain management also plays an important role in green production. Choosing environmentally friendly raw materials, considering the life cycle of products, and collaborating with suppliers increase the sustainability of enterprises. At the same time, green manufacturing creates new business opportunities that give enterprises a competitive advantage.

Smart manufacturing systems allow for the automation of the production process, efficient use of resources, and cost reduction. For example, through the Manufacturing as a Service (MaaS) model, enterprises can offer their production capacities as a service to other enterprises. This helps to increase production efficiency and create new sources of income.[4]

Digital transformation also creates the basis for enterprises to create innovative products, make the production process flexible, and discover new market opportunities. Smart manufacturing systems and data-driven management are strategic opportunities that give enterprises an advantage in global competition.

As modern industrial enterprises enter the process of digital transformation, significant changes are taking place in production systems. The transition from traditional production to smart, flexible, and digitized systems requires not only technological innovation, but also strategic management, employee training, and business process reorganization. This process plays an important role in increasing the competitiveness of enterprises, improving production efficiency and ensuring sustainable development.

Industrial Internet of Things (IIoT) and artificial intelligence technologies are the main tools for optimizing and controlling production processes. IIoT devices help collect data in real time, which allows for planning production capacity, early detection of failures and strengthening quality control. Artificial intelligence algorithms analyze the production process, provide predictive maintenance and make automated decisions. This significantly increases the efficiency of the enterprise.

The digital transformation process also affects employees and the management system. Training employees in new technologies, training programs for their Involvement in and adaptation of strategic management processes ensures the successful integration of the enterprise into digital systems. Business process reengineering (BPR) serves to optimize and effectively manage production processes. At the same time, creating a work environment that is flexible to change helps to develop an innovative culture in enterprises.[7]

Sustainable and green production increases the environmental responsibility of enterprises and allows them to adapt to global environmental requirements. The principles of energy efficiency, waste reduction, recycling and the selection of environmentally friendly raw materials increase the long-term competitiveness of enterprises. Green production also brings economic benefits by creating new business models and service opportunities.

Data-driven decision-making systems enable enterprises to make effective strategic decisions in real time. With the help of IIoT and artificial intelligence technologies, the production process is predicted, resources are optimally allocated, and quality control is strengthened. At the same time, smart manufacturing systems open up new business

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opportunities, make the production process flexible, and provide an advantage in global competition.

In conclusion, industrial management and digital transformation are essential for ensuring strategic management, production efficiency, sustainable development and competitiveness in modern enterprises. IIoT and artificial intelligence technologies, the adaptation of personnel and management systems, green production and data-driven decision-making systems together transform enterprises into intelligent, flexible and sustainable production systems. Thus, digital transformation allows modern industrial enterprises to become globally competitive and innovative active entities.

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