



CENTRAL ASIAN JOURNAL OF THEORETICAL AND APPLIED SCIENCES

Volume: 02 Issue: 04 | April 2021 ISSN: 2660-5317

The Main Directions of the Organization of Production Processes at Industrial Enterprises in the Digital Economy

Saida Yuldasheva

Senior teacher of Management department, Bukhara Engineering and Technological Institute

Received 29th March 2021, Accepted 19th April 2021, Online 30th April 2021

Abstract – *In the modern world, the basic issues are those, related to improving the production organization based on digitalization of production and management. The re-industrialization of the domestic industry in line with the innovative model of Uzbekistan’s development is characterized by the creation of digitalized technologies, the digitalization of production and management, and the establishment of high-tech enterprises for product output in integrated technological chains with high added value for domestic and export markets.*

Key words: *production organization, digital economy, digital production, industrial Internet of things.*

I.Introduction

Modern trends in the transition of the economy to a new technological order necessitate the modernization of domestic production systems, the formation of relevant approaches to the organizational and economic support of production processes, as well as systems and methods of management. At industrial enterprises, after the period of reindustrialization [1, 2, 3], the processes of automation and robotization of production, the improvement of the organization of production and enterprise management and the growth of the level of its digital intellectualization are activated. In order to increase the efficiency and flexibility of production, the equipment should be adapted to quickly adjust for the release of various types of products. The modern paradigm of organization of production and management is based on the possibility of prompt exchange of information in real time between tools and objects of labor, quick changeover of equipment, reduction of the number and changes in the competence of production and service personnel, transition to the production of new products by replacing control programs in flexible manufacturing systems and robotic systems. To implement this, it is necessary to effectively use and increase human, scientific potential in order to develop innovative, science-intensive, high-tech production that produces competitive products both for domestic and for world markets. In the field of digital production, such areas of modern technologies are developing as “Industrial Internet of things”, “additive manufacturing technologies”, “cloud technologies for storing and processing information”, Big

Data Analytics, Artificial Intelligence, Smart Robotic Manufacturing, including CNC machines, machining centers, flexible production modules. Substantiation of making organizational decisions in this case is possible through the use of simulation and economic-mathematical modeling.

The digital economy is an economic activity in which the most important factor of production is the prompt processing and analysis of large volumes of digital data to support and automate decisions, which, in comparison with traditional forms of business, can significantly increase the efficiency of production, technology, - management, storage, sale, delivery of goods and services. Digital transformation of production means revolutionary changes in business models based on the use of digital platforms in order to ensure significant market growth by increasing the competitiveness of enterprises' products. The digital transformation of production involves the organization of the introduction of modern innovative technologies and products, the adaptation and development of new business models to the conditions of the digital economy and, due to this, a qualitative improvement of business processes, including the production process [6-9].

The digital platform is an integrated information system that is designed to provide multilateral user interactions to exchange information in order to optimize business processes, reduce overall transaction costs, improving the efficiency of supply chains of goods and services. The digital ecosystem brings together several digital platforms from different industries or market segments with common customers and provides conditions for the innovative development and distribution of digital devices, digital products, digital services and applications. A rationally organized ecosystem, in which added value are created using digital (information) technologies, allows multiplying the positive effect for each component of the socio-technical system with distributed interaction and mutual use and exchange of knowledge in the context of evolutionary self-development. It can be expected that the ecosystems of digital platforms of the transport, logistics and manufacturing sectors of the economy will have significant potential.

II. Literature review

The organization of production in a digital economy, according to the authors, is a set of methods, techniques and measures that allow to ensure the most effective combination of highly qualified workers with the necessary competence in the labor process with innovative tools and objects of labor in space and time for achieving production goals based on digitalization of product lifecycle management [4, 5]. According to experts, among the reasons hindering digital transformation, the following stand out: outdated technologies in 61% of enterprises, lack of specialists and teams with the necessary competencies and skills - 64%, lack of integration of existing and new technologies and data - 62% [10].

Studies in the field of digital transformation of production show that enterprises that are active in the use of new digital technologies and new management methods are 26% on average more profitable than their competitors, while those that invest heavily in digital technologies, but at the same time they do not pay enough attention to management, financial results are 11% lower, conservative organizations that modernize only management get plus 9% to profit, , but with the help of the introduction of digital technologies they can potentially triple the result; for those who have not yet worked out a development strategy, they have 24% lower financial indicators in comparison with other enterprises [11].

A significant restructuring of the infrastructure, technology, methods of organizing production management is required. The current economic situation is characterized by the beginning of the fourth industrial revolution, within which digital “smart” enterprises are being created, equipped with cyber-physical systems. Such enterprises make it possible to carry out personalized “customized” production of products that are competitive in the domestic and world markets. Among the technological trends of the fourth industrial revolution, one can single out: vertical and horizontal integration, industrial robotization, unmanned vehicles, the use of CNC machines, processing centers, additive technologies using 3D printers, the industrial Internet of things, artificial intelligence, cloud computing and storage; data analysis, big data analysis, simulation and mathematical modeling and forecasting, augmented reality, cybersecurity.

III Analysis

- Compatibility is the ability of sensors, sensors, machines, devices and people to exchange information and interact with each other through the Industrial Internet of Things (IIoT).

- transparency is a prerequisite for such interaction. In a virtual environment, a digital copy of real objects, functions, processes, systems is created, accurately reflecting everything that happens with its physical original. The constant exchange of data between the digital copy and the original allows us to accumulate information about all processes that occur with “smart” products, equipment and production in general. This requires the provision of the ability to collect data from sensors and sensors and record the situations in which they are generated.

- technical support allows the personnel to provide informed decision-making based on the collection, analysis and visualization of information necessary for the implementation of the production process. This support for hazardous or routine operations can allow production personnel to be replaced with AI-powered machines.

- decentralization in the adoption and implementation of management decisions is carried out on the basis of delegating the corresponding powers to cyber-physical systems. In the long term, automation should be as complete as possible: where machines can operate efficiently without human intervention. At the same time, the production personnel, acting as supervisors, can be involved in performing the necessary operations in emergency and non-standard situations.

The digital transformation of industrial enterprises has its positive aspects and possible risks, which are shown in the table.

Positive aspects	Risks
New disruptive digital technologies, artificial intelligence, industrial internet of things, analysis big data, unmanned air, water and land transport	Dependence on borrowed imported technologies, degradation of their own competences, the possibility of the number of hidden "bookmarks" in hardware and software
New sales markets, business models, innovative production, mass information services	Possibility of quick capture of innovative markets by companies of economically developed countries

Labor productivity growth, production efficiency, automation, robotization	Job cuts, elimination of certain specialties, unemployment, social tension
Improving the efficiency and standardization of services, exclusion of intermediaries, uberization of transport, medicine, education, service sector	Legal uncertainty, increased fraud, ethical problems, social stratification
Big data analysis, digital identification, customization of services	Disappearance of privacy, intrusive advertising, leakage of confidential information of enterprises and personal data of citizens
Investments, startups, digital money, new areas activities, a new technological order	External management of the economy, digital globalism, digital colonization

The digital transformation of an enterprise goes through a series of stages.

- Development of the concept and strategy of a digital enterprise. Assessing your current digital maturity and setting clear goals. Choosing a business model.
- Analysis of information. Determination of the required digital products. It is necessary to analyze the information with the help of a multifunctional team of experts, later

use the collected data to operate the organization, make decisions, design intelligent systems, improve products, create new offers and services.

- Determination of the necessary resources - it is necessary to determine in detail the required resources to achieve the goal, develop strategies for attracting and training specialists, implementing new technologies to improve business processes.

- Creation of initial pilot projects to test the viability of the idea and demonstrate the value of the business. Development of digital twins of products, processes and enterprises. To accelerate digital transformation, ensure the profitability of pilot projects, one should cooperate with universities, digital leaders, and work with digital startups. Based on the analysis of the experience gained, determine the completed concept of the digital enterprise.

- Transformation into a digital enterprise. In order to transform a traditional enterprise into a digital one, it is required to establish clear regulation of the structure and functions of management with clear leadership, commitments and vision of top management. To develop a personnel motivation system that would neutralize the possibility of countering digital innovations. A digital culture should be stimulated: all employees should be able to operate in a digital industry environment, be ready to try new technologies, learn new ways of operating equipment.

To implement the digital transformation of production, horizontal and vertical integration of production systems is required, and a significant part of currently used information systems can exchange information, but their compatibility should be ensured at all levels both within the enterprise and between interacting enterprises. Creation of a single information space provides the possibility of prompt and timely exchange of information between automated enterprise management systems and industrial

equipment. In digital manufacturing, products can be manufactured according to individual orders, so the consumer becomes a direct participant in the interaction and, therefore, an element of the value chain.

IV. Discussion

Digital production provides a high level of labor productivity and product quality, the possibility of remote teamwork and cooperation of project participants, allows you to significantly improve cost control and predictability of production and management processes. The use of software and hardware complexes for production and product quality control allows avoiding errors caused by the human factor. With the development of the industrial Internet of things, artificial intelligence based on neural network technologies, it becomes possible to create “smart production” that can quickly make decisions to rationalize the production process in the event of problem situations.

The modern paradigm of production organization reflects the possibility of quick changeover of equipment for various types of products, reduction of the number of production and service personnel, transition to the production of new products by replacing control programs in flexible production systems and robotic complexes.

Digital production requires the organization of an integrated information network wireless interaction of components, continuous data collection from various sensors and sensors, the exchange of information in order to identify complex events and critical states, analyze and interpret them based on the current situation, as well as, based on from the obtained results of modeling with the help of digital twins, planning further actions.

The equipment, equipped with digital sensors and sensors, allows registering production processes with high accuracy, and on the basis of the information received, the embedded processors allow making decisions independently regardless of the central production control system in the current situation within the framework of delegated authority.

Modern digital automated industrial production systems have several levels. At the physical level, in the workshops of enterprises, various sensors, sensors and actuators are located on the equipment. At the level of equipment control and management there are programmable logic controllers (PLC – Programmable Logic Controller), collecting information from sensors and controlling drives. The process control level is provided by Supervisory Control And Data Acquisition (SCADA) and Manufacturing Execution System (MES) systems. The upper level of management is made up of enterprise resource planning systems (ERP - Enterprise Resource Planning), which are located on the servers of corporate data processing centers (DPC).

Cyber-physical systems are distinguished by the presence of two-way communication between computerized computing facilities and physical production processes. The process of collecting, exchanging, processing, analyzing information allows diagnostics of the state of the production system, forecasting, comparison and selection of solutions, automatic adjustment and adaptation of equipment. Elements of cyber-physical systems can be located both in a single production area and at a remote distance from each other, and their interaction is carried out at all stages of the product life cycle [12, 13].

V. Conclusion

The organization of production in a digital economy encompasses a set of methods, techniques and measures that make it possible to ensure the most effective combinations of highly qualified workers with the necessary competence in the labor process with innovative means and objects of labor in space and

time to achieve production goals in a digitalization base for product lifecycle management. A single information space allows supporting the implementation of processes throughout the life cycle of products, including marketing research, product design, procurement, preparation of production, production, quality control, packaging, warehouse logistics, sales, transport logistics, operation, maintenance and repair, disposal. Due to the need to increase the pace of digital transformation of production, interested organizations and enterprises need to actively interact with specialized higher educational institutions to conduct a joint analysis and harmonization of educational standards and work curricula in the field of professional and continuing education in line with the development of industry professional standards.

I. REFERENCES:

1. Bodrunov S.D. (2016) Re-industrialization: socio-economic parameters of the reintegration of production, science and education. *Sociologicheskie issledovanija* = Sociological Studies, 2, 20-28.
2. Valentey S.D., Belozerova S.M., Bushmin E.V. (2015) Re-industrialization of the Russian economy in the context of new threats. Moscow: Russian Economic University, named after G.V.Plekhanov, 71 p.
3. Silin Y.P., Animitsa E.G., Novikova N.V. (2016) The industrial enterprise management in the conditions of new industrialization. Under general editorship of Y.P.Silin; The RF Ministry of Education and Science, the Ural State Economic University. Ekaterinburg: The Publishing House of the Ural State Economic University, 270 p.
4. Amelin S.V., Shchetinina I.V. (2017) The organization of high-tech production of competitive products. *FES: Finansy. Ekonomika. Strategija*. = FES: Finance. Economy. Strategy, 2(137), 25-36.
5. Amelin S.V. (2013) Improving the organization of production management in the context of new information technologies. *Vestnik VGTU* = The Bulletin of VSTU, 3.1, 159-162.
6. Berger R. The digital transformation of industry. The study commissioned by the Federation of German Industries (BDI), Munich (www.rolandberger.com/publications/publication_pdf/roland_berger_digital_transformation_of_industry_20150315.pdf). 2015.
7. Hess T., Matt, C., Benlian, A., & Wiesböck, F. et al. The options for formulating a digital transformation strategy // *MIS Quarterly Executive*, 2016, 15, (2), 103-119.
8. Schweer D., Sahl J. C. The Digital Transformation of Industry –The Benefit for Germany. The Drivers of Digital Transformation. Springer, Cham, 2017. PP. 23-31. https://doi.org/10.1007/978-3-319-31824-0_3
9. Kupriyanovsky V.P. (2017) The industrial transformation in the digital economy: planning and production // *The International Journal of Open Information Technologies*, 5, 1, 50-70.
10. The key principle of digital transformation. Access mode: www.pwc.ru/publications/PwC-Siemens-Digital-transformation