

# Management of the Organization of Digital Production Companies

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**Abstract.** Companies are concerned about the need to improve competitiveness and strengthen their position in the market, based on innovation and the introduction of digital production.

Effective management of the organization of digital production is necessary, which establishes the main approaches to the analysis of the use of digital production technologies in the enterprise and to the formation of the analysis of the strategy and the list of priority measures for the digitalization of production processes.

It is necessary to formulate the basic parameters of development at all stages of the life cycle, presented in the article, designed to ensure methodological and methodical unity in the development of programs in enterprises.

Management of the organization of digital production will allow a deeper understanding of the production process and its economic

efficiency, regional characteristics of markets and customer needs.

The introduction of specialized software systems at the stage of development of new products will solve a number of important tasks.

## 1. Concepts of organization of digital transformation

Digital transformation is more and more frequently mentioned among critical factors intended to enhance organization competitiveness and successful development [5]. Nevertheless, currently there is no uniform understanding of essence and limits of using this concept and criteria of organization digital transformation assessment. Thoroughness of this term comprehending and interpretation is necessary not only to determine the theoretical topic but also to appreciate practical analytical investigations.

Earlier, Pathel and McCarthy [6], developing the concept of organization digital transformation, were often focusing on issues like e-commerce and e-marketing or, for example, e-literacy [7]. Nevertheless, modern scientific views are more and more frequently underlining complete renovation of business models and value creation logic in all branches of industry [8,9].

According to some authors [10], organization digital transformations are taking place not through employment of particular innovative production and management tools but on the basis of digital development strategy. Currently, in order to elaborate proper development strategy, organizations make reference to opinion of experts having digital tools development and implementation experience. Summarizing the viewpoints of the core companies [10-12], it is possible to point out similarity of their way of comprehending the essence of digital transformations: digital transformation means

adaptation to digital technologies impact and integrating them into organization's external interface and into ongoing internal processes.

Development and spreading of information-communication technologies was always increasing their impact on any part of socio-economic relations. Initially, the companies considered the information and digital technologies as an aid for developing the new product, raising labor productivity and simplifying some of the business processes. However, the deeper innovation technologies were entering everyday life, the more they affected subjects and objects of market relations. Figure 1 shows three stages of organization digital transformation evolution pointed out by S.J. Berman and R. Bell, IBM Institute for Business Value [12].

## **2. Conceptual framework**

The program of development of technologies of digital production at the enterprise shall represent system of scientifically proved and target reference points, contain determination of the main directions and parameters of development:

- systems and means of "digitalization" of processes throughout the life cycle of products (design, technological preparation of production, production planning and management, supply, sales, maintenance, etc.);
- electronic document management and enterprise resources (labor, material and financial);
- digital management of the enterprise and in particular production of products in the form of "digital factories»;
- the integrated information system of the enterprise working in real time and uniting all available and planned to development of system of digital;
- management systems of project and multi-project environment, means (technical, intellectual) necessary to achieve the goals, as well as organizational and technical measures to ensure a favorable environment for the functioning of the information system.

The program of development of digital fabrication technologies must define the concept of technical, human, structural and economic policy at the enterprise, to solve problems long term in the field of digitalization, to act as a tool for strategic development of the enterprise to provide a unified methodological approach to the definition of the role of digitalization in the achievement of target indicators of the forecast of development of the enterprise, to free choice of technical and economic solutions and tools for building enterprise information systems.

The development of a program for the development of digital production technologies in the enterprise should be based on a real assessment of the production potential of the enterprise for the development of information technologies, including both internal and external factors.

The purpose of the measures for the introduction of digital production technologies in enterprises is to improve the economic efficiency of enterprises and product quality, reduce the time of creation and launch of production, optimize the use of available resources of enterprises, mobilization reserves of production capacity, ensuring the competitiveness of products on the world markets, the formation of a modern business model of the enterprise.

The tasks of digitalization of production are the creation and implementation of modern integrated information systems and advanced production technologies, digital factories, covering all business processes and divisions of the enterprise, as well as all stages of the life cycle of manufactured products.

The construction industry has a high interdisciplinary influence and interaction. Transformation of organizations must improve their competitiveness in condition of digital economy formation [5] where socio-economic integrity is affecting all spheres of the public life.

The introduction of specialized software systems at the stage of development of new products will solve the problem:

- reducing the time and cost of creating goods with increased tactical and technical characteristics;
- formalization and accounting of requirements to the developed new products, development of control algorithms on the system model and their debugging during bench tests, exchange of

information with subcontractors to the work of subsystems, based on the application of model-oriented approach to system design;

- ensuring compliance with the requirements imposed throughout the life cycle of the designed products, including ease of use, readiness for production, maintenance and maintainability;
- increase of the intellectual component in the work of the designed products due to the use of artificial intelligence technologies in the auxiliary systems of the designed products, means and methods of remote control of the newly designed products;
- providing means and ways of protection of the developed production from external influences;
- planning of requirements for the availability and delivery of necessary spare parts and accessories based on the resource management strategy of the designed products, as well as through the development and use of digital counterparts, receiving information about the work of existing;
- to ensure continuity, the reduction of staff turnover, storage, protection and reuse of intellectual works;
- reduction types of in-plant tests and the cost of their implementation due to the transition to computational methods of identifying suitable design and/or verification of the correctness of the design options:
- minimization of acceptance tests during the state acceptance/certification of the developed products (including international);
- development of schemes of maintenance, repair, creation of interactive manuals before the start of production, interactive presentations of products for potential customers at the initial stages of the project;
- the most rapid training of personnel, rapid changes in the existing design, even in the absence of design documentation and/or digital model, using virtual reality technologies;
- formation at the appropriate levels of libraries of standard components and circuit solutions that have already been tested for efficiency, reliability and have proven technology of serial production, the method of acceptance by the customer.

The development of digital systems and the introduction of elements of digital production in individual enterprises can have a synergetic effect in the introduction of elements of digital production and the organization of digital production at all stages of the product life cycle. Business processes of product development, production and maintenance are not confined to the enterprise, but, as a rule, pass through many enterprises and organizations and have a cooperative nature.

Currently, the companies are carrying out measures to modernize the industrial model of the production structure, aimed at the specialization of enterprises and the expansion of the scope of work within the framework of cooperation.

The main conditions for the implementation of the industrial model are:

- creation of a single space of accessible resource and technological base of enterprises;
- creation of a single space of product specifications and manufacturing process standards;
- providing the possibility of creating end-to-end network schedules of cooperation for the production of products with the selection of suppliers and control of the execution of deliveries in real time.

### **3. Conclusion**

Thus, the program of development of digital production technologies in the enterprise should be based on the analysis of the current state of information technology of production processes throughout the life cycle of products, the role of digitalization in achieving the main factors of economic growth of the enterprise and assessing their impact on its further development in the forecast period. During the analysis of the level of digitalization of all spheres of activity of the enterprise it is necessary to identify positive trends in the development of digital production technologies, as well as to determine the reasons for the backlog in their development for individual services of the enterprise and

individual stages of the life cycle, to identify areas where there are no digital tools, which can adversely affect the efficiency and effectiveness of production of goods, products, works, services.

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