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FLEXIBLE PRODUCTION STRUCTURE AS A BASIC REQUIREMENT OF THE GLOBAL MARKET

ГИБКИЕ ПРОИЗВОДСТВЕННЫЕ СТРУКТУРЫ ОСНОВНОЕ ТРЕБОВАНИЕ МИРОВОГО РЫНКА

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Abstract: *The main issues are considered in this topic: Modern production has both quantitative and qualitative flexibility, which is essential in the global market where there is a "dictatorship of the buyer". In such circumstances it is necessary to respond quickly to customer orders. This means that production should be able to quickly change the volume and range of products*

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In the times of the modern economic conditions we can name a "progressive production" only that which actively and dynamically responds to emerging challenges. Competitiveness and efficiency are the predominant factors in the production enterprises, especially high-tech industries. Therefore, the review of organizational and structural issues relating to operations in production is very crucial. Operational approach to the construction of industrial structures helps them to focus on targeted problems, helps to perpetuate divisions operations in achieving this goal and reduce the number of levels of hierarchy in the company. This approach promotes relationships between departments and creates opportunities for integration, providing complete information on customer needs and the production processes to meet those needs.

This topic was studied in the works of local theoreticians and practitioners such as Mina ES, Dashchenko AI, Poletaev VA, Nakhapetian VG, Goriushkin VN, Vissema H. and others.

The purpose of he given article is to examine the operational approach to structural production decisions and evaluate the need for flexible manufacturing systems.

Structural solution closely linked to production resources such as: People, Plants, Parts, Processes, Planning and control systems (a popular concept abroad "5R production management "). They should review it in close connection with changes in customer's needs, market conditions and the level of development of new technologies in production.

The combination of organizational and structural decisions depends on the goals, strategies and perspective approach to production. There are two types of orientation - orientation to manufacture the product (the traditional approach) and operational approach with a focus on integration of the production process from receipt of client orders to supply it manufactured products (operational approach) [3].

The industrial structure is in constant development influenced by changes in technics, technology and forms of organization of production processes.

During the process of formation of industrial structures, a person must take into account certain factors that determine the requirements for building sustainable structures.

Environmental factors - economic, legal, scientific, technical, socio - cultural, environmental.

Factors for the internal environment include: objectives and development strategy, resource constraints, products, technology, staff, production capacity and so on.

The choice of structural solutions in production is related primarily to the following factors: forms of specialization and cooperation departments; power, scale and orientation of production; development of technology and technology; organizational environment; location production.

There are two main forms of specialization of production units - technological and substantive.

The technological specialization units characterized by a group of similar jobs on the implementation of technologically homogeneous transactions with different products.

Subject specialization characterized by the concentration in the structural units of homogeneous or heterogeneous operations to ensure the completeness of processing.

Considering the orientation of production, we can state that the complexity of the subject specialization leads in turn to increase the number of manufacturing processes for the production of high-tech and capital-intensive products.

The production structure of these companies focused on technology development and requires the formation of production units concerned with the process.

However, there are many companies that manufacture some simple homogeneous products with a focus on the production structure of the product.

Product complexity and difficulty of production form the focus of industrial enterprises have a direct influence on the decision-making structure [1].

The development of techniques and technology as a result of scientific and technical progress leads to change: forms of production processes and their structure, proportions between phases (stages) of production, turnover rate products and its modification.

The development of technic and technology facilitates the implementation of flexible systems (group technology), which with time and experience develops the structure of production systems, combining automation based on all phases of the life cycle of the product [2].

Organizational environment characterizing the potential development of the production structure of the middle and creates conditions for the formation of new business units.

Location manufacture and departments often determined by customer demand for manufacturing products.

In today's technological complexes used in a multiple discrete production, the following requirements should be met: intensification and automation of manufacturing operations; high level of process automation, computerization of all its stages; coordinating the implementation process operations transportation, storage and management.

The need to meet the aforementioned requirements led to the emergence of new principles of organization and management process, which can broadly be described as flexible production systems.

Flexible manufacturing systems (FMS) - the most effective means of automating batch production that allows to move from one type of product to another with minimal time and labor. [2]

Flexible manufacturing system is a combination of a separate unit or process equipment and systems to ensure its functioning in automatic mode that has the properties of automated production changeover on an arbitrary range of products in a set within the meaning of their characteristics. Its use allows to spread the benefits of automation to medium scale production to produce small batches of products and extremely high adaptation to market requirements, the ability to respond quickly to consumer demand. Of course, it should be born in mind that the introduction of flexible automated production at the GMS accompanied by considerable one-off costs. Economic feasibility decision on their use requires careful justification and calculation of effectiveness of the implementation [1].

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Economic theory and practice have developed three basic methods for evaluating the effectiveness of investments of financial, material and other funds in various projects:

- Market approach, based on the analysis of the opportunities created by the sale of profitable technology on the market;

- Income approach is based on assumptions of future revenues from enterprise development and project implementation;

- Cost approach, which stems from the assessment of the costs of the enterprise, needed to play the buildings, equipment, cash, securities.

One of the key indicators of the project is the net present value, which determines the absolute result of a joint investment project. Net present value Pt is defined as the difference between the current present value of future income Dt * 1 / at reduced costs and future St * 1 / at:

$$\sum P_t = \sum^{t} D_t * \frac{1}{a_t} - \sum^{t} S_t * \frac{1}{a_t} = \sum^{t} \frac{D_t - S_t}{(1+r)^t}$$

where t - the duration of the product life cycle from the beginning of its operation to the cancellation.

Another important indicator of the economic efficiency of the project has an internal rate of return that determines the condition of equality of income and reduced costs resulting net present value (or net present income) becomes zero.

In addition to key performance indicators that characterize the excess value of the results obtained from the project, the total valuation of the cost of its development and implementation in some cases can be used by additional indicators. In assessing the effectiveness of new technology to create these indicators, in particular, include:

Resulted costs (C), determining unit costs:

C = C + EnKud, (2)

where C - the unit cost, currency; Kood - specific investments, currency .; Yong - normative coefficient of comparative economic performance.

Regulatory profit (Mo) is equal to the ratio of profit (P) to capital investments (K):

Mo = P / K; (3)

The annual economic effect of the introduction of new technology:

Ehod = (Ze - Again) * N, (4)

where Ze and again - given the cost of technology, accepted as the standard and new technology; N - annual release of new technology (and the consumer - the annual volume of products produced using new technology);

Project profitability (R), equal to the discounted income from the project to the discounted cost of the project. , (5)

Payback period (Talk):

Talk = ΣSt / Dt, (6)

where ΣSt - common amount discounted project costs; Dt - yearly discounted income from the project [2].

Technical preconditions that have made possible the emergence of GIS, was the creation of:

• modern automated equipment including numerical control (CNC), on the basis of standardized modular components, and in some cases served robots, manipulators or other types of devices that provide automation support and installation operations;

• devices that provide automated storage, retrieval, transportation and installation Cargo unit using computer equipment management.

• fairly reliable and relatively cheap computer technology that allows you to build a connected and unrelated information and control structure for specific technological units and their complexes.

For such a modern industrial complex is characterized by a high degree of technological parametric and structural flexibility and broad application of the principle of standard technological, managerial and technological solutions [3].

The technological basis of flexible production systems in various discrete production can be divided into two groups.

GVS first group to be issued with high performance large series of narrow range of products, characterized by a high degree of structural and technological similarities (so-called closed families of products. Such technological tasks are using a variety of GIS, called flexible production line. In this line of flow products moves with a given rhythm by working positions located under the technological route and link between internal transport devices for machines. Passage of product production cycle is determined in this case the relevant technological route and this route finding equipment.

For this kind of flexible manufacturing systems typical of what products to switch to another name to stop the flow, complete processing the existing backlog, stop the equipment, to its setup and then restart the flow of products to produce new name. Thus, while in production on a flexible production line can only be products of a single name. [1]

GVS second group intended to release wide range of products, only limited sizes specifications applied equipment, specialization and qualification of production staff and has a range of great technological diversity (open families of products).

For this kind of production characteristic movement of products from one piece of equipment to another by random alternate route with the possibility of interruption. Itinerary products and sequence of technological operations over them are not associated with a hardware or alternation with the same audio system specialized production teams and defined work plan and schedule production complex loading equipment and referral facilities mentioned production brigades, consisting not at once design phase of the production complex and many times during its operation for a specific product. This simultaneous in the production of various kinds of products and does not require mandatory alignment for various products Time on the relevant operations process route, as well as the number of these operations.

FMS second group includes technological complexes of various sizes, degrees of difficulty d level of automation, from flexible sites and shops to flexible automated manufacturing and associations .

Thus a multiple, flexible production, regardless of their nature characterized by simultaneous work on multiple products with the performance of certain operations with technological route to the typical operations of technological equipment. Products and related equipment and personnel when specific operations are moved relative to each other. This is done by moving a product from one workplace (working position) to another according to the schedule load equipment.

Modern production has quantitative and qualitative flexibility, which is essential in a market economy where there is a "dictatorship of the buyer". In such circumstances it is necessary to respond promptly and adequately respond to orders coming. This means that production should have the ability to quickly and widely change the volume and range of products.

We can conclude that the current trend's goal is to ensure that fluctuations in demand for variety and quality controlled by appropriate changes in production capacity. Ability to change the range of products, is qualitative flexibility is achieved by expanding the universalization training production personnel, and through the use of flexible manufacturing overloaded systems.

Scientific and technical development forecast production shows that it is flexible manufacturing systems (FMS) best to meet customer requirements, solve problems of product competitiveness in the world market, provide high profitability and efficiency. These systems avoid unnecessary overstocking products and effective spending of all resources.

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