

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL  
SCIENCES OF UKRAINE**

**EDUCATIONAL AND METHODOLOGY GUIDE**  
**for the educational practice "Operational Management"**  
for students of specialty 073 "Management", Academic Degree "Bachelor"

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Educational edition

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## INTRODUCTION

Completion of the educational practice "Operational Management" by students of the 4th year of bachelor's training of the academic degree "Bachelor" in the specialty "Management" (Management of Investment Activities and International Projects) is the final stage of the study of professionally oriented disciplines and the basis of the idea of the future profession, the study of professional functions of future managers in various spheres of economic activity.

The program and methodological guidelines of the practice are focused on the training of specialists for enterprises of various legal forms of ownership and economic activities and regulate the basic requirements for the content of the practice.

The organization of practical training of students is carried out in accordance with:

- the Law of Ukraine "On Higher Education" dated July 1, 2014, No. 1556-VII, as amended;
- Regulations "On the practice of students of higher educational institutions of Ukraine", approved by the order of the Ministry of Education of Ukraine dated April 8, 1993. No. 93;
- Regulation of the Ministry of Agrarian Policy and Food of Ukraine "On practical training of students of higher agricultural educational institutions of Ukraine" dated September 5, 2013;
- Regulations on the educational and scientific center for practical training of students of NULES of Ukraine;
- Regulation of the National University of Life and Environmental Sciences of Ukraine "On practical training of students of the National University of Life and Environmental Sciences of Ukraine " dated November 5, 2021;
- working programs of students' educational practices;
- curriculum of specialty 073 "Management" Academic Degree "Bachelor";

- valid documents regarding the organization of the educational process at the NULES of Ukraine: <https://nubip.edu.ua/node/12654>.

The purpose of the educational practice "Operational Management" is to form the foundations of the professional culture and competencies of future managers; deepening the theoretical knowledge acquired in the course of training in the main disciplines of the professional field; formation of a complex of special knowledge regarding operational management; development of proposals for the introduction of new technologies of production processes at the enterprise.

The main tasks of the educational practice "Operational Management" are:

– consolidation and deepening of knowledge obtained during the study of professionally oriented educational disciplines;

- familiarization of students with professional requirements for specialists, necessary practical skills and abilities;

– development of practical and professional skills of a young specialist regarding the use of basic management tools;

– study of the main factors and elements of the process of forming a manager's style and image and development of means of purposeful creation of a holistic positive image;

- acquisition of professional knowledge and skills regarding the performance of organizational functions in the office.

The sequence and terms of students' educational practice are regulated by the industry standard, a variable part of the educational and professional training program for a specialist in the field of "Management", Academic Degree "Bachelor". The calendar periods of practice for each academic year are determined by the schedule of the educational process of the NULES of Ukraine.

The result of the training practice "Operational Management" is the formation of the following professional competencies among the students of the specialty 073 "Management", Academic Degree "Bachelor":

- the ability to use acquired theoretical knowledge in practice to improve the effectiveness of operational performance management;

- the ability to plan, organize and implement personal practical research in the field of operational and strategic management;

- the ability to perform the functions and procedures of forecasting, organization, operational and strategic management, motivation, coordination and control in the organization;

- the ability to develop the company's operational strategy;

- the ability to substantiate decisions regarding the creation of an operating system, support for the proper mode of its functioning.

## **CHAPTER 1. ORGANIZATION OF THE PRACTICE**

The basis of practice is the Educational and Scientific Laboratory of Investment Projecting of the Production and Investment Management Department.

The basis for the practice is the order of the National University of Life and Environmental Sciences of Ukraine, which specifies the place and term of the practice and appoints a supervisor from the Production and Investment Management Department.

The educational practice "Operational Management" provides students with the mastery of a system of skills and abilities for the organization of production processes at the enterprise. Practical training is organized after students have mastered the necessary theoretical material and completed laboratory and practical work.

Before the start of practice, the Production and Investment Management Department holds a general meeting with students, where the main goals and tasks of the practice are determined, a diary, a work program for practice and an individual task are issued, which are specified in the plan. The calendar of practice is approved in the diary. After the practice, the diary on educational practice must contain feedback and evaluation of the student's work during the practice period by the practice supervisor from the educational institution.

The term of educational practice is 1 week. During this period, tasks determined by the practice program are performed. The term of defense of reports based on the results of educational practice at the end of the practice (set by the Production and Investment Management Department).

The practice program should contain the following main sections:

- goals and objectives of practice;
- organization of practice;
- content of practice;

- individual tasks;
- summarizing the results of educational practice.

**The main responsibilities of a student during practice are:**

- before the start of practice, it is necessary to get acquainted with the program and procedure;
- it is necessary to undergo training on labor protection and accident prevention at the department;
- it is necessary to coordinate the practice schedule with the practice supervisor from the Production and Investment Management Department of the NULES of Ukraine;
- to receive the necessary package of documents from the practice supervisor: methodical instructions, program, diary on educational practice, individual task;
- to receive consultations on all issues of organization and conduct of practice;
- to arrive at the place of practice in a timely manner and document the start of practice:
- to observe labor discipline, rules of labor procedures, safety and occupational health and safety techniques, industrial sanitation;
- to fully perform the assigned tasks provided for by the practice program, the recommendations of the practice manager;
- to keep a diary on educational practice on time and at the appropriate level, noting the work done;
- during the entire educational practice, consistently perform an individual task.
- bear responsibility for the work performed and its results and show an example of a conscious and conscientious attitude to work;
- to participate in public, cultural and mass life of the enterprise, organization, institution;



– in a timely manner, within the deadline set by the Production and Investment Management Department, to issue the reporting documentation and pass a credit on educational practice.

During the internship, the student must follow the established rules of internal procedure and safety rules.

At the end of the educational practice, students are assigned marks based on the results of checking the diaries and the teacher's personal observation during the practice. If necessary, individual students are interviewed on the implementation of the practice program.

The diary is the main document that confirms the student's educational practice, which shows all his current work. The diary contains:

- the work plan, which is drawn up together with the practice supervisor from the Production and Investment Management Department;
- work records during practice;
- the conclusion of the practice supervisor on the completion of the practice, including the final evaluation of the student's work during the period of practice.

A sample form of the diary is given in Appendix A. After completing the practice, the diary is signed by the student and certified by the signature of the practice supervisor.

The supervisor of educational practice from the Production and Investment Management Department is obliged to:

- manage educational and methodological support of practice in the NULES of Ukraine;
- conduct briefings on the procedure for passing practice;
- instruct students on occupational health and safety;
- control students' compliance with the rules of the internal procedure of the practice base;

- organize students' industrial practice;
- monitor the implementation of the schedule of educational practice;
- to provide students with the opportunity to use available literature and necessary documentation;
- provide students with the necessary documents: internship program, diary, internship calendar;
- inform students about the practice reporting system;
- to assist students in completing internships in accordance with its program, ensuring decent working conditions;
- conduct regular, in accordance with the drawn up and approved schedule, consultations on issues of practice;
- control compliance with the deadlines for practice tasks, their correction if necessary;
- advise and help students in writing a diary;
- monitor compliance by students the rules of the internal procedure;
- as part of the commission, conduct a final attestation based on the results of the students' educational practice in the form of a credit based on the practice diary and personal observations;
- for the results of the educational practice, prepare a written report on the results of the practice according to form No. 55 and submit it to the educational department within the terms established by the University Order.

## **CHAPTER 2. CONTENT OF THE EDUCATIONAL PRACTICE "OPERATION MANAGEMENT"**

Students of the specialty 073 "Management", Academic Degree "Bachelor" in the course of training practice "Operational management":

- learn to analyze the situation and identify the causes of deficiencies in the management system, take measures to eliminate and prevent them;
- master the process of developing and implementing the company's strategy;
- get acquainted with the essence and stages of operation strategy development;
- learn the features and properties of the enterprise's operating system as a management object;
- learn to organize the operational activities of the enterprise;
- master the methods of managing the current functioning of the operating system and the productivity of operational activities.

Educational practice is conducted in three stages. At the first stage, the theoretical and methodological foundations of management are summarized in the context of a systemic approach to the concept of operational and strategic management; understanding the process of implementation of operational management, the scope of decision-making, functions and methods of the operational manager; construction of principles of modern operational management. At the second stage, practical tasks of practice are carried out. At the third, final stage, students summarize their practice with mandatory completion of the diary on educational practice.

The content of the educational practice "Operational and strategic management" is performed by students of the specialty 073 "Management", Academic Degree "Bachelor" within the scope of the topics of professionally oriented educational disciplines, namely:

### **CHAPTER 3. SUMMARY OF PRACTICE RESULTS**

After the end of the practice period, the student draws up a diary and submits it to the supervisor for verification and signature. The practice supervisor signs the diary and makes a conclusion about the practice, which must be reflected in the practice diary.

The completed and signed diary is presented to the commission appointed by the Head of the Production and Investment Management Department. The commission consists of the head of practice and professors of the department who taught disciplines according to the practice program. According to the results of checking diaries, personal observation of the professor during practice and oral survey on theoretical and practical knowledge and skills, students are assigned marks by commission members. If necessary, individual students are interviewed on the implementation of the practice program.

The commission evaluates the completion of practice according to unique criteria (Appendix B).

Differentiated credit for practice is provided considering:

- evaluations for writing a diary, specified in the conclusion of the practice supervisor;
- presentations by the student of the results of the practice during the answers to the questions of the commission members;
- answers to the questions of the members of the commission on acceptance of practice credits.

The results of educational practice are evaluated according to the following criteria:

- mark "excellent" means that the student completed the main tasks of the educational practice and the individual task, according to the calendar plan, kept a practical diary where he meaningfully recorded all observations, during the defense

showed the ability to analyze, compare, generalize, abstract and concretize, classify and systematize materials;

– mark "good" means that the student, according to the calendar, completed the main tasks of the practice, drew conclusions considering cause-and-effect relationships and mechanisms (algorithms) of the course of phenomena (processes), while at the defense sufficiently demonstrated the acquired skills and skills in working with documentation and information;

– mark "satisfactory" means that during the practice, the student completed the main tasks of the practice, but there is an insufficient level of acquired abilities and skills in working with documentation and information, conclusions are drawn without considering cause-and-effect relationships and mechanisms (algorithms) of the course of phenomena (processes);

– mark "unsatisfactory" means that the student during the educational practice violated labor discipline, did not follow the practice program, did not prepare a practice diary, received negative feedback from the practice supervisor.

The assessment for the practice is fixed in the assessment and examination list and in the student's credit book in accordance with the national scale (Appendix B).

A student who did not complete the practice program without valid reasons or received a negative evaluation by the commission for practice, will be expelled from NULES of Ukraine for not fulfilling the schedule of the educational process. In some cases, the student may be granted the right to undergo practice again according to an individual schedule.

The results of educational practice are discussed at the meetings of the Production and Investment Management Department.

**The program of the discipline contains**  
**CONTENT MODULE 1**  
**OPERATIONAL SYSTEM OF THE ORGANIZATION AND**  
**OPERATIONAL MANAGEMENT**

**Topic 1. Operational management as a kind of functional management**

The essence, scope and organization of production activities of people. Relationship of functions of the organization with management. The concept of operational management and evolution of its development. Goals and objectives, content, areas and objects of operational management. Operational management as a kind of functional management. The process of implementing operational management. The purpose and objectives of the operational manager. Areas of decision making and functions of the operational manager. Functions of operational management: planning, forecasting, organization, motivation, control. Methods of operational management: organizational, administrative, economic, socio-psychological. Development and use of effective methods in production and operational management. Principle provisions of modern operational management.

**Topic 2. Operational strategy**

General characteristics of the content of the operational strategy of the enterprise. The essence of operational strategy. Operational priorities. Main competitive priorities. Working framework of operational strategy in production. Operational strategies: from customer needs to order fulfillment. Key operational opportunities. The process of implementing the strategy. Formation of production strategy. Production capacity solutions. Vertical integration. Strategies that determine the dynamics of production technology. Making strategic decisions on the scale of production of traditional and new products. System of strategic measures for the use of production personnel. Quality management. Solutions for the development of

production infrastructure. Relationships with suppliers and other cooperation partners. Distribution of ready products. Production management. Features of the service sector that affect operational strategy. The role of operations in ensuring competitiveness on corporate level in the field of service. Development of process strategy. Types of process strategies.

### **Topic 3. Operational system of the organization: structural and process characteristics**

System approach in operational system of management. Basic principles of system approach in operational system management. Operational system as an element of the organizational system. Operational system as a special class of system. Production enterprise as a complex dynamic system. Production structure systems. Operational system as an object of management. Operational system as a unity of interconnected subsystems. Characteristics of the processing subsystem. The structure and functions of the support subsystem: technical preparation of production; technical production service; resource provision. Planning of subsystem and control of the organization. Hierarchy of the production system of the enterprise. The influence of the external environment on construction and operation of the system. Characteristic features of operational systems. Typical structures of information transfer in operational systems depending on the type and construction. A set of functional tasks that are solved.

Typology of operational systems. Characteristic features of the organization of production systems on the basis of the established uniform characteristics of types of production. Classification of operational systems on various grounds. Two-dimensional approach to classification of operational systems (matrix "product-process"). Characteristic features of the project-type operational systems. Small series

production. Mass production. Operational system. Operational system with continuous process. Requirements that modern operating systems must meet.

#### **Topic 4. Production process**

The concept of operational activities of the enterprise. The essence of the operational function. The main types of conversion. The composition of fixed resources as inputs to the operational activities. Operational system in the general structure of industrial enterprises. Resources as controlled factors of production. The concepts that used to measure resources: "bottleneck" ("insufficient resource"), "Surplus resource", "resource of limited power".

Operational (production) process of the organization as the basis of functioning and operational system development. Technological operation. Stages of the production process. Classification of production processes. Types of production process depending on the method of organizations. Basic principles of organization of production processes: differentiation, concentration and integration, specialization, proportionality, parallelism, directness, continuity, rhythm, automaticity, flexibility. Organization of the production process in space and time. Differentiation of production process at the enterprise. Production structure of the enterprise. Forms of organization of production: group (technological), subject and flow. Formation of production units of the enterprise. Organizational and technical level of production. Methods of calculation. The main ways to increase the organizational and technical level of production.

## **CONTENT MODULE 2**

### **CURRENT OPERATIONAL MANAGEMENT SYSTEMS**



## **Topic 5. Production strategy and competitiveness of the enterprise**

Economic strategy of the organization and the need for its development. The most significant features of the organization's strategy. Stages by which testing is carried out. The process of strategic planning. Formation of a strategic plan. Management survey. Stages of strategic planning. Models of choosing options for economic strategy of the organization. The Boston Matrix consulting group (BCG). Porter's competitive strategy model. Determination of Porter analysis components. The essence of the production strategy. Strategy and tactics in operating room management system. Production strategy. Criteria for implementing the strategic plan. Storage strategies and tactics in operational management.

## **Topic 6. Planning and projecting in the operational process of the enterprise. Project Management**

Project management. Prerequisites for projecting the operational system. Interrelated aspects of projecting of production systems: production, structural and organizational, aspects of efficiency. Methods of projecting the operational system of production enterprises. Characteristics of the general condition of the operational system at the enterprise. Operational triangle. Methods of designing the operational system of a manufacturing enterprise. The main stages of the operational system projecting process. The main stages of the process of product projecting. Factors to consider when projecting services. The tools that are most widely used in process planning. The essence of the project approach to organizational management. Project as a sequence of interrelated operations. The main features of the project. Classification of projects. Project approach. Project management. Project management rules. Project planning. Postoperative list of works. The structure of the project. Qualitative development of the project work structure. The main characteristics, features, benefits

and shortcomings of a separate project. project. Classical matrix organizational form of structures, its advantages and disadvantages. Project estimate.

### **Topic 7. Management of material resources**

The main motives for the creation of inventories. Classification of stocks of enterprises. The main functions performed by stocks: protection of prices from inflation; cost management through the use of discount; accumulation. "Extracting" and "pushing" operational management systems. System of operational and calendar planning. In-Time Production System. Systems "just in time": positive and negative features. Inventory management systems and their main types. The essence of inventory management. Inventory management system. System parameters of inventory management.

# **I. THEORETICAL MATERIAL USED IN THE LECTURES**

## **CONTENT MODULE 1**

### **OPERATIONAL SYSTEM OF THE ORGANIZATION AND OPERATIONAL MANAGEMENT**

#### **Topic 1. Operational management as a kind of functional management**

##### **1. The essence, scope and organization of production activities of people.**

###### **Relationship between organizational function and management**

##### **2. The concept of operational management and the evolution of its development**

##### **3. Goals and objectives of operational management**

##### **4. The process of implementation of operational management**

##### **1. The essence, scope and organization of production activities of people.**

###### **Relationship between organizational function and management**

Every enterprise in the process of its operation carries out production activities, which, along with financial and marketing activities, ensures the achievement of its goals.

Production activity is understood as a set of purposeful processes carried out by people through means of labor or natural processes, as a result of which objects of labor are transformed into finished products, changing their composition, condition, shape and obtaining certain new properties.

The production activity of the enterprise is a complex process. It consists of production - the process of manufacturing marketable products and production maintenance activities (tool, repair, transport, warehousing, energy, logistics, etc.). In turn, every production service or supply in the framework of its tasks also performs the

function of converting input components into finished products, i.e. it is also a production activity.

*Production activities include:*

- living labor of people as an active part of production, which is the basis of the labor process. It is the workers who are the main creators of tangible and intangible goods;

- objects of labor on which a person works to turn them into an intermediate or final product in order to meet certain needs of consumers. In industry these are it's materials, blanks, raw materials, semi-finished products, i.e. all that is aimed at human labor;

- means of labor are part of the means of production (machinery, equipment, tools, equipment, etc.), by which a person affects the objects of labor.

Production activity (production function) is one of the functions of the enterprise. It is closely related to its other functions, i.e. financing, marketing, staffing, etc.

In addition to the concept of "production function" there is also a widely used concept of "operational function". The operational function includes all actions that result in the release of products and services supplied by the organization to the environment. This feature is inherent in any business. The specific content of the operational function can be determined by a set of separate, fairly autonomous activities of the enterprise, which are due to its creation, operation and development.

Enterprises (organizations) differ in the types of activities included in the operational function. Organizations that produce goods, as a rule, are material and energy-intensive, i.e. consume significant amounts of raw materials, semi-finished products, fuel and energy resources, etc. Such organizations include construction sites, machine-building enterprises, bakeries, etc. The products of these organizations, except for construction, are usually designed for the mass consumer - it's cars, vacuum

cleaners, bakery products, etc. At the same time, service organizations (service enterprises, airports, bus stations, hospitals) consume a small number of raw materials and energy. However, their services are usually individual and determined by the requirements of customers (customers).

Using the methodology of the systems approach we can establish that every enterprise or organization is an open system that converts input values, i.e. raw materials, semi-finished products, labor and others into output, i.e. products, services.

The organization of the elements of production involves their effective placement in space and time. The organization of production aims at a rational combination of these elements to effectively solve the problems of production and profit.

It is well-known that the fundamental concepts of the organization of production include the productive forces. These are the forces and means involved in social production. The main element of the productive forces is the person who sets in motion the means of production.

The means of production include the means of labor (everything by which man acts on the material and spiritual world) and the object of labor (the object of human effort, everything from which products are made).

In the process of production and division of labor there are production relations among people, a kind of which is production and technical relations. The main purposeful, organizing, motivating and controlling body of production activity of the enterprise is production management, i.e. its management. Production management is one of the special functions of management, which is to plan, organize, motivate and control the production activities of the enterprise.

The organization of production is one of the functions of production management, which is carried out by specialists of production units of the management staff and ensures the streamlining of the processes of creation, development and

production. The organization of production answers the question of how to organize the basis of business - its production system, and production management - how to make the production system efficient and ensure its rational use to achieve the goal of the enterprise.

## **2. The concept of operational management and the evolution of its development**

Operational management is interpreted somewhat differently by many scholars and practitioners due to its versatility and the search for the most successful definition. It is common to associate operational management with production activities or physical changes in the condition of objects of labor. Therefore, it is most often defined as follows:

*Operational management is the activity of managing the process of purchasing materials, their transformation into a finished product and the supply of this product to the buyer.*

Many experts agree that this definition is quite generalized. It includes the functions of procurement, production and physical distribution, which, although closely related to operations, are usually considered separate areas of research. In addition, this definition is relatively limited, as it does not allow any actions that are not related to material production.

Usually, all useful activities involve the processing of something. This can be, for example, the processing of information on the stock exchange, publishing or advertising.

Consumers (hotel business; hairdressing, travel, medical services, etc.) may be involved in the processing process. Operations on the processing of objects of labor, information are carried out in the structural (functional) units of the production

enterprise, for example, in the planning and economic department, quality service, personnel department, labor and more.

A more precise definition, according to L. Galloway, is as follows: "**Operational management** is all activities related to the deliberate transformation (transformation) of materials, information or customers."

Operational management, according to this author is effective and efficient management of operations. It is emphasized that the degree of participation of physical goods in these operations is not important. In this case, the theory can be applied to the plant, factory, hospital or banking institution.

Similar to marketing and finance, operational management is a business area with clearly defined management functions. Operational management is part of management, not one of the methods for decision-making in any field, so its managerial role distinguishes this area from other disciplines. It should be agreed with V.O. Vasylenko that, in fact, **operational management** is synonymous with *production management of the organization*. It is based on the management of production systems.

To confirm the above, we give another definition: "**Operational management** is a system of implementation of management decisions for the development, design, planning, control, maintenance and organization of production systems of the enterprise."

The basis of production management is the management of the production system of the enterprise or organization. A production system is a system that uses production factors (resources) to convert the input factor introduced into its chosen product or service. The "input" of such a system can be represented by raw materials, the state of the customer or finished products obtained from another production system, as well as the customer (for the service, services) in need of service.

Thus, operational management can be considered as purposeful management actions for the development, use and improvement of production systems, on the basis

of which the main products or services of the enterprise (organization) are manufactured.

The activity carried out in all organizations to create goods and services is called operational.

Operation is a process, type of activity or set of actions, usually of a practical nature. Operations are an integral attribute of human activity, which is characterized by organization and productivity. Therefore, all organizational functions are operations and management activities include operational management.

In management, it is believed that the terms of operation and production are interchangeable. However, "production" mainly means the production of goods and processing of raw materials. The term "operation" is broader, it includes not only the production of goods but also the provision of services. The operational function contains the actions that result in the production of goods and services supplied to the external environment. All organizations have the function of operations, otherwise they simply cannot exist.

*Operational management aims to achieve efficiency in the management of any operations.* In operational management, efficiency should be understood as a certain degree of achievement of the goals set by the operating system. For the organization, efficiency is the satisfaction of consumer needs.

### **3. Goals and objectives of operational management**

The subject of the discipline of operational management is the study of scientifically sound forms and methods of managing the processes of creating an operating system and ways to ensure its effective functioning in different modes (regulatory, transitional). Among the methodological foundations of the course "Operational Management" can be divided into two main concepts:



- *systems approach based on general systems theory;*
- *life cycle theory approach.*

*The system approach* involves the study of all components of operational management in the relationship and interaction in order to understand their structure, organization, identify patterns of development and improve management methods.

The system approach as a method of scientific research is based on the concept of system. A system is a set of interconnected elements aimed at achieving a specific goal. An element of a system is an object, phenomenon, or process that is part of a whole and that does not need to be separated into its component parts.

*Life cycle theory approach* is based on the idea that each object (product, system, etc.) goes through a number of stages in its development, some of which are repeated many times. The composition and sequence of stages of the life cycle is determined by the characteristics of the object and the nature of external conditions.

The main purpose of the operational system is to ensure a clear implementation of the production plan or the provision of services of established quality by the number of each range and at a given time on the basis of rational use of production resources, as well as by identifying and mobilizing internal reserves. The implementation of this goal requires a clear definition of specific tasks and measures for their teams. The specific tasks to be solved within the current operation of the operating system include:

- complete and uniform execution of the production program with observance of terms of sending of production to consumers;
- full and rational use of means of production and labor resources;
- efficient use of working capital;
- development of modern forms of production organization;
- maintaining flexibility in production activities, which allows you to effectively adapt to environmental fluctuations;

– ensuring the optimal level of inventories, production and employment in accordance with the level of sales.

#### **4. The process of implementation of operational management**

Production management can be seen as the management of facilities or processes that manufacture goods or provide services.

This expansion of boundaries allows us to consider operational management more broadly, in relation to the management of any work and process. In addition to production, management theory should be applied to services, catering, public health, tourism, banking, trade, transport, hospitality, etc.

*Operations are all productive activities both production itself and other activities related to the creative process.*

Operational management is designed to ensure the efficient and rational conduct of productive activities in the field of production, and any other related to the service. Therefore, all managers should be considered operational managers, as they must manage their departments so that they work efficiently and rationally, regardless of their function. In addition, operations are the basis of any manufacturing or service business and if the operational function is not performed effectively then the organization as a whole will not be able to succeed. Thus, knowledge of the principles of operational management will not only help management to work more effectively but also will better understand the principles of the entire organization.

The organization will not be able to retain market leadership without a rationally organized operational function, as it loses in the efficiency of delivery, price and quality. The main purpose of the enterprise is characterized by a chain "production - consumer needs"

## **Topic 2. Operational strategy**

**1. General characteristics of the content of the operational strategy of the enterprise**

**2. The essence of the operational strategy**

**3. Operational priorities**

**4. Working framework of the operational strategy in production**

**1. General characteristics of the content of the operational strategy of the enterprise**

Operational strategy is one of the functional areas of corporate strategy. It is fundamentally important that in modern business all functional strategies (financial, operational, marketing, logistics, information, human resource management).

The overall strategy of the enterprise should take into account the strengths and weaknesses of the operational system through various functional strategies, strengthening the former and, if possible, eliminating the latter. In turn, the operational strategy should be a part of the overall strategy and other functional strategies. This requires that business leaders work in contact with all functional departments and develop strategies that do not conflict but complement and support each other.

At the functional level of integration, coordination of functional strategies with each other and with the overall strategy of the organization is difficult. Functional integration hinders the vision of a single goal of the enterprise and its implementation. The process approach to management and related operational and inter-organizational integration of activities allow to ensure the effective achievement of the goal and mission of the enterprise as a whole.

According to W. J. Stevenson, in the 1970s and early 1980s, American managers often neglected operational (production) strategies in favor of marketing and financial strategies. Decisions were often made by people unfamiliar with the case, and often to the detriment of the case. Meanwhile, foreign competitors have begun to fill the vacuum by focusing their efforts on operational strategy.

According to leading experts, the success of the company in the market by 20% depends on the correct strategy, 80% of success determines the implementation of the chosen strategy. In the implementation of the overall strategy of the enterprise, the operational strategy plays a major role, as it is related to goods, services and processes, as well as the organization of their implementation in all subsystems of the business operating system, covering all divisions of the enterprise. Thus, the operational strategy can have a significant impact on the competitiveness of the business. Without an efficient and streamlined operational system that develops according to the chosen operational strategy, no company can retain market leadership because it loses in delivery speed, price, quality, or all indicators combined.

In ideal conditions, after the development of the overall strategy of the enterprise should begin designing the appropriate production facilities, business processes and business operational system that meets the requirements of the chosen strategy.

If the company already exists and its capacity more or less meets the requirements, the creation of new production facilities is unlikely. Managers often feel more comfortable if the operational system set up at the enterprise changes radically. As a rule, in such cases new technologies are introduced into the already existing process. Although the use of new technologies is generally welcomed by employees, it does not necessarily lead to the creation of competencies that could help to win potential customers. It is necessary not only to increase the number of new technologies, but also to restructure the operational system for the production of new products so that it differs and would be more efficient than those used by competitors.

From this point of view, operations and processes should be seen as a characteristic of the quality of work of the whole enterprise. Without a clear operational strategy and effective operational management, the company can survive only by accident.

## **2. The essence of the operational strategy**

Operational strategy in the modern management literature is seen as a general policy and plans for the use of resources of enterprises aimed at the most effective support of their long-term competitive strategy. In some approaches, the operational strategy is considered to be a strategy that defines the principles of management of individual parts of the organizational structure and the value chain. According to some authors, the operational strategy should be considered as a strategy for the development of the operational system of the organization.

Most scientists consider an operational strategy in terms of long-term and stable operation of the operational system and its generation of products for markets with stable conditions and clearly projected demand.

So that an *operational strategy* should be understood as a set of interrelated management decisions for the development of general policies and plans for the use of resources of the enterprise (organization), aimed at effectively supporting its long-term competitive strategy in terms of development of operational system. The operational strategy, combined with the corporate strategy, should cover the full range of activities of the enterprise and involves a long process, which should provide the ability to respond quickly to any changes in the future.

Getting acquainted with the operational strategy, we will pay more attention to operations in production. At the same time, it should be understood that operational

strategies in both production and services have much in common and are, in principle, similar.

The operational strategy is to make decisions related to the development of the production process and the infrastructure needed to support its operation. The development of the process is to select the appropriate technology, scheduling the process over time, determining inventory, as well as how to place this process. Infrastructure decisions relate to planning and management systems, quality assurance and quality control methods, payroll structure, and organization of the enterprise's operational function.

Operational strategy can be considered as an integral part of the overall planning process, which ensures compliance of operational tasks with the objectives of a broader organizational structure. As such tasks tend to change over time, the operational strategy should also be developed taking into account possible future changes in the needs of buyers of the company's products. The operational capabilities of any enterprise can be considered as a portfolio of capabilities that are best suited to adapt to the demands of consumers of products or services of the enterprise.

To ensure their competitiveness, companies in different countries are guided by different priorities. The path to the success of an operational strategy is to identify as accurately as possible all possible priorities; understand what may be the consequences of choosing each of the available options, as well as what compromises will have to be made in case of choosing one or another option.

### **3. Operational priorities**

According to the early work of S. Wickham Skinner from Harvard Business School and later research Terry Hill from London Business School, the scientists distinguish several main types of operational priorities: production costs, product

quality and reliability, lead time, reliability of supply, the firm's ability to respond to change in demand, flexibility and speed of development of new products, as well as specific criteria for each product.

Let's consider these priorities in more detail. In any industry, there is usually a market segment in which sales depend solely on how low the costs of the company will be. To compete successfully in such a market niche, a firm must be a low-cost producer, but this is a necessary but not sufficient condition and does not necessarily mean that the company will achieve a high level of profitability and success.

As a rule, consumers who buy goods of daily demand are simply not able to distinguish the same products produced by different companies, which leads to the fact that the main criterion when choosing a purchase is its price. However, more often this market segment is very large, and, in addition, many companies are attracted by the potential to make a significant profit, which is often associated with large volumes of production. As a result, competition in segments of this type is usually very strong and fierce, and the percentage of bankruptcies is usually high. In such conditions, there can be only one producer with the lowest production costs, which usually determines market prices.

Another important priority is product quality and reliability. There are two separate categories of quality: product quality and process quality. The level of quality of each type of product varies depending on which market segment it is intended for. It is obvious that a children's two-wheeled bicycle must have a different quality than the car of a professional cyclist.

To ensure the appropriate level of product quality, it is necessary to take as a basis the requirements of consumers. It is obvious that excessively complex products with unreasonably high quality will not be bought because of its inflated price. On the other hand, the production of low-quality goods will lead to the loss of those potential

buyers who prefer to buy a thing a little more expensive, but one that, in their opinion, has certain advantages.

The quality of the process is also extremely important, as it is related to the reliability of the product. No matter which bicycles the company makes - children's or cars for cyclists - consumers want the thing they bought to be free of defects. Thus, the main purpose of quality assurance in the manufacture is to produce goods without any technological errors or shortcomings. Requirements for the manufacture of a product are determined by its technical characteristics specified in the size tolerances. To ensure the level of reliability of the product in accordance with its specific purpose, it is necessary to strictly adhere to these technical standards. In some market segments, the main condition for achieving competitive advantage is the ability of the company to produce products or provide services faster than others, i.e. the term of the order. Take, for example, a company that offers repair services for computer network equipment. A firm that is able to offer and perform such repairs on the client's territory within one to two hours has significant advantages over a competing company, which guarantees such repairs in just 14 hours.

The operational priority of "security of supply" is related to the company's ability to deliver goods or services exactly as promised. It is extremely important for any company, such as a car manufacturer, that its tire suppliers supply the required quantity of a given type of product on a daily basis. If the tires required to make a particular machine model are not available at the assembly line at a certain point where they are mounted, the entire conveyor may stop and stand until these components arrive. In addition, in the 80s and 90s of the last century, special attention was paid to the problem of reducing inventories, which led to a further increase in the role of security of supply as an evaluation criterion in the choice of suppliers of components.

#### **4. Working framework of the operational strategy in production**



The production strategy cannot be implemented in isolation, it must be related to consumers (vertically) and other elements of the enterprise structure (horizontally). Choosing a target market can be a very difficult task, but it must be solved.

The key operational capabilities, or area of competence, are the skills and techniques that distinguish a manufacturing or service firm from its competitors. The normal process of implementing a strategy is as follows: consumer inquiries about new products lead to the formation of priorities, which then become mandatory for operations.

Having determined the requirements for performance, the production unit of the enterprise uses all its potential, as well as the capabilities of its suppliers in order to meet these requirements. Enterprise capabilities include technology, systems and personnel. In each of these three industries, fundamental concepts and tools such as system of integrated management (SIM), total quality management (TQM) and the “just in time” principle (JIT) are used.

In order to reflect the fact that suppliers may be rejected if they have not passed certification testing in the field of technology, systems and personnel management, they also included a scheme (in the "cylinder") of operational capabilities. In addition, in determining the operational capabilities of the company in almost any case have to make another important decision: to produce or purchase parts and components.

Today, world-class manufacturers usually ask questions about every element of production, for example: if we are not world leaders, say, in the field of metal stamping, should we do it at all or is it better to sign a contract with a contractor who will do it quickly and qualitatively?

For example, in the production of computer equipment, most manufacturers receive all components from external sources, leaving only the assembly and testing of finished products (recently, the approach is becoming more widespread, when even

these operations are performed in the place where the product will be installed and operated as it provides higher quality work).

Perhaps the most difficult problem facing businesses is to abandon the traditional approach.

### **Topic 3. Operational system of the organization: structural and process characteristics**

- 1. System approach in operational management system**
- 2. Operational system as an object of management**
- 3. System hierarchy**

#### **1. System approach in operational management system**

A system approach in operational management system is understood as a way of thinking about organization and management, rather than a set of ready-made principles for managers. The local approach involves the study of a certain structure and functional features of its autonomous elements.

The system approach considers each object as a system and focuses on identifying different types of connections and combining them into a single system.

The systems approach is closely related to general systems theory. It is a methodology for the analysis and synthesis of objects of nature, science and technology, organizational and industrial complexes as systems.

A system is a set or combination of interconnected elements or parts that form a complex whole that interact in a certain way to achieve a given goal.

In the system approach, the organization is studied as a system, which is characterized by the unity of its structural and functional elements. Certain relations are established among the elements in the system. These relations and properties are a manifestation of the main principle of the system approach, i.e. the integrity of the system.

At the same time, according to the general theory of systems, the system approach involves the decomposition of the system, i.e. its division into individual elements, the study of their properties as elements of the whole.

One of these elements of the system is the operational system which acts as part of a whole that is separated by the social division of labor and has the ability independently or in conjunction with other systems to meet the needs of potential consumers through goods and services.

From the standpoint of a system approach, production is an important area of human activity, i.e. a complex system. Systems consisting of a set of interconnected objects are the national economy, industry, enterprise, shop, site. However, complex systems are complexes of functions, activities carried out in enterprises. As a single complex system can be considered all the activities of the enterprise, which consists of a network of subordinate less complex systems.

Operational systems are a special class of systems consisting of workers, tools and objects of labor and other elements necessary for the functioning of the system, in the process of which products and services are created.

A manufacturing enterprise is a complex dynamic system, the elements of which interact with each other in a single process, create a beneficial effect and thus participate in the functioning of other systems.

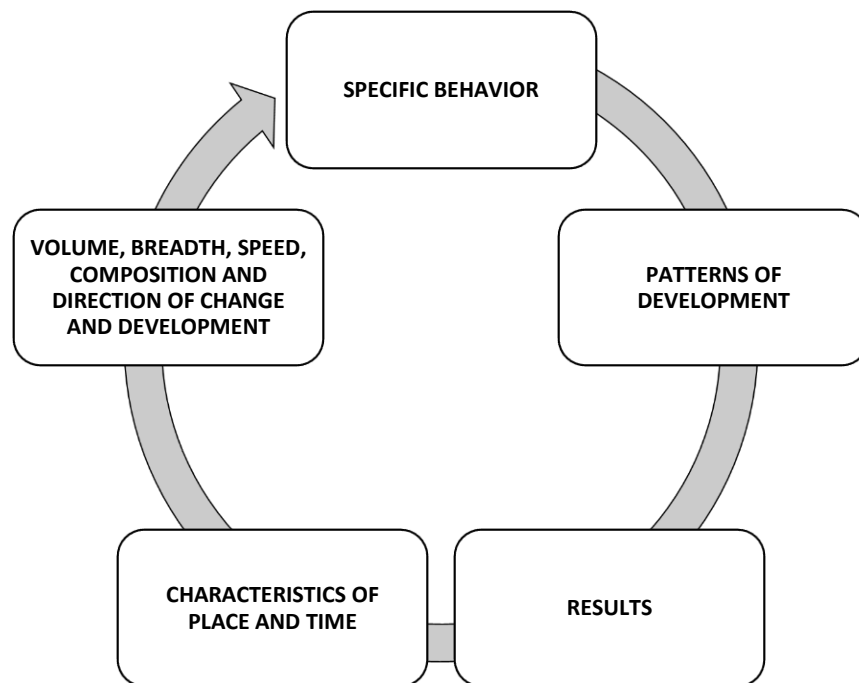
Elements of the system are relatively separate parts of the system which not being systems of this type in their direct interaction create a system of a certain functional purpose. The elements of the operational system include labor, objects and means of labor.

There are two main types of systems: closed and open. A closed system has rigid fixed boundaries, its actions do not depend on the external environment. An example of such a system is a clock in which the interdependent parts move continuously and

very clearly. And as long as the watch has a source of stored energy, it functions independently of the external environment.

An open system is characterized by interaction with the external environment. Such a system is not self-sufficient, it depends on energy, information and materials coming from outside. In order to continue to function, it must have the ability to adapt to changes in the environment. All enterprises, firms, organizations are open systems. The survival of every enterprise depends on the action of the environment.

The system has certain functions and it is characterized by them. (Figure 3.1) It means that all production dynamic systems are characterized by the implementation of the functions of processing, transmission, storage and management of information, energy and technological processes. The function of the system characterizes the manifestation of its properties in this set of relations and it is a way of operating the system when interacting with the external environment.



**Fig. 3.1. Functions of the production system**

The function of the system is a manifestation of its qualitative properties in interaction with other objects of systemic and non-systemic order. Changing external conditions causes a change in the mode of operation of the system when it interacts with the external environment, i.e. leads to a change in the function of the system.

The function is the most variable, mobile side of the system. The structure of the system is more conservative before the changes. The structure of the production system is a set of elements and their permanent connections that ensure the integrity of the system and its identity to itself, i.e. the preservation of basic properties in various external and internal changes. The integrity of the production structure is one of the main properties.

All elements of the production system operate with a single common goal - the development, design and manufacture of the necessary products. Large components of the system, such as the production site, the shop often acts as systems themselves. They can, in turn, consist of smaller subsystems (crew, workplace). Thus, a subsystem is a set of interconnected and interacting elements that implement a certain group of system functions. The affiliation of the subsystem to a particular level of the system determines the existing set of defined properties.

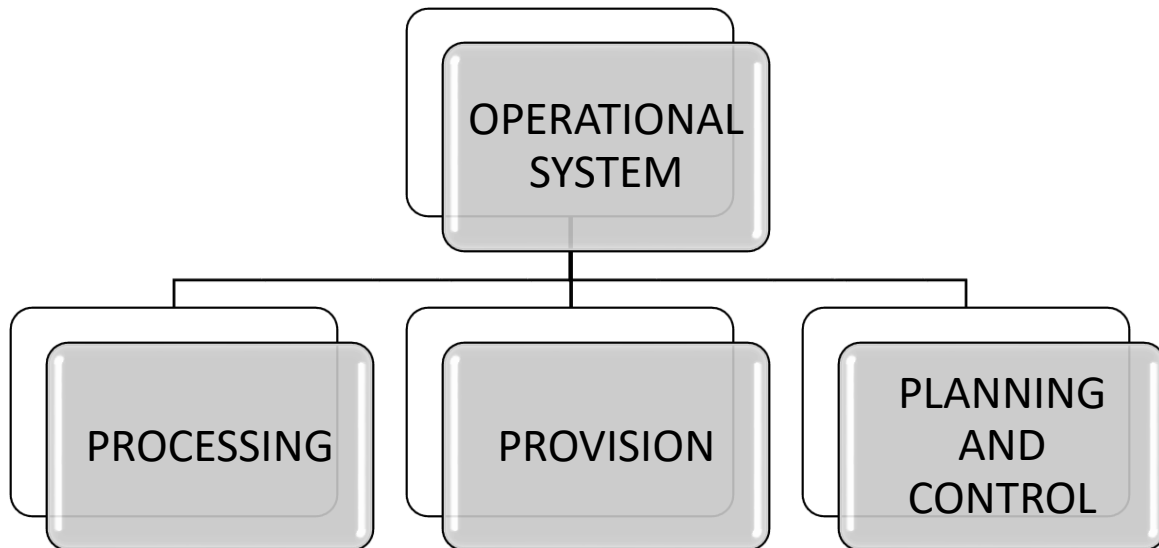
The system is characterized not only by the presence of connections between its components (a certain organization of the system), but also inseparable unity with the external environment, in interaction with which the system reveals its integrity. Each system can be considered as a subsystem (element) of another system of higher order (“supersystems”)

## **2. Operational system as an object of management**

The effectiveness of the organization depends on the correct choice of operational strategy. Depending on the strategy of the organization, the operational system is constructed.

Operational system is one of the components of every organization, within which the operational function is implemented, i.e. the process of production or provision of services to external consumers.

The operational system is considered as a set of interconnected subsystems (Fig. 3.2.)

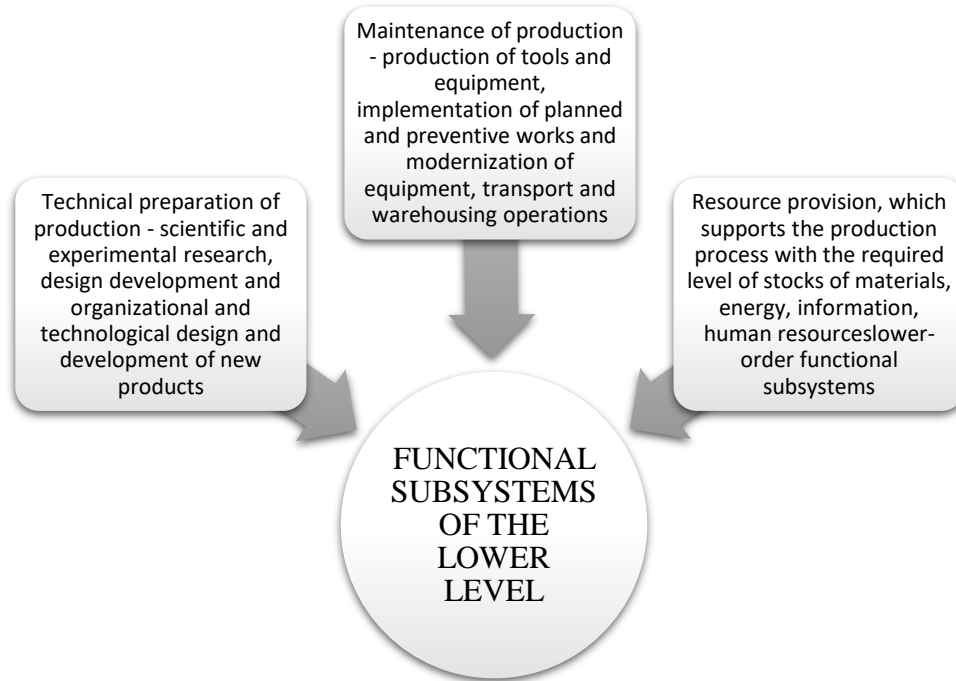


**Fig. 3.2. Subsystems of the operational system**

The processing subsystem carries out productive activities related to the conversion of input values into output results. All transformations of resources in the processing subsystem are carried out exactly according to the accepted technology, which in a broad sense means a combination of skills, equipment, infrastructure, tools and technical knowledge required to carry out the desired transformations in materials, information or people.

In essence, *technology* is a way that allows you to convert input resources into the desired output.

The supply subsystem is not directly related to the production, but performs the necessary functions to ensure the smooth rhythmic operation of the processing system. The subsystem of support includes auxiliary and service farms. The support subsystem itself consists of three lower-order functional subsystems (Figure 3.3):



**Fig. 3.3. Functional subsystems of the lower level**

The planning and control subsystem receives information about the state of the system from the processing system. Information comes from the internal environment (about the goals, policies of the company, staff, etc.) and the external environment (about demand, cost of resources, trends in technology, legislation, competitors, etc.). This subsystem must process all the information and issue a decision on how the processing subsystem should work. Specific issues to be addressed include capacity planning, operational management, inventory management, quality control, etc.



The planning and control subsystem plans the activities of the organization for the next period, monitors the implementation of decisions, determines the strategic directions of development of the organization.

### **3. System hierarchy**

Let us consider in more detail the hierarchy of the operational system at the manufacturing plant. The individual components of the system (its subsystems), such as the production shop act as systems themselves. They, in turn, may consist of smaller subsystems (crew, unit, workplace). Thus, a subsystem is a set of interconnected and interacting elements that implement a certain group of system functions. The affiliation of the subsystem to a particular level of the system determines the existing set of defined properties. They determine the level (degree) of the hierarchy of individual subsystems as components of a system. All levels of the hierarchy can be divided into subsystems of a functional nature and as cybernetic systems have an object and a subject of control.

The system is characterized not only by the presence of connections between its components (a certain organization of the system), but also inseparable unity with the external environment, in interaction with which the system reveals its integrity.

Each system of a certain level of the hierarchy can be considered as a subsystem of a higher level system and at the same time as a system that includes elements of a lower level subsystem. In this case, each higher level of the hierarchy is a component of the external environment for the lower, and the lower is a component of the internal environment for the higher. Multilevel (hierarchy) is a characteristic feature of complex systems. Individual levels of the system implement certain functions, and the integral functioning of the system is the result of the interaction of its elements of all hierarchical levels.

The complexity of the functioning and development of a system object is manifested not only in the fact that it consists of a large number of elements (many subsystems), but also in the fact that in the process of forming a complex system it is necessary to eliminate some contradictions at certain stages of system creation and development as well as at different levels of its functional and structural organization.

The production system is based on two concepts: product and production. They occupy a different place in the system: one is the result in the form of a product (product, service), the second is the activity aimed at its creation (process).

## **Topic 4. Production process**

### **1. Production process. Components of the production process.**

#### **2. Production cycle**

### **1. Production process. Components of the production process.**

A process is a long-term action, a series of operations (activities) that are carried out on the original materials (process input), increase its value and lead to a certain result (process output).

The enterprises carry out various processes (production, economic, social, etc.) in various directions, methods of regulation and content, the set of which unites the components of the enterprise into a single system.

From the point of view of the system approach, the enterprise is considered as a certain integrity, which consists of interdependent parts, each of which contributes to the characteristics of the whole.

One or more production processes can be carried out at enterprises.

Simple (specialized) enterprises with one production process: production of homogeneous products from the same raw materials (small enterprises producing one type of product) (flour production).

Complex or combined enterprises with different production processes: a wide range of products is produced (meat processing, milk processing production)

The production process is the basis of all the activities of the enterprise, a set of interconnected partial labor processes, as a result of which the raw material is converted into finished products.

For example, the entire production process for milk processing consists of three stages (production phases):

1) primary processing of milk (mechanical cleaning, pasteurization, cooling and storage);

2) processing of milk into finished products (mechanical, thermal, chemical, microbiological and other processes);

3) packing and packaging of finished products.

The main condition for the implementation of production processes is the interaction of three elements, the optimal combination of which is the task of organizing the production process:

1) purposeful human activity;

2) means of labor (machinery, equipment, vehicles, buildings, structures, etc.);

3) items of labor (raw materials and materials that can be processed).

The production process consists of partial processes which, depending on participation in the production process can be divided into main and auxiliary.

The main production processes are production processes, as a result of which there are qualitative changes in the objects of labor (internal properties, appearance, shape, etc.). The main process determines the purpose (profile) of the enterprise. As an example of the main processes we can name certain stages of production: normalization of milk, carcass deboning, bread baking, caramel formation, filtration of wine materials, blending of wine materials, malting, etc.

The main processes include technological, natural, etc.

*The technological process is a formalized set of operations aimed at processing raw materials into semi-finished products and finished products.*

Technological processes are the basis of production technology.

Technology is the science of the most economical methods and processes of production of raw materials and products. By the nature of qualitative changes in raw materials and technologies can be physical, chemical and mechanical.

The natural process is carried out under the influence of natural forces on raw materials without human intervention. Such processes in food production are: flour maturation, dough fermentation, wine fermentation, cheese maturation, milk fermentation, cognac alcohol aging, malt cultivation, etc.

Human intervention in natural processes can accelerate (intensify) them. An example of such intensification is the transition from classic production technologies to new (accelerated) ones: production of beer, champagne, hard cheeses, maturation of dietary products, sour cream, cured sausages, etc.

Auxiliary production processes create the necessary conditions for the main processes (providing production with material resources, repairing equipment, energy production, shipment of finished products).

The set of auxiliary processes is auxiliary production. The company's activities are ensured by a clear coherence of actions in the main and auxiliary production processes. The production process is divided into operations, which are the primary link in this process. An operation is a part of the production process that is performed at one workplace directly by one or more workers or under their supervision.

Execution of a production operation is characterized by the use of certain means of labor and is not interrupted by other work. A production operation is a part of the production process that is performed in the same workplace using the same means of labor with the same object of labor.

Partial labor process performs several operations at one workplace by a worker (group, workers). Work cycle includes several operations that are performed in one workplace. Production stage is one or more partial processes, as a result of which there is a transition of the object of labor from one qualitative state to another. For example, the stage of primary processing of milk consists of such operations as: quality control of raw materials, acceptance, cooling, intermediate storage, cleaning, normalization, pasteurization and cooling, industrial storage of milk, washing equipment.

Production processes consist of a large number of heterogeneous operations that can be classified by purpose in the production process and by method of execution.

Basic operations make changes in the condition, shape, appearance of the object of labor. The main operations also include breaks in the processing of the object of labor, which are necessary for the course of natural processes. The set of basic operations creates a technological process.

Auxiliary operations, in contrast to the main ones, do not make changes in the subject of work, but create the necessary conditions for the implementation of basic operations. Auxiliary operations are moving, control and maintenance.

The duration of technological operations depends on the quality of raw materials. The duration of the operation is also affected by the method of its implementation.

Ensuring the efficient execution of production operations allows to solve the problems of reducing the production cycle, optimizing the structure of the production process.

## **2. Production cycle**

The production cycle is the total duration of all time spent on work and breaks from the beginning of the manufacture of one choice (batch of products) to the end, which is repeated in full. The production cycle can be represented as the sum of two components: the working period and break time. The working period can be represented as the duration of technological operations, natural processes, transportation operations and control.

Breaks that determine the production cycle may be related to the mode of operation of the enterprise (duration of breaks between shifts, number of non-working days per week, and those caused by shortcomings in the organization of production

processes, which include: state of production planning, compliance with productivity individual areas of production, poor organization of jobs and their maintenance).

The duration of the production cycle is one of the important economic indicators, which affects the volume of production, labor productivity and so on.

The duration of the production cycle (PC) is measured in units of working time (days, hours, minutes) and is determined by the formula 4.1 :

$$PC = (\Sigma t_{t.o.} + \Sigma t_{c.o.} + \Sigma t_{o.o} + \Sigma t_{br}) - \Sigma t_{sum} \quad (4.1)$$

$PC$  - duration of the production cycle;

$\Sigma t_{t.o.}$  - duration of all technological operations as a part of one cycle;

$\Sigma t_{c.o.}$  - duration of all control operations as a part of one cycle;

$\Sigma t_{o.o}$  - duration of all organizational-technical and service operations as a part of one cycle;

$\Sigma t_{br}$  - duration of all regulated breaks as a part of one cycle;

$\Sigma t_{sum}$  - the duration of all compatible components of the production cycle.

In general, the production cycle is one of the most important indicators, which is the basis for calculating many other indicators for production and economic activities of the enterprise. On the basis of the production cycle, the terms of launching products into production are set, the capacities of production units are calculated, the volume of unfinished construction and some other indicators are determined.

## **Topic 5. Production strategy and competitiveness of the enterprise**

- 1. Economic strategy of the organization and features of its development**
- 2. Models of choosing options for economic strategy of the organization.**

### **The Boston Consulting Group (BCG) Matrix**

- 3. The essence of the production strategy. Strategy and tactics in the system of operational management. Operational priorities**

#### **1. Economic strategy of the organization and features of its development**

Strategy is the art of leading a certain organization. The most significant features of the organization's strategy are:

- it develops senior management, but implementation involves all levels of government;
- it aims at the prospects of development of the whole organization;
- it should be based on extensive research and factual data (collection and analysis of data on industry, market, competition);
- it gives the firm certainty, individuality in terms of selection and attraction of resources;
- it must be integral for a long time and at the same time flexible
- it can be modified and reoriented if necessary.

#### The need to develop a strategy for the organization:

- provides management with the basis for creating a plan for the long term;
- provides a basis for management decisions;
- allows you to determine the main directions of action;
- helps to reduce risk in decision making;
- helps to ensure the unity of the common goal within the organization.



The strategy is developed in several stages, i.e. the process of developing a plan; adjustment of planned tasks; making changes and additions.

Formation of a strategic plan is a careful, systematic preparation for the future.

The first step is to define the mission of the organization. Mission is a super-task that determines the feasibility of its existence, describes the space of activity in terms of production (services) and market place.

Basing on the mission of the organization the general goals are formed. They specify the mission. After defining the mission, goals, analysis of the external environment, it allows those who work out a strategic plan to control external factors in relation to the organization, to identify opportunities and threats to the company.

The next step of the management survey is a methodical assessment of the functional areas of the organization in order to determine its strategic strengths and weaknesses.

By aligning internal strengths and weaknesses with external threats and opportunities, management can begin to choose the appropriate strategic alternative.

## **2. Models of choosing options for economic strategy of the organization.**

### **The Boston Consulting Group (BCG) Matrix**

The BCG matrix performs two functions:

1) allows you to distribute strategic funds between strategic areas of management in the future;

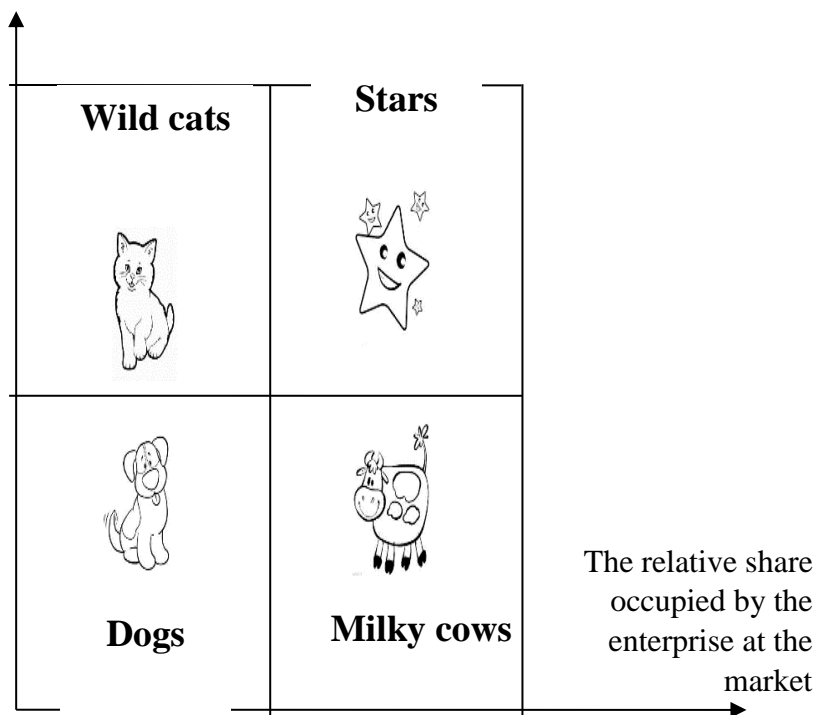
2) allows you to make decisions about achieving the desired market position based on the analysis of Threats, Opportunities, Weaknesses and Strengths.

The matrix is based on two indicators:

- the volume of demand (growth rate of production) is the total level of sales, the ratio between the level of supply and demand at the moment in a particular market;

- the market shares of the enterprise relative to its main competitor in the industry is the share of the firm among other potential rival firms of the same profile;

The rate of growth of the market of the corresponding products



**Fig. 5.1. The BCG Matrix**

Quantitative and qualitative parameters of the future growth rates and market share are determined for each economic zone. These data fit into the corresponding quadrants of the matrix. Economic zones are given a conditional name:

- "stars" are characterized by high growth in demand and high market share;
- "wild cats" mean high growth in demand and low market share;

- "dogs" determine the low growth in demand and low market share;
- "milky cows" show low growth in demand and high market share.

The "wild cat" zone is characterized by high demand and low market share compared to the main competitor. There are opportunities to increase production, significant investment is needed, and this is risky. Special research is needed to establish an appropriate strategy for achieving star status.

The "star zone" brings together high-demand businesses that control significant market share. In this situation, it is necessary to follow a growth strategy, introducing technological innovations.

The area of "milky cows" has a low volume of demand, a high market share of the seller compared to the main competitor. It is necessary to control investments, transfer the excess funds from sales under the control of senior management for use in other areas of activity.

The dog zone covers a group of enterprises with low demand and low market share. Strategic decisions can be as follows:

- 1) the transition to a related industry and an attempt to succeed there;
- 2) modernization, re-equipment, change of product range;
- 3) sale at auction, the strategy of getting rid of excess.

In practice, the BCG matrix is used in conditions when the country's economy is developing stably, without sharp fluctuations in market conditions.

Porter's competitive strategy model.

This is a model of strategy selection in a competitive situation. Its task is to prepare the company for a state in which it can take full advantage of its competitive advantages. The focus is on competition analysis, which involves the selection of 4 diagnostic components.

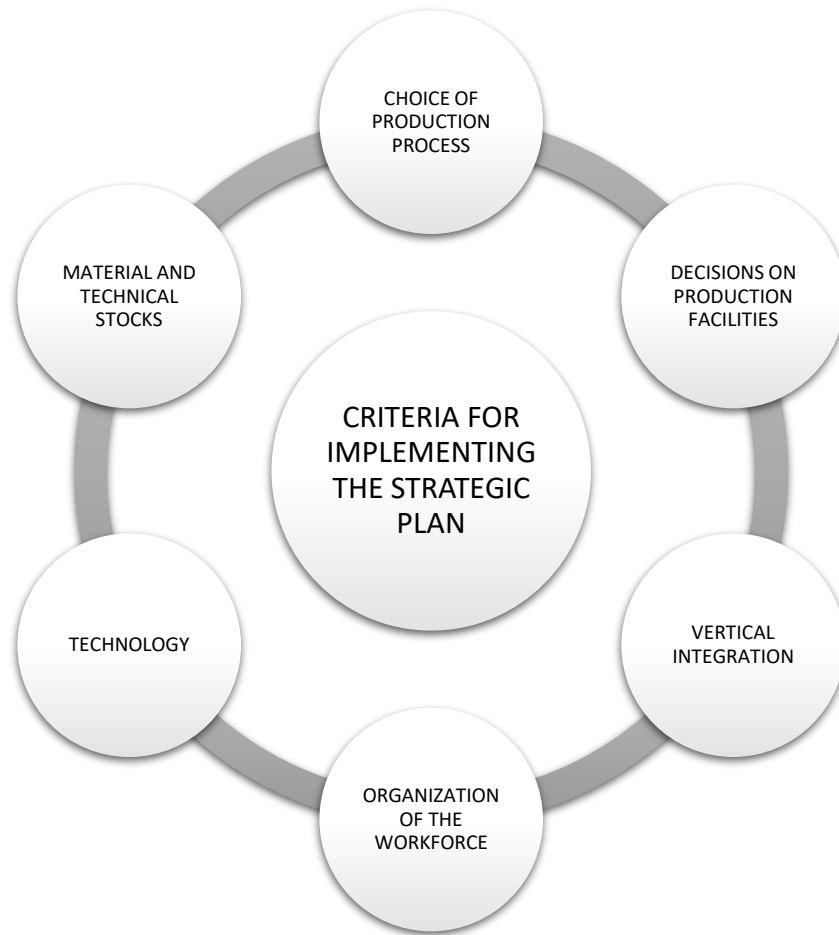
### **3. The essence of the production strategy. Strategy and tactics in the system of operational management. Operational priorities**

Production strategy is to develop a general policy and plans for the use of resources of the firm, aimed at the most effective support of its long-term competitive strategy. Production strategy in conjunction with corporate strategy covers the full range of the company's activities and allows for a long-term process designed to provide the company with the ability to respond quickly to any imminent changes in the future.

Production strategy is a subsystem of corporate strategy, presented in the form of a long-term program of specific actions to create and implement a product of the organization. This subsystem involves the use and development of all production facilities of the organization in order to achieve a strategic competitive advantage.

Production strategy is expressed in making decisions related to the development of the production process and the infrastructure needed to support it. The development of the process consists of choosing the appropriate technology, drawing up a time schedule of the process, determining inventories, the method of placement of this process. Solutions are related to infrastructure, planning and management systems, methods of quality assurance and quality control, the structure of remuneration and the organization of the production function of the company.

The criteria for implementing the strategic plan are shown in Fig.5.2:



**Fig. 5.2. The criteria for implementing the strategic plan**

The company's strategy is to provide products and services through the operational function to meet the needs of consumers.

Tactics is a way of current organization of management functions, which provides a phased and ongoing implementation of operating system strategies.

## **Topic 6. Planning and projecting in the operational process of the enterprise. Project Management**

- 1. Projecting the operational system of a manufacturing enterprise**
- 2. The main stages of projecting of the operational system**
- 3. Projecting of products and fulfilment of the production processes**
- 4. Projecting the process of production or provision of services**
- 5. The essence of the project approach. Project planning**

### **1. Projecting the operational system of a manufacturing enterprise**

When studying the projecting of production systems, it is advisable to identify three interrelated aspects:

*1. Production aspect.* The activity of the enterprise is evaluated in terms of the implementation of its production program. The enterprise program is divided into subroutines. The production aspect is of importance because:

- according to production indicators (quality and volume of products, the level of costs of the enterprise, the received profit) the activity of the enterprise is planned and estimated;
- the organization of production and the structure of the enterprise are determined primarily by the technology of production;
- most of the important studies of the impact of scientific and technological progress is carried out in terms of production of the enterprise.

*2. Structural and organizational aspect.* The organizational structure of the enterprise must meet the requirements of rational division of labor. In this aspect, we can identify the following subsystems:

- main divisions (direct transformation of objects of labor);

- auxiliary units (other production processes);
- research, development and technological work;
- enterprise management (management of production processes, planning, accounting).

*3. The aspect of efficiency concerns the problem of choosing the criteria for assessing both product quality and the activities of individual production units of the enterprise.*

It is necessary to distinguish two sides of this aspect:

- the intensity of the impact of subsystems that determine the efficiency of production on certain types of products;
- the possibility of the influence of individual structural units of the enterprise on the subsystems that determine the efficiency of production.

Design of the operational system is considered at the higher levels of the enterprise, as well as the type of product to produce, the production processes, capacity, and sometimes logistics.

Management is crucial, because the efficiency of the operational system depends on the quality of management decisions.

## **2. The main stages of projecting of the operational system**

Collection of analytical and information data involves the collection of operational and technological, accounting and economic and other information that reflects the course of the production process, the state of supply systems, quality, production logistics.

*Sources of data collection:*

- technological documentation (route, operational and operational-instruction technological maps, which are used depending on the type of production, special technical control maps);

- accounting and economic documentation provided by the planning and economic department and accounting. Evaluation of this documentation makes it possible to analyze the state of the enterprise and its readiness (availability of necessary resources) for change.

The collection of information is carried out together with:

- constructing a model of the organizational structure of operational system management, which provides hierarchical links and information flows. It clearly shows the subordination and functions that are duplicated, i.e. it can be reduced;

- formation of a complete list of works performed in the management system, which allows their logical grouping, ranking, while determining the need for resources and time to perform them. On the basis of these analytical data it is possible to define expediency of performance of each of task and to fix them on concrete divisions.

*The sequence of actions of the operational manager (management decisions):*

- goal setting;
- determining the need for information on the blocks of the operational system (collection of information about the production process, functioning of the supply system, quality system, logistics system, management system);

- separation and evaluation of operational information;

- separation and evaluation of analytical information;

- creation of a single database (on electronic media);

- assessment of the reliability of the received information;

- elimination of incorrect and duplicate information;



- formation of a new database;
- assessment of the completeness of the received information;
- making changes;
- result.

### **3. Projecting of products and fulfilment of the production processes**

Production project is aimed at meeting the needs of the consumers. Analysis of specific consumer requirements for the product is carried out according to the following product design criteria: cost, quality, efficiency, luxury elements, size, power, strength, service life, reliability, service requirements, simplicity, versatility, safety, etc.

The sequence of actions of the operational manager (management decisions) in the design of products: selection of the product to be produced; demand assessment; calculation of product development costs; forming a list of all components of the product; development of the list of all functions of a product taking into account inquiries of the consumer; identification of the main and possible alternative functions of the product and the cost of them, from which several are selected with the lowest cost; analysis of possible implementation and costs; the best option is chosen; development of a detailed project; conclusion on the feasibility, cost-effectiveness and efficiency of the product.

*Projecting the production process* according to which the product will be manufactured involves determining its stages and time of work. It is important at this stage to pay attention not only to technological processes, but also to logistics, control and other auxiliary processes of the "production" system.

Criteria for designing the production process: production capacity, cost-effectiveness, flexibility, productivity, duration, reliability, standardization and

sustainability of results, safety, industrial sanitation, hygiene, meeting the physical needs of workers.

*Projecting of the operational system capacity.* Capacity means the maximum volume of production for a certain period of time. Determining the required capacity, the existing demand must take into account. The accuracy of the calculation of it depends on the accuracy of the level of required capacity.

Among the common methods of forecasting the required capacity there are first of all the trend. The trend is easily determined using the analysis package MS Excel. Today, most industrial workers choose to work with this program as quite simple and easy to use.

*Projecting the production operations* means development of working schedule and calculations of the use of production resources.

Projecting of production operations involves: goal formulation; development of personnel tasks; division of works into operations; determining the required execution time of operations; determination of waiting time and downtime; optimization of operations in time; development of work schedule; determining the quality of operations; development of a calendar plan.

Among the most important aspects of projecting of the operational system are:

- projecting of works, which includes the exact definition of the content of each type of work, their distribution among employees, determining the degree of specialization.

- rationing of labor, which is to establish the necessary cost of working time to perform the operation.

*The main stages of product projecting.* Product projecting should be aimed at meeting the needs of the buyer. In its day-to-day operations, the company is obliged to monitor the demand for each type of product produced, as well as to monitor changes in the product offer of competitors and production technology. A quick response to the

state of market demand forces the company to purposefully search for new ideas and new products.

The main stages of designing a new product:

- analysis of forecasted needs in products;
- search for a new product idea;
- preliminary evaluation of the idea and selection of the most acceptable way of its implementation;
- research of consumer properties of a new product and preliminary market analysis;
- selection of criteria of the designed product according to market requirements;
- determination of the necessary properties of the product based on the choice of alternatives to the design characteristics;
- studying of the peculiarities of the production process and the possibility of adapting a new product to the existing conditions of the enterprise;
- new product projecting;
- production process projecting;
- organization of experimental production and trial sales;
- transition to mass production and implementation of a comprehensive marketing program.

At the end of each stage, a comprehensive review of the results is achieved, on the basis of which it is possible to return from any following stage to any previous stage with the repetition of the above procedures. Thus, these actions are iterative.

Work at different stages can be combined or carried out in parallel. Therefore, in the course of working on the product, flexibility is needed to re-evaluate the results obtained, and sometimes to change the ideas underlying the solution.

Factors to consider when projecting a service:

- buyer's participation;
- inability to store services;
- variability in demand for services;
- industrialization in the development of services means removing the customer from production;
- quality of service;
- service efficiency;
- the buyer can be seen as a workforce (self-service process);
- possibility of flexible use of labor (use of part-time work schedule);
- automation of service provision (vending machines);
- centralization of service delivery processes.

#### **4. Projecting the process of production or provision of services**

When the product is projected it is necessary to determine the stages of the production process of this product, the total duration of its manufacturing. Different variants of the technological process affect the average production time, the complexity of manufacturing products, freight flows at the enterprise, the use of production capacity.

The greatest effect will be achieved if complex technological processes are developed, covering, in addition to the main production operations, transport, control and other auxiliary processes. In this case, even before the production process on the technological documentation it is possible to determine the length and direction of transport routes between technological operations, duration of transport operations. The relevance of this approach is dictated by the fact that, as a rule, the volume of auxiliary operations often exceeds the volume of the main.

As with product project, the process developer (technological service of the enterprise) must consider the relative importance of the following criteria for designing the production process: production capacity; economic efficiency; flexibility; productivity; duration; reliability; standardization and consistency of results; safety, industrial sanitation and hygiene; meeting the living needs of employees.

To ensure the desired characteristics of the process, the designer must choose from several options in the following areas:

- type of processing system (design system, small-scale production, continuous process, combination of the listed options);
- own production or purchase of some components;
- performance of some tasks by own means or their transfer to subcontractors;
- methods of processing (for example, painting of products can be conducted by spraying, a brush, the platen, immersion);
- degree of mechanization and automation;
- level of auxiliary works;
- degree of specialization of workers.

Specialization (division) of labor is the most important factor in increasing the productivity of production workers and workers.

Advantages of specialization:

- reduction of training;
- raising the level of professional skills in each specialized workplace;
- separation from production tasks of those that do not require skilled labor, but can be performed by unskilled workers who receive lower wages;
- increasing the possibility of using specialized equipment.

The main disadvantages of specialization:

- reduction of flexibility when production tasks change;
- reduction of workers' satisfaction with their work;
- increasing fatigue during monotonous work;
- increase in the number of absenteeism.

The role of the manager at the stage of determining the content of work is very important.

Projecting the production process, the main focus is concentrated on the individual processes through which materials or components pass during manufacture.

The most widely used points in the process planning are:

- operational route maps (routes of movement of preparations on operations of technological process);
- assembly diagrams and drawings (detailed image of all individual components of the product);
- schemes of technological process (display by means of standard symbols of everything that occurs with production in the course of its consecutive manufacturing on the corresponding production equipment).

After the development of the technological process as a whole the process of projecting of its individual stages begins. In more detail, the process is divided into three components: a set of tasks; flows of materials and information that combine these tasks; storage of materials and information.

At the initial stage of the product life cycle, its sales are quite low. The design of the product may not be quite stable, and competitiveness is based on its distinctive features, not on price. At this stage, the production process must be flexible enough so that it can be quickly changed and improved in accordance with demand and changes in product design. The company's ability to produce products in large quantities and with high economic efficiency is the main task at this stage. The production process at

this time is usually quite time consuming, not sufficiently automated. In the process of product improvement, its design will be increasingly standardized and sales will increase. The main factor of competitiveness will be the price. The production process will be highly mechanized and will acquire signs of mass production.

## **5. The essence of the project approach. Project planning**

A sequence of interconnected operations, usually aimed at achieving a specific significant result within a given time with set resource constraints, is called a project.

Project management is the art of managing human and material resources throughout the project life cycle, carried out using a system of modern management methods and techniques in order to achieve certain results in terms of composition and scope of work, cost, time, quality and satisfaction of project participants.

Project management is the main form of planning and control of current activities of the enterprise.

The purpose of the project is the desired and reasonable result that must be achieved within a certain period and under the given conditions of the project.

The formulation of the purpose of the project involves the justification of the task, which requires:

- determination of results of activity for a certain term;
- quantitative evaluation of the results of this activity;
- proof that these results can be achieved;
- identification of the conditions under which these results can be achieved.

Project participants are legal entities and individuals who are obliged to perform certain actions provided by the project, and whose interests will be involved into the project.

The main participants of the project may include: the initiator of the project; customer (owner); investor; project manager, project team; general designer, designers; general contractor, subcontractors; suppliers; legal, consulting, engineering companies; authorities; landholder; people; buyers of final products; competitors; other stakeholders.

The project approach is to form a team with a high degree of motivation to work at a specific project. The success of every project largely depends on how the project team works and how well the work and project management are organized.

Project management can be described as a procedure for planning, allocating and regulating resources (labor, material and equipment), taking into account all the limitations of the project (technical, budgetary and time).

*The main sources of project funding are:*

- own financial resources (profit, depreciation deductions, funds paid by insurance bodies as compensation), as well as other types of assets (fixed assets, land, etc.) and borrowed funds (funds from the sale of shares, charitable or other contributions, funds allocated) higher-level holding or joint-stock companies, industrial and financial groups on a gratuitous or preferential basis);
- allocations from the public, regional and local budgets, the business support fund provided free of charge;
- foreign investments provided in the form of financial or other participation in the authorized capital of joint ventures, as well as in the form of direct monetary contributions of international organizations and financial institutions, states, enterprises and organizations of various forms of ownership;
- various forms of borrowed funds, in particular loans granted by the state on a reciprocal basis; loans to foreign investors; bond loans; loans from banks, investment funds and companies, insurance companies, pension funds; promissory notes, etc.



An important component of successful project implementation is project cost planning. All project participants (suppliers, banks, contractors) must take into account the cost indicators of the project when planning. The project estimation is used for this purpose.

The estimation means a set of documentary calculations necessary to determine the amount of project costs. The estimation has a dual function: on the one hand, it is a document that determines the cost of the project, and on the other hand, it is a tool for monitoring and analyzing the cost of funds and resources for the project.

Effective project management is a complex process. It requires a clear division of responsibilities for the implementation of certain works, a clear system of timely reporting on the progress of the project and effective personnel management.

Project planning may involve the creation of appropriate project organizations within the enterprise to perform work that goes beyond the normal management of the operational system.

The composition of the project executors is temporarily assigned to the project and it is notified by the results of work at the top management level.

Project managers have the opportunity to use extensive information at the enterprise and monitor the progress of the project.

Each project begins with a list of works (Statement of Work - SOW). This is usually a brief description of the main tasks of the project with a list of all operations to be performed, start and end dates of these operations. The list of works also includes budget requirements at each stage of the project and a list of written reports to be provided during its implementation.

The next element that is introduced into the project is a working task. It takes no more than a few months and is performed by one group. Sometimes, if there is a need to present the project in more detail, the task is divided into several subtasks.

The working task is a set of operations that are grouped together and performed by a single organizational unit. This element is also included into the general structure of the project: it provides a description of operations to be performed within this package of works, indicates the dates of their start and end, budget requirements and performance criteria, as well as highlights the stages of work performed in certain periods of time. Typical stages are project development, production of a prototype, completion of tests of a prototype, manufacturing and acceptance of the test results.

The Work Breakdown Structure (WBDS) is a hierarchy of project tasks, subtasks and working tasks. Execution of one or more subtasks leads to the task; completion of all tasks means the end of the project.

*For high-quality development of the project structure, it is recommended to follow the following recommendations:*

- striving to ensure that the implementation of each element of the structure can be worked independently;
- ensuring that the dimensions of the structural elements allow them to be managed effectively;
- distributing the powers related to the implementation of each element of the project;
- monitoring the progress of the project;
- providing all necessary resources.

To implement a project, senior management must decide which of the three organizational structures will be used to link the project to the organizational structure of the enterprise: a separate, matrix or functional project.

***A separate project*** (Pure Project) is characterized by the fact that a specific group of specialists is constantly working on a specific project.

Advantages of a separate project:

- the project manager receives all the powers related to its implementation;

- team members report to one leader, they do not have to worry about the loyalty of the functional manager;
- the procedure for exchanging views is significantly reduced, as a result of which decisions are made much faster.
- concepts such as team pride, motivation and dedication are very important.

Disadvantages of a separate project:

- concentration of resources. Equipment and personnel cannot be used in various projects;
- the organizational goals and policies of the enterprise are ignored, as group members often move from one unit to another, both psychologically and physically.
- due to the weakening of the connection of functional units, the company is late with the development of new technologies;
- as group members do not have a “native” functional area, they are concerned about what they will do after the project is completed, which often leads to delays.

***Functional Project*** is characterized by the fact that the project is implemented in existing functional units.

Advantages of the functional project:

- project team members can work on several projects simultaneously;
- technical experience is retained within a specific functional area, even if the project participant leaves the group or resigns from the organization;
- the functional area remains "native" for the project team members even after the project implementation. Functional specialists can move up the service.

As a result of the saturation of the group with highly professional specialists from several functional areas, the efficiency of solving various technical problems related to the project increases.

### Disadvantages of the functional project:

- insufficient attention is paid to aspects of the project that are not directly related to a specific functional area;
- team motivation is often very weak;
- the client's needs are secondary, the response to them is slow.

### *Network planning methods: advantages and disadvantages*

Today, a large number of graphical computer programs have been created thanks to which the management of enterprises, customers and project managers have the opportunity to choose from a variety of options for presenting the process of monitoring the project.

Network methods are used to plan project works and control their progress.

The most well-known methods of drawing up a network schedule:

PERT (Program Evaluation and Review Technique is a method of evaluation and review of programs) and CPM (Critical Path Method).

Using PERT and CPM methods, you can present the project in graphical form. Its individual tasks are interconnected so that the main focus is on the most important points for the project.

The structure of PERT and CPM consists of five steps:

1. Identify the project and all its main works or tasks.
2. Establish all connections between works: determine which works should precede and which should follow the considered works.
3. Develop a network that contains all the work.
4. Determine the time and monetary costs associated with each job.
5. Determine the critical path, i.e. calculate the longest path on the network from the beginning of the project to its end (critical path).
6. Use the network to implement the plan, work schedule, management and control of project development.

5. Determining the critical path is an important part of monitoring the progress of the project, representing tasks, the delay in which leads to a delay in project implementation. Managers enjoy the flexibility of project management through work that lies in non-critical ways, allowing, within certain limits, the ability to make changes in planning, work schedules and redistribution of human and financial resources.

In their basic forms, the PERT and CPM methods were designed to determine the longest path in the sequence of works (critical path), which becomes the basis for planning and monitoring the progress of the project. Lines with arrows and nodes are used to graphically display this sequence in both methods. Although PERT and CPM differ slightly in terminology and network construction, their techniques are the same. The analysis used in both methods is very similar.

The use of PERT and CPM methods is extremely important, as they can help answer questions about a project consisting of thousands of works:

*When will the project be completed as a whole?*

*What jobs or tasks are critical in the project?*

*Which work delay determines the delay in the project as a whole?*

*Which works are not critical?*

*What is the probability that the project will be completed by a specific date?*

*If the project is to be completed in a shorter time, what is the way to ensure its completion at the lowest cost?*

With the practical use of information systems for project management, various software products are widely used, which can significantly increase the speed of all processes related to project management.

## **Topic 7. Management of material resources**

### **1. The essence of stocks**

### **2. "Extracting" and "pushing" operational management systems**

### **3. Stock management systems and its main types**

#### **1. The essence of stocks**

*Stocks* are products of industrial and technical purpose, which are at different stages of production and circulation, consumer goods and other goods awaiting entry into the process of industrial or personal consumption.

As a rule, stocks are a reserve of material resources of the enterprise.

Despite the fact that the maintenance of stocks is associated with certain costs, entrepreneurs are forced to create them.

#### The main motives for creating stocks are:

- Probability of violation of the established schedule of deliveries (unforeseen decrease in intensity of an incoming material stream). In this case, the stock is necessary in order not to stop the production process, which is especially important for companies with a continuous production cycle.
- The possibility of fluctuations in demand (unforeseen increase in the intensity of the output flow). Demand for any group of goods can be predicted with high probability. However, it is much more difficult to predict the demand for a particular product. Therefore, if you do not have a sufficient stock of this product, there may be a situation where effective demand will not be met.
- Seasonal fluctuations in the production of some types of goods. This mainly applies to agricultural products.

- Discounts for the purchase of a large consignment of goods can also cause the creation of stocks.

- Speculation. The price of some goods can rise sharply, so a company that has managed to anticipate this growth. The stock is created in order to make a profit by raising the market price.

- Costs associated with placing an order. The process of registration of each new order is accompanied by administrative costs (search for a supplier, negotiations with him, business trips, long-distance negotiations, etc.). These costs can be reduced by reducing the number of orders, which is equivalent to increasing the volume of the party being ordered, and, accordingly, increase the size of the stock.

Possibility of uniform implementation of operations on production and distribution. These two activities are closely connected: what is produced is shared. If there are no stocks, the intensity of material flows in the distribution system varies according to changes in production intensity. The presence of stocks in the distribution system allows the implementation process to be more even, regardless of the situation in production. In turn, the availability of inventories smooths fluctuations in the supply of raw materials and semi-finished products, ensures the uniformity of the production process.

Possibility of immediate customer service. You can fulfill customer orders as follows:

- make the ordered goods;
- buy the ordered goods;
- issue the ordered goods immediately from the available stock.

The latter method is usually the most expensive, as it requires keeping a stock. However, in conditions of competition, the possibility of immediate satisfaction of the order may be crucial in the struggle for the consumer.

The stock allows to minimize downtime due to lack of spare parts. Equipment failures and various accidents can lead to a stoppage of the production process in the absence of spare parts. This is especially important for companies with a continuous production process, as in this case, stopping production can be expensive.

Creating of stocks leads to simplification of the production management process. We are talking about the creation of stocks of semi-finished products at different stages of the production process within the enterprise. The presence of these stocks allows to reduce the requirements for the degree of consistency of production processes at different sites, and, consequently, the corresponding costs for the organization of management of these processes.

These reasons indicate the need to create stocks in logistics systems. At the same time, a feature of the direct logistical approach to inventory management is the rejection of the functionally-oriented concept in this area.

1) In the theory of stock management there are the following types:

- stocks by place of production;
- stocks of material resources;
- stocks of works in progress;
- stocks of finished products;
- stocks of containers;
- stocks of returnable waste.

2) Regarding basic logistics activities:

– stocks in supply, material resources that are in the supply chain from suppliers to warehouses of material resources of the manufacturer, designed to ensure the production of finished products;

– production stocks, stocks of material resources and work in progress, which came to consumers and were not processed, are in enterprises of all branches of



material production, intended for industrial consumption and allow to ensure the continuity of the production process;

- commodity (sales) stocks, stocks of finished products, transport stocks, which are in the warehouses of finished products of the manufacturer and in the distribution network, designed to meet consumer demand (sales);
- total stocks are the object of optimization of logistics management in terms of total costs and include all of the above types of inventories.

## **2. "Extracting" and "pushing" operational management systems**

Every production requires the constant monitoring of the entire production process by the operational manager in order to ensure its required productivity. If possible the operational manager tries to improve it. One of the tools to use in the process is the system of operational and calendar planning.

Under the *system of operational and calendar planning* one understands the methodology and techniques of planning of works, which are determined by the degree of centralization. The choice of planning and accounting unit, differentiation of planning periods, composition and accuracy of calendar and planning standards, as well as composition, design and movement of planning and accounting documentation are also determined by the operational manager.

When organizing the movement of material flow in the planning process there are two approaches:

- 1) Planning systems: movement of material flow based on the principle of ejection of semi-finished products out of the manufactured products. With this approach, it is difficult to rebuild the operational process when demand changes. Using this system, even during the month, it is necessary to change production schedules several times for all technological stages.

The disadvantages of this system include the following:

- it is very difficult to take into account, evaluate and adjust the material flow;
- the process accounting for each group of resources requires complex and expensive information, software and logistics;
- limited availability of material stocks, installation of redundant equipment, involvement of additional employees in case of malfunctions.

2) Planning systems based on the principle of extraction of semi-finished products from the previous operation to the next during the entire manufacturing process. Using this approach, the central management system does not interfere in the exchange of material flows between different technological sections of the enterprise, does not set for them current production tasks. The production program of each separate technological link consists of the size of orders of the next technological link. The main function of the control center is to set the task before the final technological link.

The advantage of such systems is that they do not require general computerization. But at the same time, they provide high discipline and compliance with all parameters of supply, as well as increased responsibility of performers at all levels.

The main objectives of the extraction systems:

- preventing the spread of fluctuations in demand or output of the next process from the previous one;
- minimization of fluctuations of parameters between technological operations;
- maximum simplification of material resources management due to its decentralization;

- maximum increase in the level of operational shop management.

After the World War II, just-in-time (JIT) production systems were developed in Japan. They were used to modernize the production of high-quality goods and services and combined 5Ps of operational management. All manufacturing companies that apply the concept of total quality management (TQM), in fact, simultaneously use in their activities, at least some elements of JIT.

The JIT system is the only set of measures taken to achieve large-scale production using minimal inventories of parts and components, semi-finished and finished products. The parts arrive for the next operation "just in time" and they are processed and quickly go through this operation. The method "just in time" is based on the logistical concept - "nothing will be produced until it is necessary."

The "just in time" supply system in the relevant production management system is a supply organization system based on the synchronization of the processes of delivery of material resources of the required quantity and at the time when the operational system needs them, in order to minimize costs associated with stockpiling.

The need for production is created by the current demand for these products. When a product is sold, the market, according to this concept, "pulls" it from the last stage of production, i.e. the final assembly. This serves as a signal to start the production assembly line, where each worker immediately "pulls" the next part from the previous section of the material flow to replace the removed part. The section from which the part is taken, in turn, "pulls out" the now necessary part from the previous section and so on, until the "extraction" of raw materials. To ensure the continuity of such an "extraction" process, JIT requires high quality products at every stage of the process, clear fulfillment by suppliers of their contractual obligations and correct forecasting of demand for finished products.

JIT systems are sometimes informally divided into "big JIT" and "small JIT". "Big JIT" (often called unsaturated or underloaded production) is a concept of operational management, the task of which is to eliminate losses in all areas

### **3. Stock management systems and its main types**

Stock management is a specific activity that involves the creation and storage of inventories. Stock management is a functional activity that aims to minimize the total amount of annual inventory costs provided proving that the customer service is satisfactory.

Stock System is a set of rules and methods of regulation, which can be used to control inventory levels and determine which of the levels should be maintained, which inventory should be changed and what should be the volume of the order.

The main purpose of the analysis of stocks in the field of production and warehousing services is to show when it is necessary to order certain components and what should be the size of the order.

Many companies tend to enter into long-term relationships with suppliers, which must meet their needs, for example, throughout the year. In this case, the questions "when" and "what should be the size of the order" become the question "when" and "how much to deliver".

The stock management system should determine the time and volume of purchases of products to replenish stocks.

#### The parameters of the stock management system are:

- order point (the minimum (control) level of stocks of products, subject to which it is necessary to replenish them);
- normative level of stocks (the estimated value of stocks, which is achieved during the next purchase);

- volume of separate purchase;
- frequency of procurement (the duration of the interval between two possible purchases of products, i.e. the frequency of replenishment of stocks of products);
- replenished quantity of products for which the minimum cost of stock storage is achieved in accordance with the specified replenishment costs and specified alternative costs of invested capital.

*The following technological stock management systems are used:*

- stock management system with a fixed order size;
- stock management system with a fixed frequency of orders;
- system with the established frequency of replenishment of stocks to the established level;
- system "Maximum-minimum".

For a situation where there are no deviations from the planned indicators and stocks are consumed evenly, in the theory of inventory management two main inventory management systems are developed: inventory management system with a fixed order size and inventory management system with a fixed order frequency. Other inventory management systems (a system with a set frequency of replenishment to a set level and a system of "maximum-minimum"), in fact, are a modification of these two systems.

The system with a fixed order size is quite simple and a kind of classic. In this system, the size of the order to replenish the stock is a constant value. The order for the supply of products is carried out under the condition of reducing the stock available in the warehouses of the system to the established minimum critical level, which is called the "order point".

In the process of functioning of this technological system, delivery intervals can be different depending on the intensity of costs (consumption) of material resources in

the system. The regulating parameters of this system are the order size and the "order point".

If the stock reaches the lower critical limit and organizes the next order for the supply of the necessary material resources, the stock level at the time of the order should be sufficient for uninterrupted operation during the operational cycle. The insurance reserve must remain intact. In some cases, a floating (oscillating) order point is used. It is not fixed in advance, and the time of ordering is determined taking into account the fulfillment of its obligations by the supplier or taking into account fluctuations in demand for manufactured products.

The minimum amount of stock in this system depends on the intensity of costs (consumption) of material resources in the period between the submission of the order and the receipt of the party to the warehouse in the system. It is conventionally assumed that this time interval in the procurement period is constant.

This control system provides protection of the enterprise from the formation of a deficit. In practice, the inventory management system with a fixed order size is used mainly in the following cases:

- large losses due to lack of stock;
- high storage costs;
- high cost of the ordered goods;
- high degree of demand uncertainty;
- availability of a discount from the price depending on the quantity ordered;
- imposition by the supplier of a restriction on the minimum size of the delivery lot.

A significant disadvantage of this system is that it provides for continuous accounting of the balance of material resources in the warehouses of the logistics system, so as not to miss the moment of reaching the "order point". In the presence of

a wide range of materials (or range - for a commercial enterprise), a necessary condition for the use of this system is the use of automated identification technology.

## GLOSSARY

**ABC analysis** is a widely used method in the practice of inventory management, which involves the division of material resources into categories A, B and C. ABC analysis emphasizes that there is a critical minority (category A) and a trivial majority (categories B and C) of positions material and resource resources to which different management policies should be applied; the main focus should be on a critical minority of positions.

**Aggregate planning** is the process of forming a resource-balanced production program of the enterprise and its distribution by individual calendar periods and by individual structural units of the operating system.

An enterprise is an independent business entity established by a competent state authority or local self-government body, or other entities to meet public and personal needs through the systematic implementation of production, research, trade and other economic activities.

**Areas of operational management** are management of stable operation of the operational system and management of its creation, transformation and development.

**Calendar-planning standards** are tools for interconnection of calendar plans, coordination of work of interconnected workplaces, sections and divisions, as well as ensuring efficient use of equipment and personnel. The main calendar and planning standards are: the size and rhythm of batches of parts, assembly units and products, the duration of production cycles; anticipation of the launch and release of batches of parts and assembly units; reserves and standards of work in progress.

**Cause-and-effect diagram** is a tool that allows you to identify the most significant factors that affect the end result. It is usually used to analyze the defects that lead to the greatest losses. At the same time it is possible to analyze the four main causal factors: personnel, machine (equipment), material and method of work. Based



on this, such a diagram is sometimes called a diagram of "four M" (*man, method, material, machine*).

**Certificate of quality system** is a document issued to the company by the certification body of quality systems and certifies compliance with the requirements of the regulatory document (standard), as well as confirms the ability of the company to ensure and maintain the quality of its products at the appropriate level.

**Checklist** is a tool for collecting data and automatically organizing them to facilitate further use and processing of collected information.

**Competitiveness of the enterprise** is the potential or realized ability of the economic entity to effectively operate for a long time in a relevant environment. Competitiveness is based on the competitive advantages of the enterprise, determines its ability to withstand competition in a particular market, reflects the position of the enterprise relative to its competitors.

**Comprehensive quality management system (TQM-system)** - in the broadest sense - is a management approach focused on achieving long-term success by the company through the fullest satisfaction of customer requests. The ideology of TQM is based on the principle of continuous quality improvement. In a narrow sense, it is a comprehensive system focused on continuous improvement and improvement of quality, minimization of production costs and delivery on time. The TQM system provides for the general, purposeful and well-coordinated application of quality management systems and methods in all areas of activity - from research to after-sales service - with the participation of management and employees at all levels and in the rational use of technical capabilities.

**Control card** is a tool that allows you to track the nature of the process and influence it, preventing it from deviating from the requirements of the process standard. This is a kind of graph, which differs in the presence of control limits, which mean the allowable range of scatter of characteristics in stable conditions of the process.

**Costs for ordering and execution** are costs associated with the organization of the order and its implementation. They include costs of forming a supply network; costs of evaluation and selection of a specific supplier; transport, entertainment, postage; travel expenses, etc.; the cost of registration and execution of the order does not depend on its size.

**Craft strategy** is a strategy on the basis of which production is built, in which workers-universals manually or using simple, multifunctional tools produce small batches (units) of products in accordance with individual customer requirements.

**Critical resource** means resources, the availability, quality and efficiency of which are vital for the successful implementation of operational activities and the functioning of the organization as a whole.

**Current stocks** are stocks of inventory ensuring the continuity of supply of the production process between two regular deliveries. The main purpose of creating such stocks is to eliminate the need for hourly deliveries and ensure the continuity of operating activities.

**Deming Cycle (DC)** is a modern methodology of improvement, which is based on the consistent implementation of 4 functions: planning, execution, verification, corrective action, through the implementation of which the impact of the quality system on the production process is provided. It is based on the assumption that improvement is the result of the application of knowledge accumulation.

**Dispatching** is the process of continuous monitoring and operational regulation of production in order to ensure the implementation of the plan in accordance with the established calendar schedule.

**Effectiveness** is the total result of the system and the accumulated potential for further development. Performance is a multicriteria value; its main criteria are: efficiency, profitability, efficiency, productivity, quality, innovation, quality of working life, market position of the enterprise.

**Environmental Management System (EMS)** is a system based on the group of ISO 14000 standards which unlike many other environmental standards are not focused on quantitative parameters (emissions, concentration of matter) and not on technology, and the formation of satisfactory environmental behavior at three levels: organizational - through improving the environmental "behavior" of corporations; national - through the creation of a significant addition to the national regulatory framework; as a component of state environmental policy.

**External environment of the operational system** is a set of variables that are outside the operational system; it consists of the immediate environment of the operational system, which is formed by other systems of the organization (financial, marketing, etc.), and the external environment of the organization.

**Firm** is a general term for any commercial enterprise, i.e. an enterprise established for profit.

**Flow production** means production characterized by the following features: a group of jobs is assigned to the processing or assembly of a product of one name or a limited number of product names that are related in structural and technological terms; jobs are located in accordance with the technological process; the technological process of manufacturing products is divided into operations; one or a limited number of related operations are performed at each workplace; items are transferred from transaction to operation piecemeal or in small transfer batches.

**Functions of operational management** are separate from each other, relatively independent types of management activities. The main functions of operational management are goal setting, planning, organizing and coordinating, motivating, controlling and regulating.

**G. Taguti's methods** are a set of approaches to quality management aimed at implementing the idea of quality improvement in the case of product planning taking into account variations and uncertainties.

**Gantt chart (Gantt chart, bar chart)** is a graphical representation of the plan of a certain set of works during a specific period; variety of bar charts. It represents the segments located on a horizontal time scale; each of the segments corresponds to a separate work (task). The tasks that form the plan are placed vertically; the beginning, the end and length of a segment on a time scale correspond to the beginning, the end and duration of work. Gantt chart is used to plan work complexes, present the current state of work, control the production process.

Going beyond the **control limits** means a violation of the stability of the process and requires analysis of the causes and taking appropriate measures.

**Guarantee stocks (insurance, reserve)** are stocks of inventory designed to ensure the continuity of the production process in case of unforeseen circumstances: deviations in the frequency and volume of actual batches of supplies from the contract, changes in consumption, delays in delivery, etc.

**Histogram** is a tool that is a bar graph and allows you to visually estimate the law of distribution of statistics. It is used to display the distribution of specific values of the parameter by the frequency of its repetition for a certain period (week, month, year).

"Just-in-time" system (JIT-system) - in a broad sense - is a production philosophy, the main idea of which is the continuous improvement of products and the systematic removal of all unnecessary, i.e. all that leads to an increase in its value without increasing its consumer value. In the narrow sense, it is a system of chain management "supply-production-sales"; the basic principle of this system is the production and delivery of the necessary inventory to the required place and in appropriate quantities exactly at the time when they are needed. It is based on the use of a "pulling" approach to workflow management - parts and semi-finished products are fed to the next technological operation as previously required, i.e. each work site performs work according to the request of the next work site, no rigid production schedule. The

application of the system allows the company to approach the implementation of the concept of "Production with zero stock" ("Production without a warehouse").

1) ensuring the stable operation of the operational system for production, works or services in the planned volumes in a timely manner at the appropriate level of quality with maximum performance while maintaining the optimal level of operational system flexibility which guarantees its suitability for renewal and development;

2) initiating and supporting changes in elements, processes, parameters, structure of the operational system to transfer it to qualitatively new levels of operation with minimal resources and time based on a combination of external opportunities and internal resources of the organization.

**Integrated system for high-quality equipment (TPM-system)** is a system that provides the optimal combination of efficient use of production capacity and the cost of maintaining them in working order by reducing breakdowns and downtime (including through readjustment), as well as increase productivity and improve equipment. It covers not only the maintenance of production facilities during their operation but also the design and manufacture of these facilities, provides active participation in the process of improving the use of equipment of employees of all levels, all services and departments of the enterprise. A characteristic feature of the TPM system is the operation of the equipment by operators grouped into small groups working on this equipment. Also known as the General Operational System.

**Inventories** are stocks that are expected to be included in the process of production or personal consumption. Inventories formed in the operational system consist of products of different levels of readiness and include: stocks of raw materials, basic and auxiliary materials, semi-finished products, parts and components; inventories of work in progress; stocks of finished products.

**Inventory management** is an aspect of operational management the main object of which is the inventory formed in the operational system and its purpose is to reduce

excess inventory and stabilize delivery times, i.e. periods of time from placing an order for inventory to receipt enterprise of the necessary resources.

**Inventory storage costs** are costs associated with the current maintenance of existing stocks, as well as costs arising from the withdrawal of inventories of the enterprise; inventory storage costs increase in direct proportion to the increase in the size of the order.

**Kanban (Japanese)** is a term meaning "signal" or "visual record".

**Kanban system** is a system of organization of production and material and technical supply, which allows to fully implement the principle of "Exactly on time". When working on the "Kanban" system, the manufacturer does not have a strict work schedule; it is not bound by a general plan, but by a specific order of the consumer shop and optimizes its work within this order. There is no specific production schedule for the decade and month; it is actually formed by the circulation of selection cards and Kanban order cards. The Kanban system is based on interaction with a narrow range of suppliers, which are selected on the basis of the ability to guarantee the delivery of high-quality components exactly on time.

**Labor rationing** is the process of establishing the necessary time to perform a particular job.

**Laws of organization of operational systems** are the necessary, essential, established relationships between the elements of the operational system, as well as between this system and its external environment. Laws of organization of operational systems are interdependent and interdependent; they are divided into two groups, i.e. the laws of statics of the system (manifest themselves in structures) and the laws of dynamics of the system (manifest themselves in the processes of development).

**Management** is a function of organized systems of different nature (biological, social, technical), which ensures the preservation of their structure, maintaining the mode of operation, the implementation of their programs and goals.

**Management methods** are ways to influence employees and production teams in general, ensuring the coordination of their activities in the process of achieving goals. All methods of operational management according to the composition and nature of the impact on the objects they manage, are divided into the following four groups: organizational, administrative, economic, socio-psychological.

**Model** is a conditional image of an object of study designed to simplify that study.

**Model of optimal size of order** is a model that aims to determine the optimal (economic) volume of the order, based on the criterion of minimizing the amount of two types of inventory management costs: the cost of registration and execution of the order and the cost of inventory storage.

**Modeling** is research of objects of cognition by means of models; a powerful tool for scientific knowledge and solving practical problems, widely used in science and in many areas of practical operations.

**MRP-I system** is a system of organization of production and logistics. Also known as "Small MRP", "First Generation MRP", "Material Needs Planning System". The basic principle is that all materials, components and components of the product must arrive at production on time to ensure the creation of the final product without any delays. It is based on the use of a "push" approach to workflow management - parts and semi-finished products are fed to the next technological operation in accordance with a strict production schedule; implemented through a computer program that allows you to regulate the supply of components in the production process, while controlling stocks in the warehouse and the course of production.

**MRP-II system** is a system of organization of production and logistics. Includes the functions of the MRP-I system, such as planning the needs for inventory, as well as a number of other functions (automated design, process control, etc.). Like the MRP-I system, it is implemented through a computer program. Also known as "second generation MRP", "Production Resource Planning System".

Non-flow production means production characterized by the following features: at workplaces are processed different in design and manufacturing technology items of labor; Workplaces are arranged in typical groups without any connection with the sequence of operations; in the manufacturing process, parts are moved by complex routes.

**Objectives of operational management:**

**Operational cycle** is the time of one operation, during which one part is made, a batch of identical or several different parts; consists of the sum of durations of technological time and breaks of party affiliation; serves as a basis for determining the production cycle.

**Operation** is a part of an operational process carried out on a certain object of work (object of operational activity) at one workplace by one employee. It is characterized by the immutability of the subject of labor, workplace and performer.

**Operational activities** are purposeful activities to create any utility (any tangible and intangible benefits). It covers the production of material products, and the provision of services, and the performance of any other work in any field of activity.

**Operational control** is the process of comparing the actual parameters of products, technology, the course of the production process with the normative values and regulation, if necessary, i.e. the course of production. It is implemented on the basis of operational accounting and operational analysis.

**Operational function** includes all actions performed in the operational system, as a result of which products are produced, which are supplied by the organization to external consumers. The essence of the operational function is the conversion (transformation) in a series of actions called operational processes, through which the inputs of the operational system are converted into end results.

**Operational management** means management actions aimed at ensuring the effective functioning of the operational system of the organization and achieving the



goals set before it; the process of planning, organizing and coordinating, controlling and regulating the processes of production of certain volumes of products, performance of works or provision of services carried out within a specific enterprise (institution, organization); the process of making and monitoring the implementation of management decisions that ensure the successful implementation of the operational function of the organization.

**Operational planning** is the process of establishing or clarifying and specifying the production goals of the organization as a whole and structural unit of its operational system, determining the means of achieving them, timing and sequence of their implementation, identifying needs, resource allocation.

**Operational process** is a set of completed interconnected actions, which together create a certain utility that has value for the consumer to the customer; a set of actions of people, means of operational activities and nature for transformation of objects of operational activity into its final results. The operational process consists of operations.

**Operational strategy** is a set of interrelated decisions (technological, economic, organizational and resource) to streamline the operational activities of the organization to achieve its strategic competitive advantages; one of the functional strategies of the organization.

**Operational system** means one of the systems of organizations in which the implementation of the operational function is carried out, i.e. production, provision of services, performance of works.

**Operational system planning** is a plan of the spatial arrangement of the material components of the operational system. It is customary to distinguish between planning on the subject principle (linear), on the technological principle (functional) and on the principle of group technology.

**Operational-calendar planning** is the process of establishing a place (operational system unit, site, workplace), time (quarter, month, decade, change),

volume and sequence of operations for the manufacturing of products or services in accordance with the production program of the enterprise. It is divided into inter-shop and intra-shop.

**Optimal production program** is a production program provided by sales, which best corresponds to the resource structure of the organization, which guarantees the best results according to the accepted criterion (as the criterion of optimality is most often used maximum profit).

**Optimal size of the order** is the size of the order, which provides the minimum amount of total costs for inventory management (costs for registration and execution of the order and the cost of inventory storage).

**Order point** is a parameter that indicates the lower limit of the stock after which it is necessary to organize the next purchase order. The level of stock at the time of ordering should be sufficient to continue the smooth operation of the operational system, and the insurance stock should remain intact.

**Planning and accounting unit** is the accounting unit of work accepted in the organization for planning purposes; the composition of planning and accounting units is the most important characteristic of the operational planning system. The main planning and accounting units are: detail of each name; a set of parts included in one assembly unit; a set of parts that are part of different assembly units, but have the same calendar and planning standards (advance on the issue, the rhythms of the parties); order in general, i.e. the whole set of parts and components of the product of one name.

**Preparatory stocks** are stocks of inventory, created in case of need for additional preparation of material resources for use in the production process.

**Process approach** is the application within the organization of a system of processes together with their definition and interaction, as well as their management. For an organization to function effectively, it must identify and manage a number of interrelated activities.

**Process** is a set of interconnected actions that turn inputs into outputs. Inputs include all types of resources consumed by the organization, customers and their property. Outputs are the result of purposeful activities within the process, as well as additional outputs in the form of information, experience, negative impacts on the environment and so on. The inputs of one process are usually the outputs of other processes.

**Product** is the result of operational activities; may be submitted in material form (material products), in information form (intellectual products) or in the form of work performed and services provided.

**Product life cycle** is a set of production processes, processes of circulation and consumption of products of a certain type from the beginning of the study of the possibilities of its creation to the cessation of its consumption and disposal.

**Product quality** is a set of properties and characteristics of the product that provides the ability to meet established or anticipated needs (established needs - fixed in legal norms, standards, orders, agreements, specifications and other documents; anticipated needs - those expectations that the consumer usually does not formulates specifically, but refers to established wishes).

**Production** - in a broad sense - is the process of creating goods; in a narrow interpretation it is the manufacture of material products carried out at industrial enterprises.

**Production function** is a function that shows the maximum possible output that can be achieved during the calculation period for each specific combination of factors of production.

**Production management** is a set of consistent actions of management to determine the objectives for the object of management (production) and their actual state on the basis of registration and processing of relevant information, the formation and approval (decision-making) of economically rational production programs and

operational tasks. The general functions of production management are organization, rationing, planning, coordination, motivation, control and regulation.

**Production program** is a plan of the enterprise for production, performance of works, provision of services, which contains a specific set of tasks on the volume of production of a certain range and range and proper quality for a certain calendar period (usually one year).

**Production structure** is a set of purely production units (shops, sections, service farms and services), which directly or indirectly participate in production activities, their number and composition, the links between them.

**Productivity** is a characteristic of the ability of a particular enterprise to perform the same amount of work less than others to spend resources. It is determined by the ratio of production volumes (services) and the cost of their creation (logistical, technological, raw materials, spatial, personnel, energy, information, time).

**QFD method** is a technology of structuring the quality function, which is a systematic way to study the needs and desires of consumers through the deployment of functions and operations in the company's quality assurance at each stage of the product life cycle, which would ensure the end result that meets consumer expectations. It is used to convert consumer requirements into quality parameters of the expected product, as well as the compliance of certain parameters with the quality requirements of the processes of planning, development, production and improvement of the product.

**Quality control** is an activity that involves measuring, examining, testing and evaluating one or more characteristics of an object and comparing the results with the established requirements to determine the degree of conformity for each of these characteristics.

**Quality group** is a group of employees of a particular unit of the operational system (shop, department, site, etc.), who voluntarily and regularly meet to identify

and analyze real or potential quality problems of the organization, as well as to develop solutions and proposals to management or implement their own decisions.

**Quality** is the level to which the set of own characteristics of a product, process or system meets the stated needs or expectations.

**Quality level** is a relative characteristic of product quality, based on the comparison of the values of quality indicators of the evaluated products with the basic values of the relevant indicators.

**Quality loop** is a schematic representation of interdependent activities that affect quality at different stages of the product life cycle: from identifying needs to assessing the level of their satisfaction. From the point of view of quality management, the "quality loop" is a model of the impact of the quality system on the process of creating products or providing services through the consistent implementation of the functions of administrative and operational management.

**Quality management** includes coordinated management activities to manage the organization in relation to quality.

**Scatter chart (correlation chart)** is a tool that builds a graph of the relationship between two parameters and allows you to determine the type and density of the relationship between them. By having such a relationship, the deviation of one of the parameters can eliminate the impact on the other.

**Seasonal stocks** are stocks of inventory which are formed by the seasonal nature of production, consumption or transportation. The main purpose of creating such stocks is to ensure the stable operation of the operational system for the period of seasonal breaks in production, consumption or delivery.

**Situational approach** is a methodological approach in which the main task of the operational manager is to correctly link the general approaches and management concepts with the realities of a particular situation in order to most effectively achieve the goals of the operational system of the organization. It is an attempt to identify

relevant situational variables and to find out how they affect the efficiency of operational activities. The situational approach is aimed at realizing the possibilities of direct application of scientific provisions to specific conditions of specific situations.

**Stakeholders** are groups of people who have a certain interest in the results of the organization, which include investors, customers, employees, company management, society, suppliers.

**Standard** is a regulatory and technical document that establishes the basic requirements for product quality. Standards define the procedure and methods of planning to improve product quality at all stages of its life cycle, set requirements for tools and methods of quality control and evaluation. Product quality management is carried out on the basis of state, international, industry standards and enterprise standards.

**Standardization** is the activity of establishing in regulatory documents certain requirements (norms, rules and characteristics) in order to ensure the safety of products (services) for the environment, life, health and property of consumers; technical and information compatibility; product interchangeability; quality of products and services in accordance with the level of development of science, technology and engineering; unity of measurements; safety of economic facilities, taking into account the risk of natural and man-made disasters and other emergencies.

**Statistical acceptance control** is sample control, which makes it possible to assess the quality of a batch of products based on the results of control of a certain sample taken from this batch.

**Statistical precautionary control** is selective control which makes it possible to assess the quality of the technological process by checking samples that are periodically taken from products that have been processed at a certain stage of production (operations). Process quality control is used to regulate the stability of

technological processes and is carried out directly during the production or provision of services.

**Statistical quality control** is a scientifically based method of sample control based on probability theory and mathematical statistics, which allows not only to establish the actual level of product quality, but also to actively influence the production process, i.e. to ensure its regulation. It is established to distinguish between statistical acceptance and statistical preventive quality control.

**Strategy of mass production** is a strategy on the basis of which large-scale machine production is built. It is specialized in the production of large volumes of products homogeneous in purpose and design and technological features. It provides maximum standardization and unification of components and parts. Strategy of mass production is characterized by a high level of complex mechanization and automation of all major technological processes.

**Strategy of serial production** is a strategy on the basis of which the production of products is built in large batches (series), repeated at certain intervals, possibly with the subsequent modernization of products. Enterprises with serial type of production specialize in the production of products with a relatively narrow range.

**Strategy of unit production** is a strategy on the basis of which the production of different types of products in one or more copies or small series. A wide range of materials and universal technologies are used in unit production. Most often, this strategy is used by companies specializing in the manufacture of products to individual orders.

**Strategy, the key priority of which is quality** is production strategy focused on the introduction of quality at all stages of production to meet customer requirements; quality criteria are applied not only to the product or service provided to the consumer, but also to all relevant processes - development, design, production, after-sales service of the product.

**Strategy, the key priority of which is time** is production strategy, the basic priority of which is to reduce the time of operations (development and production of new products or services, responding to changes in consumer demand, supply of products or services, etc.). The basic idea is that by reducing response time, costs are usually reduced, productivity is increased, new products are brought to market faster, and customer service is generally improved.

**Structure of the operational system** is a set of elements and relationships between them that ensure the integrity of the operating system, i.e. the preservation of its basic properties under various external and internal changes. It is determined by the composition and relationships of its elements and subsystems, as well as relationships with the external environment.

**Subjects of operational management** are certain persons who carry out the implementation of the objectives of operational management. These persons include: representatives of senior management of the organization which make strategic decisions in the field of operations; middle and lower management operational managers responsible for the development and implementation of current operational plans to maintain the stability of the operational system and others.

**System approach** is a direction of research methodology, which is based on the consideration of the object as a whole set of elements in the set of relations and connections between them, i.e. the consideration of the object as a system. The systems approach is focused on revealing the integrity of the object; to identify the various types of connections in it; to highlight the patterns and specific properties of the object that determine its structure and, accordingly, the organization.

**System** is a set of elements that are in relationships and connections with each other and form a certain integrity, unity; basic concept of system approach. According to the nature of the relationship of parameters with the environment, systems are divided into open (systems that exchange matter, energy, information with the



environment) and closed (isolated systems that do not exchange matter, energy, information with the environment).

**System of "fixed time" inventory management system** is one of the two basic inventory control and management systems, in which fixed values (regulatory parameters) are the order interval and the maximum level of stock in the warehouse. Orders for replenishment of stocks are placed with the specified frequency; the volume ordered is different each time and depends on the stock in the warehouse at the time of placing the order.

**System of inventory management "with a fixed quantity" of the order** is one of the two basic systems of inventory control and management, in which fixed values (regulatory parameters) are the volume of the order and the point of the order. The level of stocks is constantly monitored; when the quantity of material or raw material decreases to a certain level (order point), the next order for replenishment of stocks is issued, thus the same volume is always ordered.

**System of operational management** is a set of interconnected structural elements that ensure the coordinated interaction of the operational system units to implement the goals set for them. The main elements of the management system are: goals and objectives; object and subject; methodology and principles; functions and management methods.

**System of operational management of operational activities** is a complex organizational and planning system, the main purpose of which is to ensure the rhythmic operation of the enterprise for the production of products (services) in accordance with the established plan by controlling and regulating the processes of its implementation. The main functions of operational management are operational planning and operational control (dispatching).

**System of optimized production technology (OPT-system)** is a computerized system of organization and production of its management, focused on the prevention of "bottlenecks" in the chain "supply-production-sales".

The concept of "Six Sigma" is a concept of business improvement, the main purpose of which is to find and eliminate the causes of defects and errors in production and service processes, focusing on results that are critical for the consumer and clear financial indicators of profitability. The theoretical basis is the developed provisions for assessing the ability of a statistically controlled process to meet the specified requirements, taking into account the variance of characteristics.

**The concept of lean production (Lean production-concept)** is the concept of creating efficient production using limited resources.

The concept of uninterrupted information support of the product life cycle (CALS-concept) is the concept of organization and integrated information support of the product life cycle adopted in most industrialized countries. It is based on paperless data exchange and standardization of data presentation at each stage of the life cycle. The area of the most expedient application is the design and creation of complex high-tech products.

**The method of FMEA-analysis** is the technology of analysis of the possibility of defects and their impact on the consumer, its task is to identify those defects that cause the greatest risk to the consumer, identify their potential causes and take corrective action before these defects appear, and thus prevent the cost of correcting them.

**The method of organization of production** is a way of carrying out the production process, a set of tools and techniques for its implementation. It is characterized by a number of features, the main of which is the relationship of the sequence of operations of the technological process with the order of the equipment and the level of continuity of the production process.

**The Pareto chart** is a tool that allows you to see the number of losses depending on the various defects, focusing on the elimination of those defects that lead to the greatest losses.

**Time rate** is the amount of labor costs set to perform a unit of work (products) by an employee (group of employees) of the appropriate qualification under certain organizational and technical conditions of production.

**Usefulness** is the ability of a product or service to meet certain needs of consumers. It is customary to distinguish the usefulness of form, place, acquisition, condition, time.

**Virtual enterprise** is an association on a contractual basis of firms involved in product lifecycle support processes and operating on the basis of a common system of information interaction standards. The creation of such enterprises is widely used in the organization of work on the basis of the CALS-concept. Within virtual enterprises, joint projects for the development, production, marketing and service of various types of knowledge-intensive goods are implemented.

When applying these methods, the emphasis is on the so-called non-productive regulated quality (in the process of planning the experiment) and the use of "loss function G. Taguti", which can calculate the amount of quality loss in value terms, deviating from the target value of quality indicators.

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2. Операційний менеджмент: практикум / О.М. Овдіюк, М.М. Тимошенко, А.М. Пивовар, П.В. Пивовар. – Житомир: ЖНАЕУ, 2015. 156 с.

3. Соснін О. С. Виробничий і операційний менеджмент : навч. посібн. К. : Вид. Європ. ун-ту, 2002. 147 с.
4. Сумець О. М. Основи операційного менеджменту : підручник для студентів економ. спец. К. : ВД «Професіонал», 2004. 416 с.
5. Школа І. М. Операційний менеджмент : практикум. Чернівці : Книги XXI, 2004. 376 с.
6. Чорна М.В., Смірнова П.В., Бугріменко Р.М. Управління витратами: навч. посіб. / М.В. Чорна, П.В. Смірнова, Р.М. Бугріменко, 2017. 166 с.
7. Як законно працювати в умовах карантину: актуальні зміни законодавства / Руслан Редька // ЛІГА:ЗАКОН: URL : Режим доступу: [https://biz.ligazakon.net/analytics/194180\\_yak-zakonno-pratsyuvati-v-umovakhkarantinu-aktualn-zmni-zakonodavstva](https://biz.ligazakon.net/analytics/194180_yak-zakonno-pratsyuvati-v-umovakhkarantinu-aktualn-zmni-zakonodavstva)

### **13. Інформаційні ресурси**

1. Агентство з розвитку інфраструктури фондового ринку України. URL : <http://smida.gov.ua/>.
2. БІЗНЕС-ВИДАННЯ: Журнал «&СТРАТЕГИИ» (Ділове щомісячне видання). URL : <http://www.management.com.ua/announce.php?edition=18>.
3. Всесвітні веб-ресурси з економіки (Електронна економічна бібліотека. Містить публікації та матеріали з різних аспектів економіки та бізнесу, а також велику кількість посилань на економічні журнали, сайти відповідних асоціацій та установ) URL : <http://www.management.com.ua/links/goto.php?id=86>.
4. «Маркетинг і менеджмент інновацій» URL : <http://mmi.fem.sumdu.edu.ua/>.
5. «Менеджмент». URL : <http://menagement.knutd.com.ua/>.
6. Інформаційно-пошукова система по підприємствах, фірмах і організаціях, які працюють на ринку України. URL : <http://www.autosystems.com.ua>.

7. Онлайн-курси від провідних університетів світу з операційного менеджменту. URL :<https://www.coursera.org/courses?query=operations+management>.

8. Щотижневик «Бизнес». URL : <http://www.business.ua/>.

9. ManagementFirst.com (Віртуальний журнал, присвячений різним аспектам управління: стратегічний менеджмент, лідерство, управління маркетингом, управління персоналом, електронна комерція, управління стосунками зі споживачами). URL : <http://www.management.com.ua/links/goto.php?id=12>.

10. McKinsey Quarterly (Електронний журнал консалтингової компанії McKinsey, присвячений управлінню бізнесом у різних галузях) URL : <http://www.management.com.ua/links/goto.php?id=37>.

11. Strategic Management Journal (Щомісячний електронний журнал зі стратегічного менеджменту). URL: <http://www.management.com.ua/links/goto.php?id=31>.

12. Навчально-інформаційний портал НУБіП України. URL : <http://elearn.nubip.edu.ua/>. (дата звернення 01.04.2022 р.).

13. Національна бібліотека України ім. В.І.Вернадського URL : <http://www.nbuv.gov.ua> (дата звернення 01.04.2022 р.).

NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES  
OF UKRAINE

DIARY OF EDUCATIONAL PRACTICE

student \_\_\_\_\_  
(first name, last name)

Faculty of Agrarian Management \_\_\_\_\_

Production and Investment Management Department \_\_\_\_\_

Academic degree

Bachelor \_\_\_\_\_

Academic program Management \_\_\_\_\_

Specialty 073 «Management» \_\_\_\_\_

\_\_\_\_\_ Course, Group \_\_\_\_\_

Student \_\_\_\_\_  
(first name, last name)

Start of practice  
„ \_\_\_\_\_ ” 20 \_\_\_\_ year

\_\_\_\_\_

(signature)

(position, last name and initials of the responsible person)

End of practice  
“ \_\_\_\_\_ ” 20 \_\_\_\_ year

\_\_\_\_\_

(signature)

(position, last name and initials of the responsible person)











## Content of practice and assessment of practice in points

No	Evaluation parameter	Scores		Current control of students' knowledge	
		Min	Max	Form of control	Responsible for control
1	Passing practice (implementation of the practice schedule) (0 - 50 points)	30	50	Current	Practice supervisor
2	Forming practice results (filling accompanying documents, and namely, a diary) (0 - 20 points)	10	20	Checking the diary	Practice supervisor
3	Evaluation of acquired knowledge, abilities and skills (learning the practice program) (0 - 30 points).	20	30	Defense of practice	Commission of the department
<b>Total</b>		<b>60</b>	<b>100</b>	<b>X</b>	<b>X</b>

**Correspondence of assessment in points on a 100-point scale to assessments on a national scale**

<b>Final semester rating evaluation</b>	<b>Evaluation on a national scale</b>
1	2
90-100	Excellent
74-89	Good
60-73	Satisfactory
0-59	Unsatisfactory