



## Innovative Management of Oil Enterprises Through the ERP System.

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**Abstract.** In the development of the world economy and the provision of food to the population, the problem of providing oil enterprises with raw materials at the current stage of development is in the first place. This is article is result of research work in the sphere of innovative management of oil enterprises through the ERP system.

**Key words.** raw materials, world economy, crude oil, management system, enterprise information systems, entrepreneurship.

### INTRODUCTION

World experience shows that countries such as the USA, European Union countries, South Korea, Japan, the Russian Federation, and China are achieving high results by using modern information and communication technologies (ICT) in automating the management system of modern enterprises, ensuring the competitiveness of their products, and improving their economic status. In particular, according to research conducted by the US company Allied Market Research (AMR) in 2017<sup>1</sup>"More than 800 of the largest US companies are achieving high economic growth by spending on enterprise resource planning (ERP) - 43%, customer relationship management (CRM) - 17%, supply chain management (SCM) - 13% and other enterprise information systems - 27%."

A number of positive works on automation of the management system are being carried out in our republic. In particular, in the action strategy for the five priority directions of the development of the Republic of Uzbekistan in 2017-2021, "Implementation of investment projects on the construction of new processing plants equipped with the most modern high-tech equipment for the deep processing of agricultural products, the production of semi-finished and finished food and packaging products, as well as the reconstruction and modernization of existing ones"<sup>2</sup>important tasks have been defined. As a result of the widespread introduction of modern information technologies into economic sectors, including the introduction of a complex of information systems in production management, the widespread use of software products in financial and economic

<sup>1</sup> <http://www.itstan.ru-Modern IT - information technologies>

<sup>2</sup> Appendix 1 to the Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No. PF-4947 "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan"

reporting, by 2023 the share of the digital economy in the country's gross domestic product will double by 2023.<sup>3</sup>

In the conditions of globalization, the activity of oil-oil enterprises, the high-level competition of the environment of the vegetable oil market is carried out in the conditions of the active introduction of information technologies to oil-oil enterprises. Special attention is also paid to the development of the activities of oil-oil enterprises, and in this regard, for the consumption of the population, "if we assume that the global market of vegetable oil grew at a CAGR of 4% in 2011-2018, and the consumption volume in 2019 will be 200.1 million tons<sup>4</sup>, in such conditions, innovative management of enterprise raw material reserves through the ERP-system plays a special role in improving the enterprise's management activities and, first of all, in supplying the enterprise's production with raw materials.

In this regard, in order to develop industry production, "Due to the limitation of the raw material base, the level of utilization of the production capacity of the branch enterprises does not exceed 50 percent, which leads to a decrease in the efficiency and competitiveness of the activities of oil enterprises with the participation of the state<sup>5</sup>" the task of developing measures to eliminate existing problems was set.

Improving the management of oil enterprises and, above all, providing them with resources is of particular importance. The urgency of the development of the procurement process is related to the fact that the enterprise is in the field of raw materials, and there are important reserves for increasing the efficiency of the business entity.

In order to deeply study the need to improve the management system of the enterprise, it is necessary to search for new tools, new methods of management, to direct the expansion of the conceptual bases of economic science and the scope of analysis, and to apply the main principles of the theory of resources.

**Methods.** In the course of the study, general scientific methods and methods for processing statistical data were used. The information base was the materials of domestic and foreign research institutions, international organizations

**Results.** It should be noted that with the transition to the digital economy, enterprises are forced to reconsider their policies in the fields of production and marketing, as well as material and technical support, transportation, warehouses, and information systems. Structural adaptation to competitive conditions, directing the enterprise to new goals, that is, production of a wide range of products intended for the domestic and foreign markets, leads to the emergence of new problems at a new stage of the production process.

ERP system (Enterprise Resource Planning - Enterprise Resource Management) is a corporate information system for automating planning, accounting, control and analysis of all main work processes, solving problems in the production process for the enterprise. The ERP system helps to integrate all departments and functions of the enterprise into a single system. At the same time, it makes it easier for all departments to work with a single database and for them to exchange all kinds of information with each other.

The ERP system includes various functional modules, such as accounting and tax accounting, warehouse management, inventory of material and other resources and other logistics operations, warehouse, employee accounting, customer relationship management. Various software modules of

<sup>3</sup>PQ-4699 of the President of the Republic of Uzbekistan dated April 28, 2020 "On measures for the widespread introduction of the digital economy and electronic government" decision

<sup>4</sup><http://www.grandars.ru> - Encyclopedia Economist

<sup>5</sup>Resolution PQ4118 of the President of the Republic of Uzbekistan dated January 16, 2019 "On additional measures for the further development of the oil industry and the introduction of market mechanisms in the management of the sector"

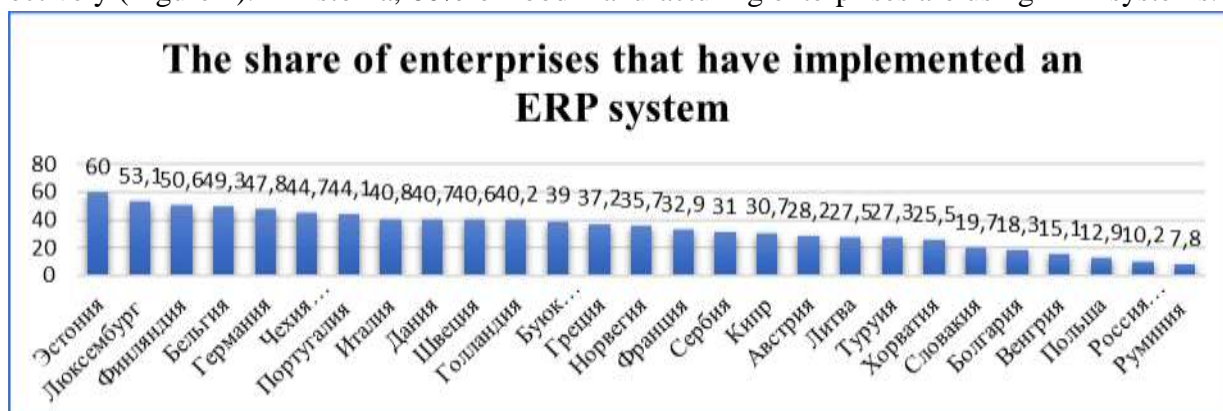
the integrated ERP system allow to replace various outdated information systems for logistics, finance and project management. All information is stored in one database, which can be retrieved at any time upon request.

US production and inventory management association (American Inventory and Production Control Society, APICS) "ERP-system". can be used in two ways. First, the information system used in the process of planning resources for the production process, procurement, delivery (provision), resource accounting and fulfillment of customer orders.

Second, a methodology for effectively planning and managing the enterprise resources needed to produce, purchase, ship, and account for the fulfillment of customer orders in (generally speaking) manufacturing, distribution, and service industries.<sup>6</sup>

**Analyses.** In fact, the development of ERP systems in the world is an objective phenomenon, because at this stage of its development it is related to the realities of the world economy, but companies are still at the stage of making a decision on the implementation of ERP systems and implementing the project. At the same time, global trends indicate an increase in customer satisfaction, an excessive decrease in the planned budget for planning ERP systems, and high competition in the market for suppliers of this software product.

Food manufacturing enterprises of developed and developing countries are using ERP system effectively (Figure 1). In Estonia, 60% of food manufacturing enterprises are using ERP systems.



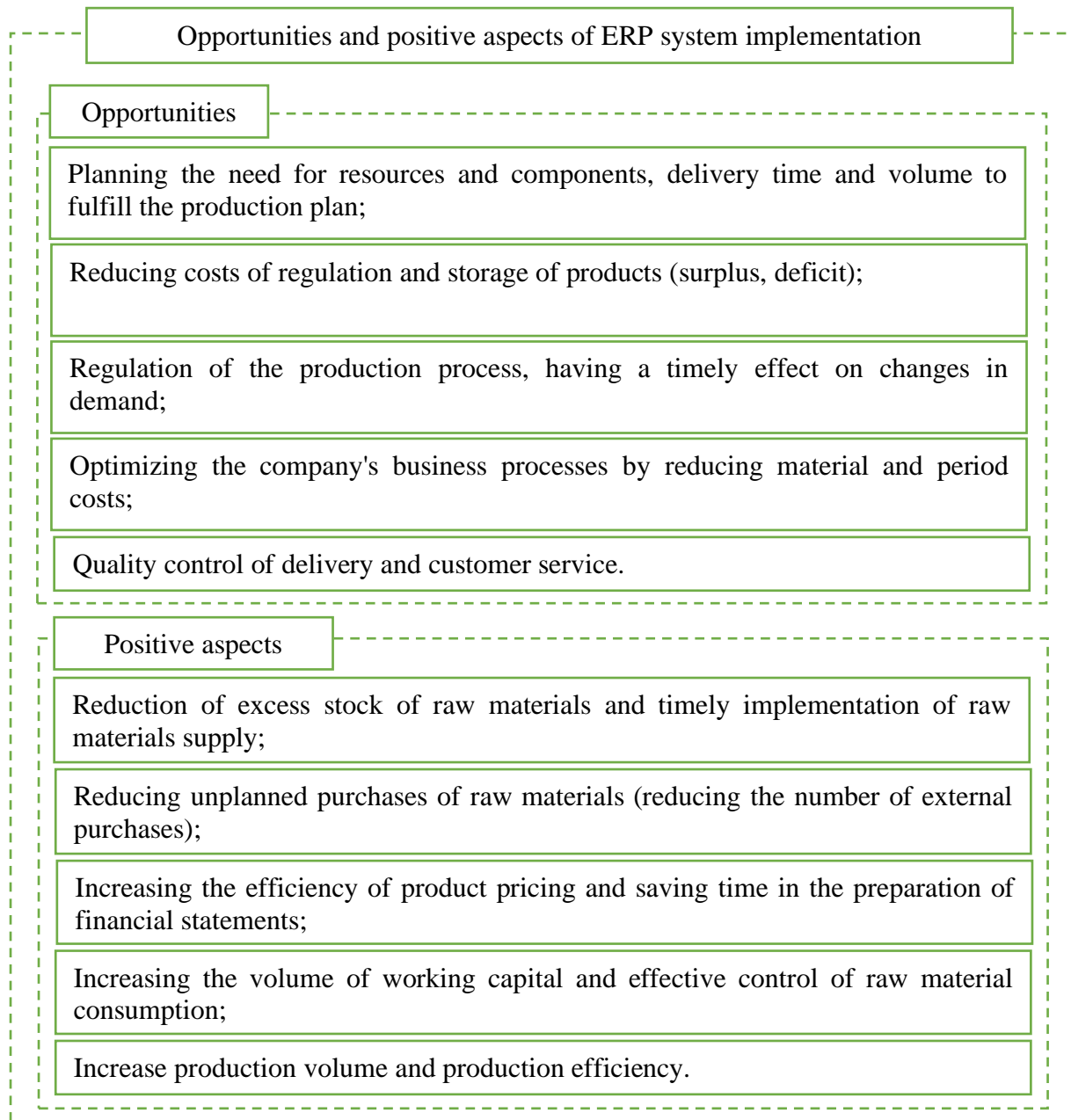
**Figure 1. In 2015, the dynamics of the use of the ERP system by enterprises producing food products<sup>7</sup>**

The figure above shows the dynamics of the use of the ERP system by enterprises producing food products in 2015. Based on it, the digitization of enterprise activities begins with the development of the ERP system. This system is used in large enterprises that produce a wide range of products with complex production and carry out large-scale warehouse operations. Also, the ERP system represents an integrated information system covering the areas of planning and forecasting of enterprise activity, sales, reserves, production, procurement, finance and management.

The ERP system includes the reengineering of the enterprise's business processes, as well as significant changes in the work of its employees. Due to the complexity of the project, the implementation of the ERP system takes a long time (2-3 years). At the same time, the implementation of the ERP system has a number of opportunities and positive aspects (Figure 2).

<sup>6</sup><http://www.intuit.ru/studies/courses/3481/723/lecture/8642>

<sup>7</sup> <https://issek.hse.ru/> - Institute of statistical and economic research



**Figure 2. Opportunities and positive aspects of ERP system implementation<sup>8</sup>**

Figure 2 above presents the opportunities and positive aspects of implementing an ERP system. The main tasks of the ERP system in the management of raw materials and production processes are to manage the technical characteristics of products and production technologies, to plan business processes, to manage sales and purchases, and to manage stocks and production processes. In this case, it is appropriate to classify all the resources involved in the production of products in the implementation of business processes.

The procedure for determining the connections between different levels of the product is called explosion. Exploded view allows you to display a complex product as a set of elementary parts that make up its composition. Such a display of the product eliminates the repetition of the same components, but at the same time the idea of which parts are part of separate units and assemblies is lost. However, the schemes in this format are very awkward and difficult to understand. Such a problem is solved by the ERP system, which makes it possible to select various

<sup>8</sup>Author development based on research results

blocks convenient for perception and practical use in different areas of production, automatically ensuring the efficiency of the overall interaction.

Thus, the ERP system is an electronic system used in the management of the production process. This system has a number of advantages as well as disadvantages. The advantages are, first of all, the ease of communication with partners (for example, if partners use the same software, it is easier to work with them), outsourcing, if the enterprise is not engaged in the creation of its own software (IT) development, then there is no need to keep service personnel in the state. This ensures that the company can quickly respond to requests and requests.

Among the disadvantages of the ERP system is its high cost, the complexity of its implementation in enterprises engaged in various activities (conglomerate), as well as in complex and non-traditional production enterprises.

The results of the study showed that the method of managing the raw materials of the enterprise through the ERP system allows to increase efficiency. The advantages of the proposed method are as follows:

- 1) minimum financial costs;
- 2) ease of use and adaptation to production conditions;
- 3) high efficiency;
- 4) analysis of business processes of the enterprise.

In this case, the ERP method is studied as a tool for raw material inventory management. Based on the modular principle, the standard type matrix of production needs provides a combination of vertical and horizontal values to find the optimal value of the problem parameter.

First, a problem shop, line or an entire enterprise is selected. After the object is selected, the main factors affecting the production process are determined. For each of the factors, the value is calculated in percentages (shares), and these data are summarized and the "Production needs basket" is formed. Here he studies the degree, quantity and characteristics of the influence of each factor on the production process.

At the final stage - by comparing the data obtained from the "Production Needs Basket" with the current values, conclusions and suggestions are given on the optimization of the current (current) efficiency and production stages. These steps include:

Vertical - resource type, resource demand, share of resource in finished product.

Horizontal - levels of production (delivery of raw materials to the initial or production process, processing of raw materials and acceptance of the final product (packaging of the finished product)).

Such a matrix is a very flexible tool, the number of vertical and horizontal values, the number of factors can be increased or decreased depending on the specific nature or complexity of production. Also, the Matrix allows analysis and optimization of production departments, specific characteristics and needs of the enterprise based on the principle of "big to small" and vice versa "small to big". The information used for the calculation is the information inside the enterprise and has an economic appearance.

There is no need to attract an outside expert to the enterprise for the implementation of such processes, because this type of work can also be performed by an employee working in the enterprise.

As a result of research, the implemented ERP system should include the following criteria:

- Criticality criteria. Initially, it is necessary to identify "critical points" in the management system of the business process, where the main problems of the enterprise are concentrated (or are concentrated in the development trend of the external or internal environment in the future).

2. Readiness criterion. Analysis of the enterprise's readiness to introduce an integrated information system. "Professional" and "psychological" readiness is the main factor of enterprise employees' readiness to switch to ERP system.

3. Time criterion. The process of implementing a complex software product It lasts from 6 months to 1-2 years. To calculate how long the costs will take, calculate the risks that are likely to slow down the project implementation process. Calculation of working time and motivation of employees participating in the project.

4. Price criteria. Usually, the enterprise ERP system implementation project is assigned to the information supply department. This, along with the disadvantages, leads to difficulties in choosing a partner for the implementation of the ERP system. It is necessary to consult with a consultant on the implementation of the ERP system<sup>9</sup>.

As a result of the research, it was found that the matrix of production needs proposed based on the ERP method is the most suitable for oil enterprises. The advantages of using logistics tools of this system - it is possible to achieve economic efficiency by reducing the cost of the product and the quality of execution in the control of planning and resource management during the production process.

The ERR system integrates the concept of supply chain management in the implementation of production chain planning and production management subsystems, synchronizes plans at different levels, and creates planned parameters between enterprises that are participants in the chain.

A supply chain is a system consisting of groups of functional elements considered from the point of view of the enterprise (suppliers, distribution points, transporters) necessary to ensure the delivery time of the product produced by the enterprise from the primary supplier to the end user.

The simplest supply chain model consists of four elements:

- 1) supplier - raw materials, materials and components;
- 2) the manufacturer - the end user - produces the final product delivered to the customer;
- 3) warehouse or distribution center - stores products and unloads cargo;
- 4) end user (customer) – receives the product.

A supply chain model consists of simple iterative models of needs and distribution points, which are combined into one model.

By using the enterprise ERR system, the enterprise achieves the following advantages:

planning the need for material resources and components, filling them in time, accurately calculating the delivery period and volumes to fulfill the production plan;

regulation of product availability (preventing excess and shortage), reduces storage costs, reduces the level of insurance reserves, reduces the number of low-quality stocks and unplanned purchases;

regulation of the production process according to changes in demand;

optimization of the business process in the enterprise by reducing material and temporary costs;

improving the circulation of working capital;

increase price efficiency;

control the quality of delivery and service to customers;

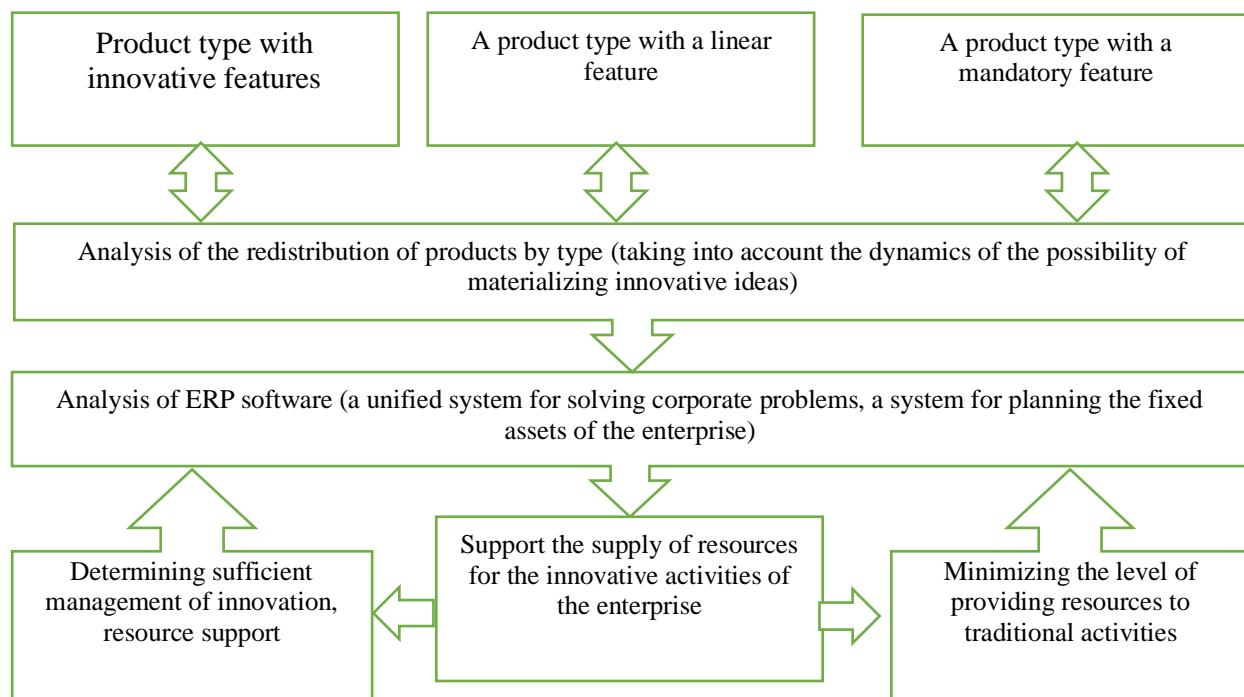
reduce labor costs for regulatory reporting.

A system of resource support efficiency criteria for the innovative activity of the enterprise during the implementation of needs planning programs is recommended, characterized by relative indicators of the resource supply criterion (RTM) with upper and lower limits. In the region close to

<sup>9</sup><http://www.intuit.ru/studies/courses/3481/723/lecture/8642>

the optimal value, the increase and decrease in the level of resource provision of RWD leads to a slight decrease in the indicator estimate. With a further decrease or increase in the level of supply of resources, the value of the estimate of RTD decreases more and more, and when the values are higher than the minimum allowable level ( $RTD < RTD_{min}$ ) or the maximum allowable level ( $RTD > RTD_{max}$ ), the estimate becomes zero ( $RTM = 0$ ).

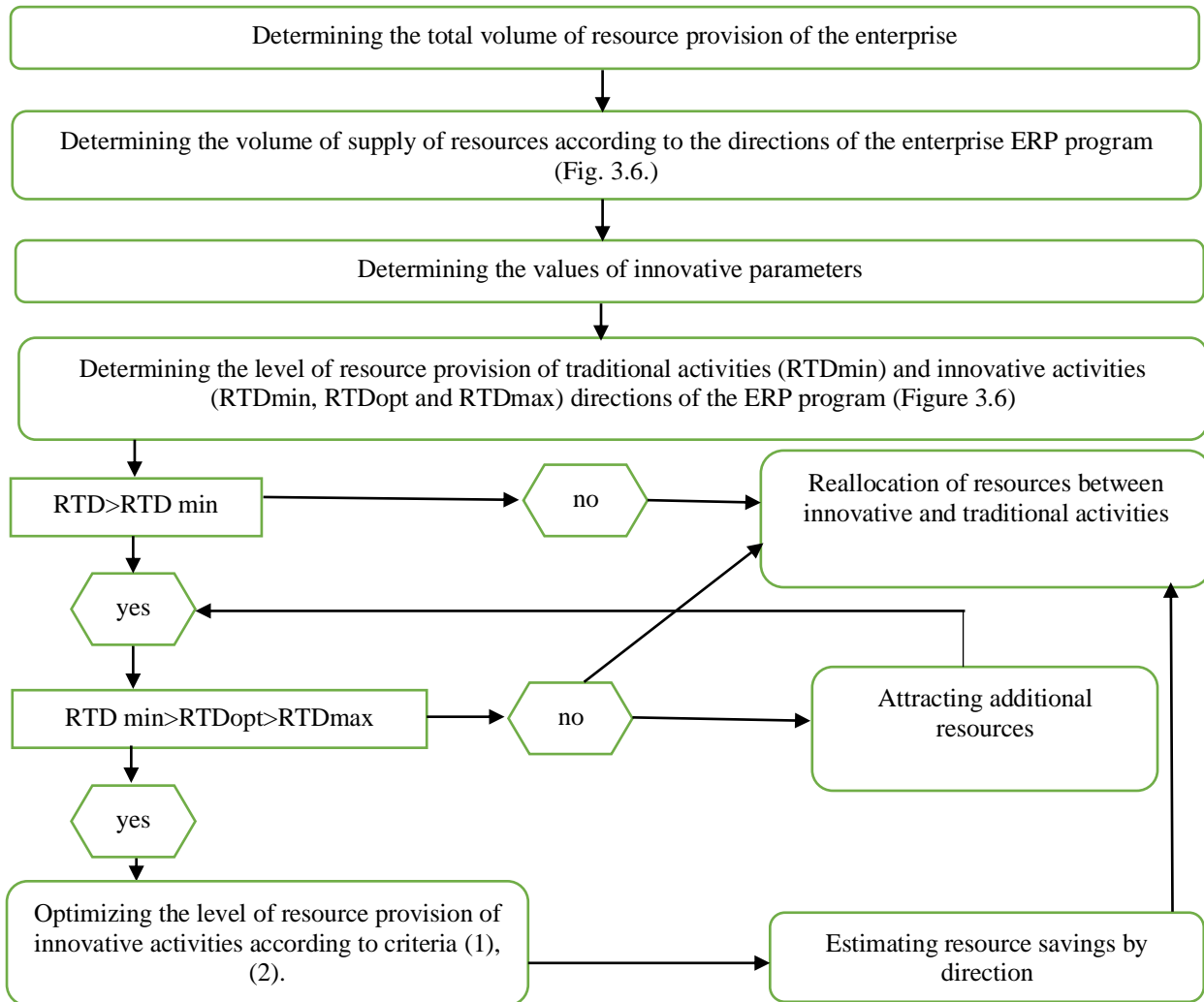
Thus, the relationship between the absolute value and the assessment of the level of resource provision is described in the section from the system of indicators  $RTD_{min}$  to the function  $RTD_{opt}$ . The values of resource supply levels are determined by the parameters of innovative activity  $RTD_{min}$   $RTD_{opt} > RTD_{opt}$  and  $RTD_{max}$ , starting from the portfolio of projects and, if it is successful, ending with the impact of the project on the economy of the enterprise as a whole (Fig. 3).



**Figure 3.** Algorithm for optimization of resource provision of innovative activities of the enterprise<sup>10</sup>

It is worth noting that, based on the needs planning programs, in order to improve the processes of optimizing the provision of resources for the innovative activities of the enterprise, the efficiency criteria for the provision of resources for the innovative activities of the enterprise were developed during the implementation of the needs planning programs. During the implementation of the needs planning programs, in the formation of the algorithm for optimizing the supply of resources for the innovative activities of the enterprise, the levels of providing traditional and innovative activities with resources (Fig. 3) were combined (Fig. 4) in accordance with the study model of the innovative activities of the enterprise during the implementation of the ERP needs planning programs.

<sup>10</sup>Author development based on research results



**Figure 4. Algorithm for optimization of resource support for innovative activities of the enterprise**

The above picture shows the developed algorithm for optimizing the supply of resources for the enterprise's innovative activities during the implementation of needs planning programs. This proposed algorithm assumes the following:

on the basis of the selected parameters of providing resources and the characteristics of the innovative activity of the enterprise, to determine the compliance of the levels of resource provision in the areas of innovative and traditional activities with the requirements;

redistribution of resources in accordance with requirements, if necessary - attraction of additional resources;

the cyclical process of optimizing the supply of resources with the innovative activities of the enterprise in the introduction of programs for planning needs, and then saving resources with their rational distribution.

The evaluations carried out during the study showed that the implementation of the optimization algorithm for the provision of resources for innovative activities in the enterprise during the implementation of the needs planning programs<sup>11</sup>:

- reducing insurance reserves by 18-20 percent;
- reduce storage capacity by 11-12%;
- increase the turnover of inventory by 30-32%;
- reduce management costs by 13-15%;

<sup>11</sup>



allows to reduce the production period of innovative products by 45-50 percent.

As a result of the research, methodological recommendations on the implementation of the method of optimizing the supply of resources for the innovative activity of the enterprise in the implementation of the needs planning programs on the following issues:

Determining the amount of supply of resources according to the directions of the ERP program;

determining the values of the parameters of the innovative activity of the enterprise;

to determine the level of provision of resources in the directions of the ERP program for the traditional and innovative activities of the enterprise;

the procedure for redistribution of resources between innovative and traditional activities of the enterprise;

was formed on the optimization of the level of resource provision of innovative activity in accordance with the developed criteria for the efficiency of providing resources for innovative activities.

### Discussion

At the end of the work on resource saving calculations in the directions of the ERP program, the main conclusions and suggestions of the author were given on methodological issues related to the optimization of the supply of resources for the innovative activities of the enterprise based on the implementation of the needs planning programs.

Through the implementation of the ERP system by the enterprise, the main mechanism for increasing the efficiency of the use of capacity is the possibility of planning production and maintenance, reducing the downtime of equipment, reducing changes, as well as providing maximum technical support. With the increase in the volume of sales, the more active use of capacities creates the opportunity for large investments in new equipment. Also, fixed costs in production are reduced.

It prevents excess stocks of raw materials and finished products, reduces stocks of finished products, increases the efficiency of production planning and brings closer to the marketing service responsible for market forecasting. In some cases, inefficient use of production capacity leads to "targeted" stockpiling of finished goods during peak sales periods. It optimizes production resources for effective use of the company's production capacity, helps the production chain work efficiently.

When highly liquid reserves are reduced, the enterprise frees up capital that is likely to be invested in profitable projects. A lot of low-quality products and broken products. These problems are the low stability of the production process, which means that the enterprise cannot maintain high operational parameters for a long time. It can be achieved through technical and technological updating of enterprises (introduction of the latest technologies with the involvement of investments) and effective implementation of ERP systems in enterprise management.

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