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THEORETICAL FUNDAMENTALS OF MANAGEMENT OF TECHNOLOGICAL DEVELOPMENT OF PHARMACEUTICAL ENTERPRISES IN THE CONDITIONS OF ORIENTATION ON THE INTERNATIONAL MARKET

ТЕОРЕТИЧНІ ЗАСАДИ УПРАВЛІННЯ ТЕХНОЛОГІЧНИМ РОЗВИТКОМ ФАРМАЦЕВТИЧНИХ ПІДПРИЄМСТВ В УМОВАХ ОРІЄНТАЦІЇ НА МІЖНАРОДНИЙ РИНОК

The article examines the concepts of management of technological development of production, its principles, directions and key forms. The mechanism of technological development of export-oriented enterprise is defined as a system of complementary internal and external resources of technological development management of the enterprise, as well as tools for analysis and assessment of technological support of production, to develop a strategy for market opportunities. The considered process of management of technological development of the export-oriented enterprise represents a sequence of stages providing development of the project of improvement of production system directed on expansion of export and demanding attraction of human, material, innovation and investment resources. The purpose of the article is to define and generalize the essence and principles of management of technological development of the enterprise, to explore the tools of technological development of export-oriented enterprise. During the study, the theoretical basis of management of technological development was considered in its direction, which is the use of investment and innovation tools in the formation of financial processes to ensure technological development and improvement and restructuring of technological support.

Key words: technological development management, technological development mechanism, technological development process, export-oriented pharmaceutical enterprise.

У статті проаналізовано, що в умовах посилення конкуренції на світовому фармацевтичному ринку та прискоренням випуску нових препаратів, які користуються підвищеним попитом в умовах пандемії COVID-19, виникає нагальна потреба у підвищенні ефективності виробництва за рахунок технологічного розвитку, збільшення експорту та підвищення якості продукції, хопризведе до позитивного впливу на результати роботи підприємства як на національному, так і на зовнішньому ринках. У статті розглянуто концепції управління технологічним розвитком виробництва, його принципи, напрями та ключові форми. Механізм технологічного розвитку експортоорієнтованого підприємства визначається як система взаємодоповнюючих внутрішніх і зовнішніх ресурсів управління технологічним розвитком підприємства, а також інструментів для аналізу та оцінки технологічного забезпечення виробництва. Розглянутий у статті процес управління технологічним розвитком експортно-орієнтованого підприємства являє собою послідовність етапів, що передбачають розробку проекту з вдосконалення виробничої системи, спрямованого на розширення експорту та залучення людських, матеріальних, інноваційних та інвестиційних ресурсів. Метою статті є визначення та узагальнення сутності та принципів управління технологічним розвитком підприємства, дослідження інструментів технологічного розвитку експортоорієнтованого підприємства. Під час дослідження було розглянуто теоретичну основу управління технологічним розвитком, який полягає у використанні інвестиційно-інноваційних інструментів у формуванні фінансових процесів для забезпечення технологічного розвитку, вдосконалення та реструктуризації технологічного забезпечення. Визначено, що процес технологічного розвитку виробництва підприємства складається з послідовних етапів, серед яких: формування цілей та визначення завдань технологічного розвитку виробництва; аналіз сучасного стану технологічного оснащення підприємства; визначення світових тенденцій розвитку відповідних технологій та вибір найбільш прийнятних для компанії; визначення ключових можливостей підприємства та необхідних ресурсів для технологічного розвитку виробництва; оцінка готовності виробничої системи підприємства до впровадження обраних технологій; формування проектної групи та розробка проекту технологічного розвитку виробництва; перевірка впровадженої технології на відповідність технічним регламентам та характеристикам; реалізація проекту та аналіз результатів.

Ключові слова: управління технологічним розвитком, механізм технологічного розвитку, процес технологічного розвитку, експортоорієнтоване фармацевтичне підприємство.

Statement of the problem in general and its connection with important scientific or practical tasks.

With increasing competition in the global pharmaceutical market and accelerating the production of new drugs in high demand during the COVID-19 pandemic, there is an urgent need to increase production efficiency through technological development, increase exports and improve its quality, positive impact on the results of the enterprise both in the national and foreign markets.

Analysis of recent research and publications.

Various aspects of management of technological development of pharmaceutical companies are covered in the works of many scientists, in particular: in the work of Zakharko N.V., Sagaidak-Nikityuk R.V. "Approaches to assessing the export-import potential of pharmaceutical companies", studied the current state of foreign economic activity of Ukraine's pharmaceutical sector. Indicates a stable dynamics of sales in 2010–2012, a significant decline in 2013–2015 and a slight decrease in 2018. The dynamics of Ukraine's foreign trade shows that imports of the pharmaceutical sector are outpacing and the negative balance is growing.

In the work of Torbiak B.M. "Analysis of trends in the formation and development of regional pharmaceutical markets" defines the mechanism for developing a strategy for the development of the pharmaceutical retail market, which provides forecasting trends in individual performance indicators for different development scenarios, the functioning of the pharmaceutical market remains optimal, and short-term forecasting.

However, despite the high value of their achievements, this issue requires further research, namely the analysis of the nature and principles of management of technological development of the pharmaceutical company. All this determines the relevance of the topic of our study.

Formulation of the research task. To define and generalize the essence and principles of management of technological development of the pharmaceutical enterprise, to investigate the tools of technological development of the export-oriented pharmaceutical enterprise.

Presenting main material. To make a technological breakthrough, transition to a higher, qualitatively different level of development of the pharmaceutical company, it is necessary to improve the management system of technological development, increase the efficiency of its operation. This, in turn, necessitates the development of effective methods of enterprise management, covering all levels of company management.

The process of technological development at the enterprise begins with a technological audit, which consists in assessing the technological potential of the enterprise, identifying current technologies and identifying future directions of development to achieve competitive positions in domestic and foreign markets.

The following elements should be highlighted, the management of technological development is presented in Figure 1.

An important role in the management of technological development is played by the formation of a structural department that will be responsible for the implementation of technologies and will manage projects in this direction. Important attention should be paid to information and staffing of the structural unit.

The principles of technological development management (Table 1) show that the main aspect is the process aimed at creating a technological strategy, which is to harmonize the company's main strategy for promising technological innovations, and which aims to form the technological basis of current and future competitive advantages.

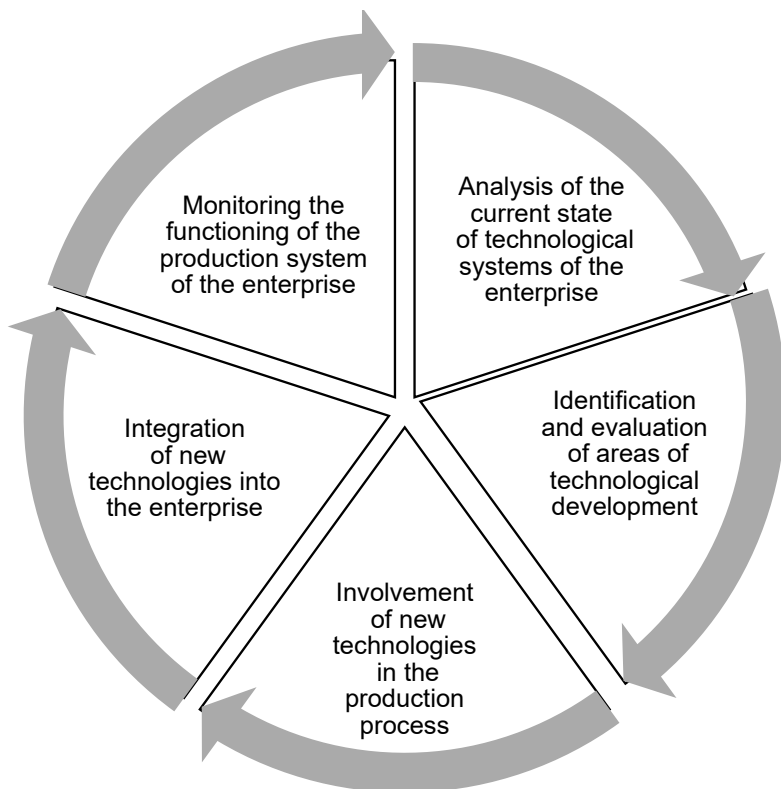


Figure 1. Elements of technological development management in a pharmaceutical company

Source: developed by the authors

Managing the technological development of an export-oriented pharmaceutical company involves combining engineering knowledge and management in order to plan, develop and attract technological capabilities that allow you to achieve strategic and operational goals of the organization. The variety of technologies that exist in the market, as well as the functions they perform, there is a need to develop mechanisms for managing technology in the enterprise [8].

The mechanism of technological development at the enterprise (Fig. 2) is a set of internal and external resources needed by management to further analyze and evaluate these factors for the technological process to develop a future strategy of technological development, focused on increasing the export potential of the enterprise. Its structure depends on the amount of all available resources of the enterprise (material, information, financial, material, social), which in turn affects the further development of the company.

The technology strategy should always include long-term goals that initiate innovative programs and projects aimed at achieving the company's competitive advantage. Competitive advantage in this case

Table 1

Principles of management of technological development of the pharmaceutical enterprise

No	Principle	Essence
1.	Strategic compliance	Inclusion in the strategic process of technology development as a prospect of technological innovation and coordination of general and technological goals of enterprise development.
2.	Goal setting	Compliance of strategic goals of the enterprise with the goals of technological development.
3.	Analysis and forecasting of the state	Analysis of the technological environment at the current stage of activity and forecasting its condition for the future. Consideration of the prospects of technological innovation, its implementation and control.
4.	The principle of system integrity	The main activity of the enterprise is a holistic economic system. It is the basis for technological development. Management staff should be based on the main goals of the company when involving technology in the company's activities.
5.	Priority of the company's development tasks	First of all, the company implements technological development of processes that are in critical condition and have the greatest impact on the further course of the production process and activities of the enterprise.
6.	The principle of industry technological imperative	According to the peculiarities of production activities, which can be structured into certain units is the technology. It is necessary to divide production into processes and apply appropriate technologies and knowledge for each of the processes, which will contribute to obtaining an effective result.
7.	The principle of resource realism	Focus on the available resources while ensuring technological development, which will allow for the effective implementation of the project without financial and material losses.
8.	The principle of efficiency	The process of implementing technology in the activities of the enterprise should benefit the enterprise and expand its capabilities.
9.	The principle of feedback	It is necessary to adhere to the balance of available technological support of the enterprise and technologies that have recently been involved in the production process.

Sources: [5; 6]

is achieved by promoting corporate technological and innovative research, organizational and methodological support for technology-oriented decisions, the use of all available tools of scientific, technical and technological development of the enterprise, methodological, organizational, and managerial support of technological development [9].

Technological development of an export-oriented pharmaceutical enterprise is determined by the internal capabilities of the enterprise and external conditions for the development of technological potential, as well as the results of its development at the enterprise.

Conditions and state of technological potential of the enterprise depends on [14]:

- Internal factors which include the effectiveness of the management mechanism of the enterprise, resource potential, organizational and legal form of the enterprise, the composition of optimal technologies, efficiency of the production process, providing the company with the necessary production capacity.

- External factors, which is state support, scientific and technical support, development of market infrastructure, investment.

Technological potential is an integral part of the production potential of the enterprise and includes a

set of available and involved human, informational, financial, logistical and organizational-managerial resources and capabilities of the enterprise to achieve the goals of scientific and technological development of the company [13]. Components of technological potential are presented in Fig. 3.

The process of managing the technological development (Fig. 4) of an export-oriented pharmaceutical company is a consistency of stages, continuity of processes that contribute to obtaining an effective result at the exit and meeting the planned goals of the enterprise. This process is cyclical, because the development of technology is quite fast, and managers of industrial enterprises must constantly monitor all technological developments in the market.

At the initial stages of management, staff must determine the main objectives of the enterprise, the purpose of measures to improve the enterprise, improve its market opportunities, as well as tasks to ensure the technological development of production. The basis for finding a connection between technology and the needs of the enterprise is formed, the current state of production facilities of the enterprise is assessed, critical problems of technological process management in the company, which is a barrier to entering foreign markets.

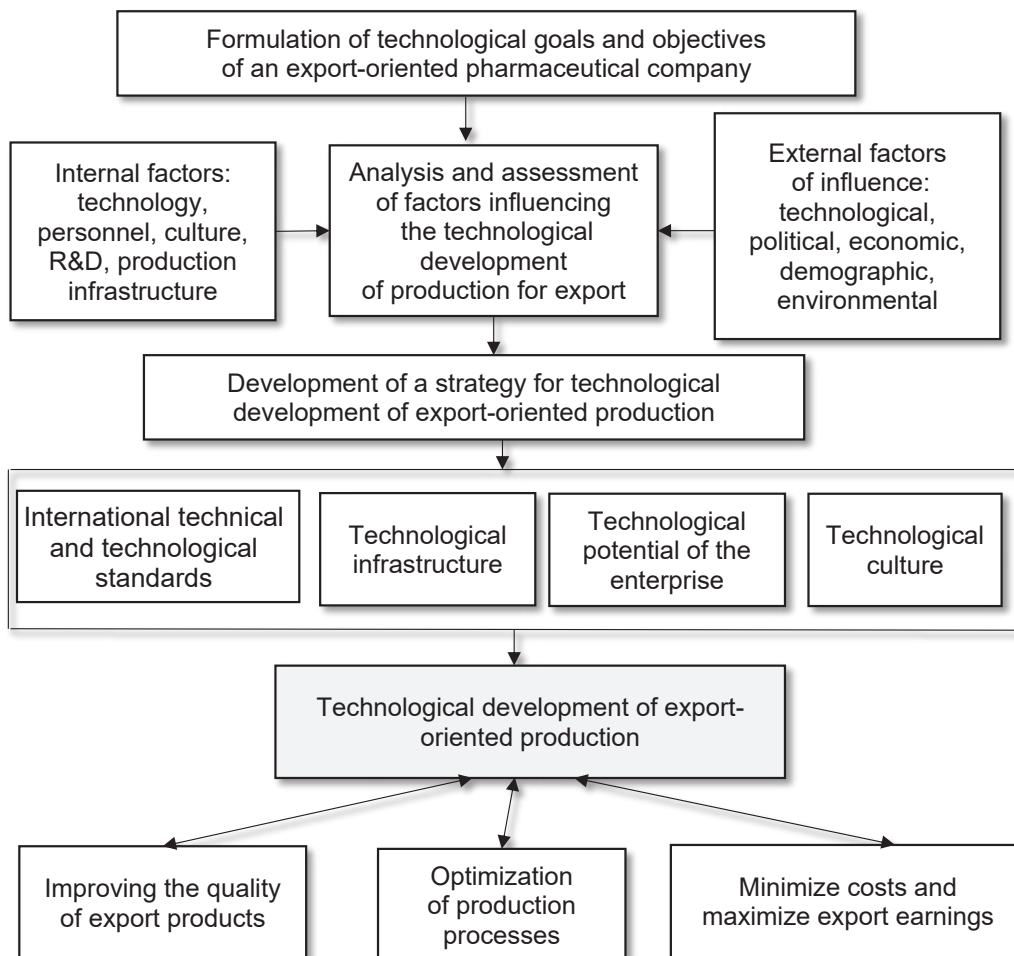


Figure 2. The mechanism of management of technological development of production of export-oriented pharmaceutical enterprise

Source: compiled by the authors

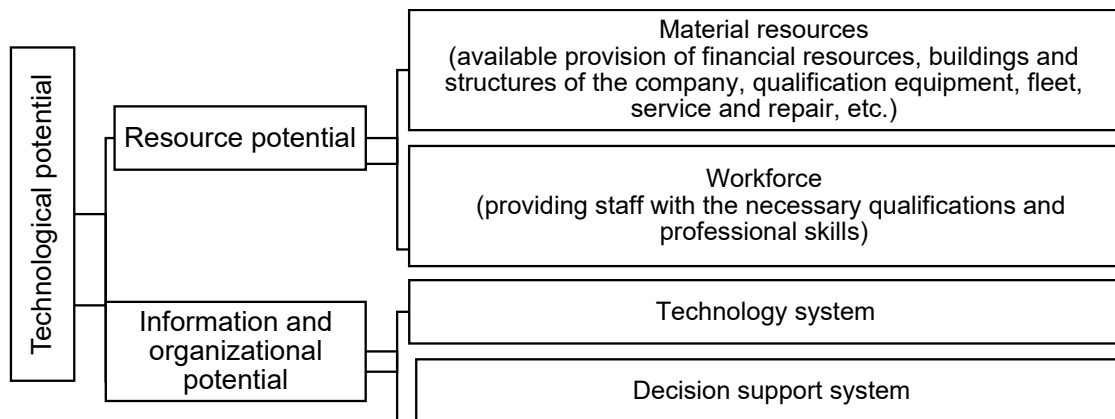


Figure 3. Components of the technological potential of the pharmaceutical company

Source: developed by the authors

The next stage is to create a map of existing shortcomings and analyze the process of technology management in each of the processes of production for export. The strengths and weaknesses of technical equipment are determined, the technological potential is determined to determine further actions for technological development at the enterprise.

As part of the technology identification process, it is necessary to analyze the market of available technologies and find those that can offer a significant impact on the development of companies. The next step is to choose the appropriate technology and purchase it. It is necessary to search for ideas and solutions from annual sources. Often the generation of options for technological development is carried out by hiring technical specialists in this field, who identify strategic opportunities and compliance of technologies, the probability of technological and commercial effect, as well as predict the future outcome of options [17].

All actions related to the identification, selection and acquisition of technology may occur inside or outside the company. The human, technological and financial potential at the disposal of the enterprise plays an important role. The other two activities (operation and protection of technology) depend solely on the conditional composition of the company and have a huge impact on improving the competitiveness of enterprises.

Next is the process of forming a project team, which should include senior R&D specialists at the enterprise such as production process manager, business development representatives and heads of departments responsible for product quality control, operations director, and support staff who is responsible for the production process at the enterprise. It is possible to involve specialists-engineers of the intermediary company, who will help to carry out technological development at the enterprise [18].

The next step is to lay the foundation for the research project, i.e. to determine the scope of the project, the list of organizational work, determine its scope and draw up a plan. Activities are conceptual and preparatory work and include search in the technical literature, search for patents and intellectual property technologies,

assessment of competitive alternatives, identification of resource gaps and preliminary technical assessment to determine or decide on the start of experimental and research projects [19].

It is necessary to conduct a financial analysis of the project, as well as to determine the necessary resources and costs that will incur the provision of technological development in the enterprise.

After evaluating the decision on the technologies that are planned to be involved in production, the project is developed and organizational actions for its implementation begin. Actions here usually include a thorough conceptual technological analysis, technical and economic experiments, identification of resource needs and solutions to their shortage, as well as assessment of the potential impact of technology on the production process.

The final stages are to implement a complete pilot project, prove technological feasibility and determine the scale of the technology and its value to the enterprise. This stage bears the greatest costs as material and financial. In addition to major technical work, other activities focus on market definition, production and impact assessment of these opportunities [20].

After the implementation of the technological development project, the project team draws conclusions about the commercial and production prospects of the involved technologies. A comprehensive analysis of technological development, additional technical assessment of the production process is carried out. The technical documentation on completion of the project and patenting of technology at the enterprise is made. The process of technological development at the enterprise affects the efficiency of the enterprise and requires constant monitoring at each of its stages.

Thus, ensuring technological development in the pharmaceutical company is a long-term process that requires the involvement of a large number of highly qualified specialists, capital investment, various sources of information and financial and material resources. Its successful implementation will help increase the investment attractiveness of the enterprise; expand market opportunities and sales channels not only in the domestic market.

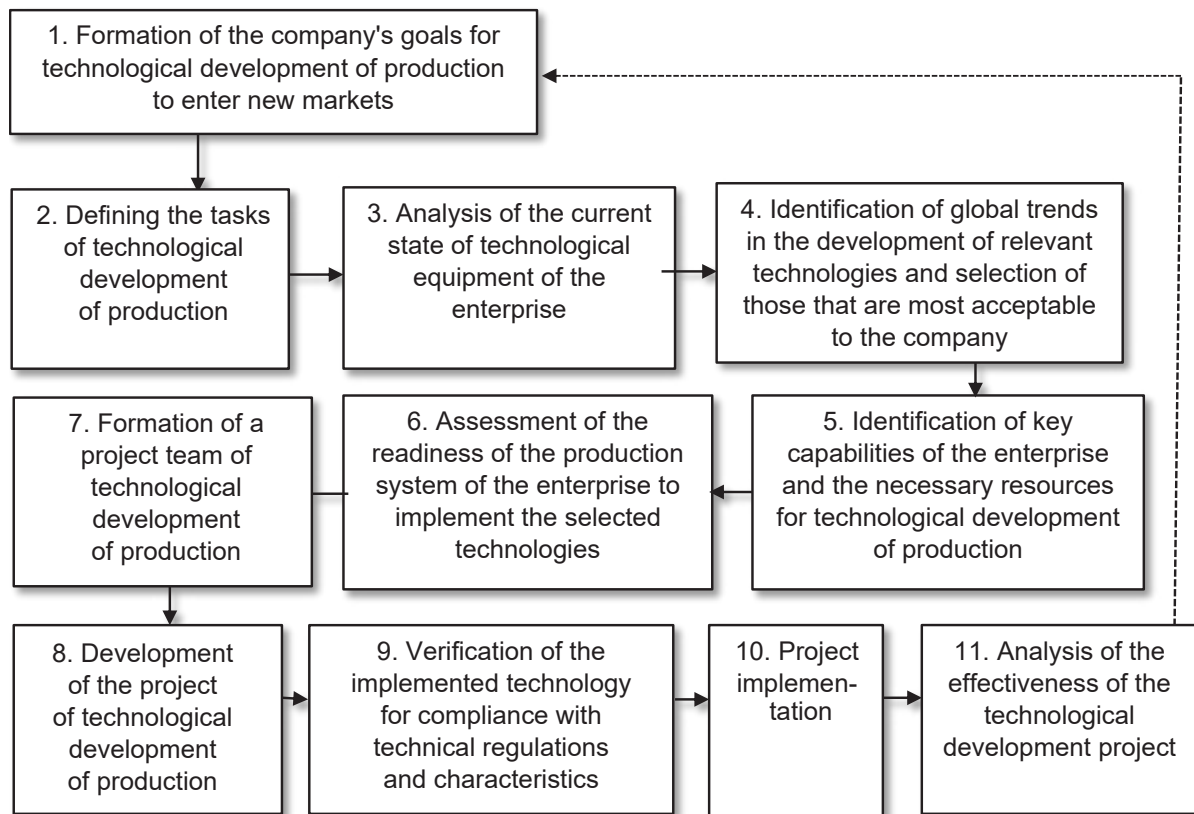


Figure 4. The process of technological development of pharmaceutical production

Source: developed by the authors

Conclusions. During the study, the theoretical basis of management of technological development was considered in its direction, which is the use of investment and innovation tools in the formation of financial processes to ensure technological development and improvement and restructuring of technological support. It is determined that the process of technological development of enterprise production consists of successive stages, including: formation of goals and definition of tasks of technological development of production; analysis of the current state of technological equipment of the enterprise; identification of global trends in the development of relevant technologies and selection of those that are most acceptable to the company; identification of key capabilities of the enterprise and the necessary resources for technological development of production; assessment of the readiness of the production system of the enterprise to implement the selected technologies; formation of a project team and development of a project of technological development of production; verification of the technology implemented for compliance with technical regulations and characteristics; project implementation and analysis of results.

A mechanism for managing the technological development of production was presented, based on management measures that include the formation of goals and objectives, as well as defining the strategy of technological development, technological forecasting, staffing and motivational activities, finding and attracting investment in technological development.

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