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INVESTIGATION OF ENTERPRISES' ACTIVITY EFFICIENCY ANALYSIS AND EVALUATION IN THE INFORMATION AND DIGITAL REALITIES

Objective. The article substantiates the theoretical and methodological foundations of enterprises' efficiency analysis and evaluation in the context of information and digital realities. **Methodology.** The article develops a theoretical and methodological approach to the enterprise performance research based on a systematic analysis of the interrelationships between economic, social, technological and environmental aspects of enterprise functioning, which allows taking into account the multidimensionality of modern challenges and ensuring the comprehensiveness of the assessment. The study uses special and general methods: synergistic and morphological analysis, deduction, induction, generalization, scientific abstraction, dialectical approach, as well as competence and synergistic approaches. **Results.** The authors create a scientific position on the economic efficiency of the enterprise as a basis for ensuring its economic sustainability. The paper analyses the essence of economic efficiency, factors and mechanisms of its formation. The paper shows that the efficiency of enterprise activity, unlike technical approaches, should be considered in the context of integrated resource use, cost minimization to achieve maximum effect. **Scientific novelty.** It develops a methodological basis for economic efficiency of enterprise activity. The article substantiates a conceptual approach to the use of efficiency assessment to ensure the enterprises' economic sustainability. The authors propose a methodology for studying economic efficiency, based on the indicators of labor and material resources use analysis, as well as assessment of profitability, profitability of enterprise and other key economic indicators. **Practical significance.** The results of the study can be used to improve the economic efficiency of the enterprise, which will be manifested in maximizing value, expanding markets for products, works or services and strengthening the competitive position of business entities, as well as increasing the gross national product of the country as a whole.

Keywords: analysis, efficiency of enterprise activity, economic efficiency, efficiency of enterprise, methods of efficiency assessment, efficiency factors, software, balanced scorecard

Formulation of the problem

Efficiency is a key issue in both general economic theory and enterprise economics. Determining the level of efficiency of production processes is critical for justifying management decisions. The theoretical basis for the need to improve economic efficiency is based on the fundamental problem of economic science the limited availability of resources. This problem is exacerbated by the constant growth of humanity's needs, which require more and more material goods, both in quantity as well as quality. Therefore, the main task of economic science is to develop methods and approaches that will maximize the satisfaction of the growing needs of humanity in the face of limited available resources.

In this context, modern enterprises are particularly acutely aware of the need to improve the efficiency of the enterprise, which has become a decisive factor in its further functioning in the market. In the face of growing consumer demand and dynamic changes in the economic environment, companies need to apply systematic methods of assessing their performance. This not only determines the current level of efficiency, but also helps to identify reserves for its improvement, which can increase competitiveness.

Modern enterprises find themselves in a situation where increasing production efficiency is not only desirable, but also a necessary condition for survival in the market. Taking into account the growing demands of consumers and the rapidly changing economic environment, businesses must implement modern methods of assessing their performance. Therefore, it is important for an enterprise to analyze and evaluate the economic efficiency of economic entities to identify weaknesses and find ways to improve

them. This will allow not only to determine the current level of efficiency, but also to identify opportunities for its improvement, which, in turn, will strengthen the competitive advantages of enterprises. All this determines the relevance of the study presented in this article.

Analysis of the latest scientific research and publications

The problem of the concept and definition of “enterprise performance” is studied by scholars of foreign and domestic classical schools and is further elaborated in the works of modern Ukrainian scholars.

I. Otenko defines performance as an indicator of the success of the system’s functioning to achieve its goals. The author distinguishes between the essence of the concepts of “enterprise activity efficiency” and “enterprise activity productivity”, arguing that while efficiency is characterized by the relationship between the financial results obtained and the resources spent on it, activity productivity is the degree of implementation of the strategic plan and budget of an enterprise, as well as the level of achievement of results [1].

V. Kravchenko notes that the efficiency of an enterprise is characterized by the optimal ratio between total costs and economic results, emphasizing that efficiency indicators are key economic indicators that reflect the relationship between the results of an enterprise’s activities, the volume of its operating activities and the level of use of attracted resources [2].

I. Nazarenko highlights this term as the ratio between production results and resources, which results in the value of production efficiency, emphasizing that in the process of assessing the key performance indicators of an enterprise, work is underway to eliminate problems and threats, as well as to increase the efficiency of using available resources [3]. At the same time, G. Misko clearly identifies a number of indicators used in assessing business performance: profitability of sales, asset turnover, and return on assets [4].

O. Petkov interprets the efficiency of an enterprise as an indicator of quality business development that stimulates its conduct. The author emphasizes that assessing the efficiency of an enterprise makes it possible to identify measures to improve its success, and also contributes to solving strategic management tasks [5].

O. Garafonova and N. Vasylyuk expand the classification of corporate efficiency, highlighting economic, social, technological and environmental efficiency as a key criterion. In their opinion, the significance of this classification is to provide a comprehensive analysis of the company’s performance, which allows taking into account various aspects of its functioning, optimize the use of resources and increase the objectivity of management decisions [6].

T. Petrushka and Ya. Yukhman define the efficiency of an enterprise as the optimal use of resources, taking into account social responsibility to society and stakeholders. Analysis and evaluation of efficiency in this context involve an integrated approach that covers economic results and social aspects of the activity, providing an objective determination of its impact on stakeholders [7].

A. Cherednyk argues that in modern science, “performance efficiency” is synonymous with “economy”, which is defined as the ratio of financial result to expended resources, while economy reflects minimization of costs per unit of production of the enterprise. The author also notes that the economic efficiency of an enterprise is determined by the growth of staff productivity, which is a key aspect of its assessment. A higher level of labor efficiency helps to reduce production costs, while employees receive material motivation through increased labor remuneration [8].

It should be noted that in modern science, the diversity of the definition of the concept of “enterprise performance” indicates the polymorphic nature of this definition, since each of the interpretations characterizes the term “performance” from different aspects, the importance of which is formed in accordance with the object and objectives of the study. However, among these definitions, the most important one can be distinguished: the efficiency of an enterprise is the best performance results under the condition of rational use of labor and material resources or at the lowest cost [9].

The above approaches to determining the economic efficiency of an enterprise thoroughly highlight its essence and versatility. However, the need for an in-depth study of various methodological approaches to the outlined issues remains extremely important, especially given the priorities of sustainable enterprise development in the context of modern economic challenges and digital transformations.

Formation of the purpose of the article

The article is aimed at deepening the theoretical and methodological foundations of efficiency and providing practical recommendations for analyzing and evaluating the efficiency of enterprises in the context of information and digital realities.

The main material of the research

Analyzing the efficiency of business entities is one of the most effective management methods and a key element in justifying management decisions. Efficiency is a key category that has been relevant long before scientists began to identify the relationship between the successful implementation of development strategies and the performance of effective activities. At the same time, in order to achieve the main goals, business activities of business entities must be not only efficient, but also effective. In our opinion, efficiency can be defined as the ratio of results, consequences to the resources used that contributed to this effect. Thus, the main problem of efficiency is the issue of choice, which is the decision-making process regarding the allocation of material and labor resources, capital, and profits.

For successful activity and achievement of goals, efficiency is an important factor, as it combines significant factors of a business entity, such as labor potential, objects and means of labor (Fig. 1).

As a result, the efficiency of production and business activities combines production, financial and labor efficiency.

For a deeper understanding of the economic essence and significance of the efficiency of business entities, it is advisable to refer to its classification. However, there is no single generally accepted classification of enterprise efficiency, as different scientific sources offer different approaches to determining the economic effect. At the same time, the definition of the classification is complicated by the diversity of factors and forms of manifestation by which the types of enterprise performance can be differentiated. However, the most decisive and multidimensional is the classification of efficiency by the level of management, the degree of cost coverage, stages of value movement, types of economic activity, and the type of final result (effect) on the basis of which efficiency is determined (Table 1).

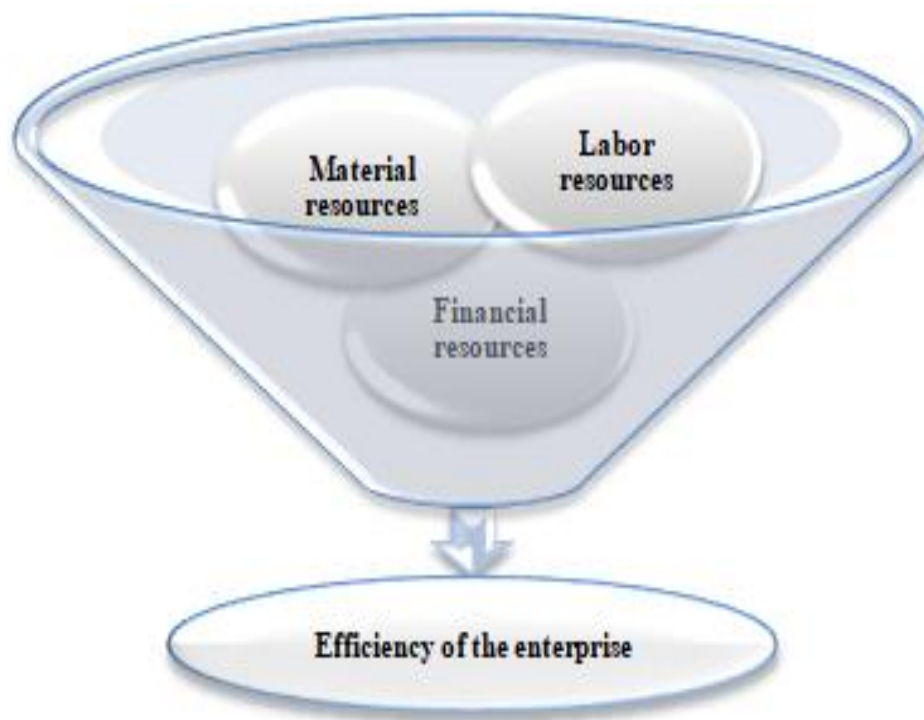


Fig. 1. Components of enterprise performance
Developed by the author based on [10]

Table 1

Classification of performance efficiency
Developed by the author based on [11]

Classification feature	Types of performance efficiency
By management level	<ul style="list-style-type: none"> - production economic efficiency; - economic efficiency of business separated property; - economic efficiency of a business entity in all types of activities; - economic efficiency of the national economy as a whole
By cost coverage level	<ul style="list-style-type: none"> - economic efficiency of using specific types of costs (resources); - economic efficiency of using total costs
By stages of value movement of the value advanced to resources	<ul style="list-style-type: none"> - economic efficiency of using resources of current consumption - economic efficiency of using resources that have already been spent
By type of business activity	<ul style="list-style-type: none"> - economic efficiency of production activities - economic efficiency of banking activities - economic efficiency of insurance activities, etc.
By type of enterprise activity	<ul style="list-style-type: none"> - economic efficiency of operating activities - economic efficiency of investment activity - economic efficiency of financial activities
By type of final result (effect)	<ul style="list-style-type: none"> - production productivity - profitability

The identification of such enterprise performance types allows for a comprehensive assessment of its effectiveness, which, in turn, contributes to a deeper analysis. This makes it possible to identify problematic aspects that require the development and implementation of measures to improve the level of efficiency [11].

The peculiarity of enterprise performance is that it depends on a number of factors that determine its level. In this context, it is advisable to propose an approach to identifying and classifying these factors and summarize them in Table 2.

Table 2

Factors influencing economic efficiency
Developed by the author based on [12]

Types of factors	List of factors
External factors that are practically independent of the enterprise's activity and are not subject to its influence	<ul style="list-style-type: none"> - business environment; - demographic changes; - social changes; - level of demand and supply for labor; - level of raw material and energy prices; - access to finance; - fiscal and tax policy of the state; - environmental legislation; - system of professional training of personnel
Internal factors that depend on the enterprise's activity, management system, availability of resources, etc.	<ul style="list-style-type: none"> - personnel management system; - application of technologies and know-how; - product range; - pricing policy; - company image; - availability of capital and resources; - profit distribution system

Thus, internal factors are formed directly at the enterprise and are the result of its own activities. External factors of direct and indirect influence are caused by the interaction of the enterprise with the external environment, including the impact of government regulation, the competitive environment, international events, etc. [13].

Analyzing the efficiency of business entities requires a systematic study of financial and economic performance indicators, assessment of the enterprise's market position and determination of development prospects, taking into account the impact of all relevant factors.

Depending on their orientation, influence factors are divided into positive ones that contribute to the improvement of the enterprise's performance and negative ones that worsen it. The impact of these factors is crucial for the management decision-making process, shaping its stages and nature. At each stage, there are risks of a different origin that need to be taken into account and mitigated to the optimum level. This allows you to make decisions with less resource consumption and higher implementation efficiency, which contributes to the economic efficiency of the enterprise.

For large business entities, information on performance is important not only for internal use but also for stakeholders. In particular, shareholders, creditors, investors, potential investors and other stakeholders often pay attention to these indicators in the context of assessing the financial condition of the company and making decisions on cooperation or investment. After all, a systematic and comprehensive analysis of the efficiency of production and economic activities of business entities allows [14]:

to assess performance quickly, efficiently and professionally;

accurately and timely identify and take into account the factors that affect the profit from certain types of products and services;

find effective ways to solve the enterprise's problems and ensure profit both in the short and long term.

The main problem for determining the efficiency of production and economic activity is the construction of a single generalized indicator. Therefore, when creating a methodology for a comprehensive assessment of efficiency, one should be guided by the general principles of efficiency analysis based on the principle of optimization (Table 3).

Table 3

Key principles of enterprise's efficiency analysis optimization

Developed by the author based on [2]

Optimization principles	Features
Consistency	Comparison of different conditions in the process of comparing the economic efficiency value for different periods requires the same coverage of results and resources used
Systematic approach	Taking into account the specifics of the enterprise's management mechanism, the level of management, the resources involved in production, the volume of production costs, etc. is a prerequisite for effective analysis of the enterprise's activities
Exchange of incomplete information	To obtain more accurate or new information, it is necessary to compare it with previously obtained data, supplement the relevant indicators, adjust the calculations made and introduce modern assessment methods
Interaction of different economic goals and interests	The viability of an enterprise, along with such goals as profitability, achieving social impact in society, etc., requires the integration of all components for a comprehensive assessment of efficiency and achieving the desired result
Consideration of the degree of structuring	For record-keeping purposes, it is important to determine how accurate and balanced the described research results are

There is no universal method in scientific approaches to analyzing the efficiency of production and economic activities of business entities, but one of the most common is the Dupont performance evaluation model. The advantages of this method are convenience, speed, and simplicity of calculation, which allows covering finance, investments, and other areas of the company's activities. At the same time, the model does not fully reflect the state of the enterprise, leaving its strengths and weaknesses undetected, which limits its analytical capabilities.

Assessment of the efficiency of production and economic activities of an enterprise requires the use of a system of indicators that characterize the enterprise from various aspects. This makes it possible to develop a methodology for researching efficiency based on the analysis of the efficiency of the labor and

material resources, the assessment of profitability and profitability, as well as other objects of analysis, which allows for a comprehensive assessment of the enterprise's activity.

The analysis of production and economic activity efficiency of business entities is a complex category that reflects the enterprise in various aspects. This is confirmed by various signs of efficiency during the analysis. That is, when assessing efficiency, both natural and cost units of measurement, as well as their combinations, can be used, namely:

- 1) resources and effect expressed in natural units of measurement;
- 2) resources in monetary form and results in natural form;
- 3) resources and results, in terms of value;
- 4) resources natural form, effect cost form.

Based on the foreign experience of assessing the enterprises' performance, we can use the methodology of the three E's concept – economy, efficiency and effectiveness [15]. This is the so-called “model of economy, efficiency and effectiveness”, which is the driving force behind the effective functioning of domestic enterprises in the market (Fig. 2).

The following methods are recommended for assessing the efficiency of an enterprise in real conditions:

- 1) a system of evaluation indicators that takes into account the interests of all stakeholders;
- 2) revenue growth compared to the analog;
- 3) method of calculating the integral effect of the innovative project development and implementation;
- 4) discounting and compounding methods;
- 5) methods of comparing costs, profits and profitability;
- 6) method of two rates of return on capital;
- 7) assessment of innovation efficiency over the useful life;
- 8) the final cost of capital method.

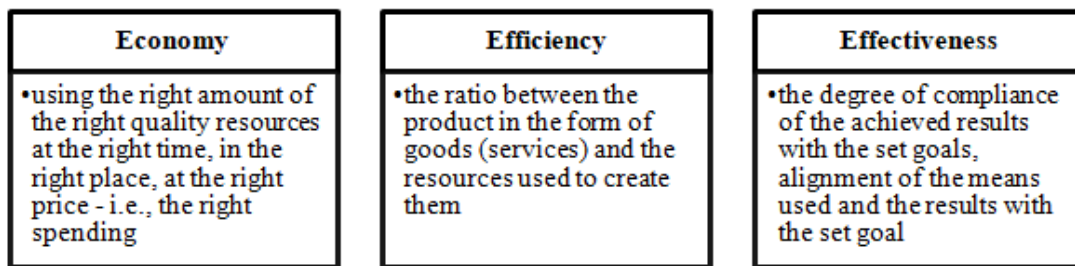


Fig. 2. Methodology of the three E's concept
Developed by the author based on [15]

The main components of the economic activity efficiency system are social, technological, resource and financial components. In this regard, the strategy for improving the level of enterprise performance should include these components, which provide an integrated approach to improving various aspects of the enterprise's functioning [4]:

- 1) characteristics of internal and external threats that affect the level of economic security of the business entity;
- 2) identification, study and control of factors that may strengthen or adversely affect the sustainability and competitiveness of the enterprise, as well as its socio-economic status in the short and medium term (3-5 years), and in some cases in the long term;
- 3) studying the parameters and criteria of indicators used to assess the economic efficiency of the enterprise, which have a semantic load in the context of satisfying the interests of owners and stakeholders, in accordance with the enterprise's economic efficiency requirements;
- 4) development of the enterprise's main economic policy steps based on the data obtained, including accounting mechanisms that affect the state of enterprise's economic efficiency;
- 5) determining the directions of the enterprise's activities to implement the chosen strategy.

Scientific and technological progress is an important factor that initiates the development of methods to reduce the labor intensity of production and related processes, and also contributes to increased labor productivity. In the face of dynamic market development, there is a need to implement qualitative changes

in production processes, which involves the transition to innovative technologies, as well as large-scale mobilization and structural restructuring of all sectors of the national economy based on the achievements of modern science and technology. At the same time, scientific and technological progress significantly affects the improvement of methods for reducing the material intensity of products, which ensures more efficient natural resource use in a number of industries, contributing to their rationalization [6].

The domestic information technology market has a large number of specialized software products designed to assess the enterprise's performance as a determining factor in its economic sustainability (Table 4).

Table 4

Specialized software products for assessing the enterprises' performance
Developed by the author based on [15]

Software	Features
Microsoft Power BI (USA)	is a powerful data visualization and analytics tool that allows to create interactive reports and dashboards based on various data sources
BSC Designer (Spain)	specialized software for creating and using a balanced scorecard that allows to build strategic maps, manages strategic initiatives and scales the enterprise strategy
Tableau (USA)	the tool is designed to create interactive dashboards and reports based on data from various sources, features a user-friendly interface and extensive data visualization customization options
QPR Metrics (Finland)	the tool provides opportunities for creating and analyzing a system of enterprise productivity and efficiency indicators, automates the data collection process, creates graphs and charts for visualizing results, and analyzes performance
SAP Business Objects (Germany)	a comprehensive analytics and reporting solution that allows creating reports, dashboards, analyzing data and making data-driven management decisions

The competitive advantages of these software products may vary depending on the needs of the company and the specifics of its business. However, their common features include ease of use, extensive data analysis capabilities, scalability, and the ability to integrate with other systems. In addition, some of them may have extensive data visualization, forecasting, and machine learning capabilities.

In our opinion, the best choice of software for domestic enterprises is BSC Designer [16], which will ensure the development of a balanced scorecard due to its functionality, operational capabilities, customization flexibility and support. This characterizes it as an attractive and effective tool for assessing the enterprise's performance.

It should be noted that when the task of developing a balanced scorecard to assess the company's performance is being solved, the choice of specialized software, such as BSC Designer, can be justified by the fact that this software provides the company with a powerful tool for assessing, analyzing, monitoring and managing and achieving strategic goals; flexible software customization options allow you to adapt the scorecard to the unique needs and requirements of the enterprise, as well as support and regular updates to keep the tool relevant and reliable over time. At the same time, the trial version of the software allows users to evaluate the effectiveness of the system and its compliance with the company's needs, and positive results of using the trial version may lead to a decision to upgrade to a paid version that offers additional features and capabilities for analyzing and managing the company's activities, i.e., evaluating the results of using the trial version of the software will help the company make an informed decision about the further use of this tool.

Considering the BSC Designer software recommended by us as the most rational solution for domestic enterprises (Table 5), let's assume that an enterprise decides to implement a balanced scorecard using this software. The first step is to use the free trial version to evaluate the effectiveness of the tool.

Thus, an enterprise that uses specialized software for developing and monitoring indicators discovers a rational way to accurately and efficiently reflect various aspects of its activities, namely:

1) development of balanced scorecards not only improves management efficiency but also provides more accurate and reliable analysis results;

2) opportunity to automating data collection from various sources, such as financial systems, CRM systems, project management systems, and others. This reduces manual work and increases data accuracy [2];

- 3) flexibility in defining and tracking key performance indicators, as well as the ability to easily make changes to the system of indicators in the event of changes in the enterprise's strategy or external conditions;
- 4) the ability to visualize data in the form of graphs, charts and dashboards, which makes the analysis more visual and understandable for managers and employees;
- 5) the enterprise can continuously monitor its performance and results, allowing it to respond promptly to deviations from goals and adjust its strategy;
- 6) support in effective management of the change process by tracking the progress of strategic initiatives and assessing their impact on key indicators.

Table 5

Efficiency of BSC Designer software integration for a balanced performance scorecard

Developed by the author based on [16]

Implementation (strategic goal)	Development of indicators for software	Effect
Improving customer satisfaction	Percentage of positive customer reviews	<ul style="list-style-type: none"> - evaluation through online surveys and customer feedback; - visual monitoring of changes in this indicator; - taking measures to improve the customer experience
Improving the efficiency of production processes	Percentage of production time reduction	<ul style="list-style-type: none"> - measurement of the time required to produce a certain amount of product; - monitoring of the indicator; - taking measures to reduce production time
Staff development	Number of training courses for employees	<ul style="list-style-type: none"> - reflecting investments in the professional development of employees; - tracking the number of courses conducted and their impact on employee productivity and efficiency

Thus, in order to ensure the development of the above factors, it is necessary to attract financial resources, which can be realized through the intensification of investment activities of enterprises focused on the introduction of innovative technologies, and therefore ways to improve the efficiency of business entities are impossible without the integration of the latest technological solutions, which, in turn, can be developed and implemented with proper funding for research and technological development [6].

Conclusions

In today's environment, the efficiency of business entities is impossible without ensuring their competitiveness against other economic entities. An important factor of economic efficiency is the quality of the products manufactured. Therefore, the management of enterprises needs to integrate effective quality management systems into their management processes, which will help to increase competitiveness and ensure the stable development of the organization.

Considering efficiency as the main factor ensuring sustainable development of business entities, it should be emphasized that efficiency is ensured by achieving the best results with the rational use of labor and material resources or minimizing costs. Efficiency can be defined as the ratio of the results achieved to the resources expended that contribute to these results, while taking into account the degree of optimization of the use of resources to achieve maximum effect.

Since it is not effective to analyze and evaluate the efficiency of business entities' economic activities using a single indicator, it is necessary to use a comprehensive system of indicators that allows for a comprehensive assessment of the enterprise's activities. Given the multifaceted nature of this process, in practice, it is worth applying a methodology based on a detailed study of indicators that characterize the efficiency of labor and material resources, as well as financial performance, including profitability, profitability and other parameters relevant to a comprehensive economic efficiency assessment of the enterprise.

Digital tools such as Microsoft Power BI, BSC Designer, Tableau, QPR Metrics, SAP Business Objects provide comprehensive solutions for developing, tracking, and analyzing balanced scorecards, contributing to the successful achievement of strategic goals of the enterprise.

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ДОСЛІДЖЕННЯ АНАЛІЗУ І ОЦІНКИ ЕФЕКТИВНОСТІ ДІЯЛЬНОСТІ ПІДПРИЄМСТВ В УМОВАХ ІНФОРМАЦІЙНО-ЦИФРОВИХ РЕАЛІЙ

Мета. У статті обґрунтовано теоретико-методологічні основи аналізу та оцінки ефективності діяльності підприємств в умовах інформаційно-цифрових реалій. **Методика.** Розвиток теоретико-методологічного підходу до дослідження ефективності діяльності підприємства ґрунтується на системному аналізі взаємозв'язків між економічними, соціальними, технологічними та екологічними аспектами функціонування підприємства, що дає змогу враховувати багатовимірність сучасних викликів і забезпечувати комплексність оцінки. У дослідженні використано спеціальні та загальні методи: синергійний і морфологічний аналіз, дедукцію, індукцію, узагальнення, наукову абстракцію, діалектичний підхід, а також компетентнісний та синергійний підходи. **Результати.** Створено наукову позицію щодо економічної ефективності діяльності підприємства як основи забезпечення його економічної стійкості. Здійснено аналіз сутності економічної ефективності, факторів і механізмів її формування. Показано, що ефективність діяльності підприємства, на відміну від технічних підходів, повинна розглядатися в контексті комплексного використання ресурсів, мінімізації витрат для досягнення максимального ефекту. **Наукова новизна.** Розвинуто методологічне підґрунтя економічної ефективності діяльності підприємства. Обґрунтовано концептуальний підхід до застосування оцінки ефективності для забезпечення економічної стійкості підприємств. Запропоновано методику дослідження економічної ефективності, що ґрунтується на аналізі показників використання трудових та матеріальних ресурсів, а також оцінці прибутковості, рентабельності підприємства та інших ключових економічних показників. **Практична значимість.** Результати дослідження можна використати для поліпшення економічної ефективності діяльності підприємства, що проявлятиметься у максимізації вартості, розширенні ринків збуту продукції, робіт чи послуг і зміцненні конкурентних позицій суб'єктів господарювання, а також у збільшенні валового національного продукту країни загалом.

Ключові слова: ефективність діяльності підприємства, економічна ефективність, результативність підприємства, методи оцінки ефективності, чинники ефективності, програмне забезпечення, збалансована система показників

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