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METHODOLOGY FOR ANALYZING THE EFFECTIVENESS OF INNOVATIVE PROCESSES AT ENTERPRISES

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Abstract: This article analyzes the issues of assessing the effectiveness of innovative activity in industrial enterprises, including its theoretical and practical aspects. Innovative activity is interpreted as a key factor in enhancing enterprise competitiveness, improving production efficiency, and introducing new technologies. When assessing innovative activity in the industrial sector, economic, technological, social, and environmental factors are considered in close interrelation. The article highlights the main system of indicators used to determine the effectiveness of innovative activity, as well as their methodological foundations and analytical approaches. At the same time, based on the experience of foreign countries, the paper identifies ways to improve innovation management systems in industrial enterprises. In assessing the effectiveness of innovative activity, the possibilities of using integral indicators, multi-criteria analysis methods, and the investment return coefficient are analyzed.

Key words: industrial enterprise, efficiency, innovative activity, assessment methods, methodology, innovative development, technological innovations, innovation strategy, competitiveness, economic efficiency, innovation management, scientific and technical potential, production modernization.

Annotatsiya: Mazkur maqolada sanoat korxonalarida innovatsion faoliyat samaradorligini baholash masalalari hamda ularning nazariy va amaliy jihatlari tahlil qilinadi. Innovatsion faoliyat korxonaning raqobatbardoshligini oshirish, ishlab chiqarish samaradorligini kuchaytirish va yangi texnologiyalarni joriy etish jarayonlarida asosiy omil sifatida talqin etiladi. Sanoat sohasida innovatsion faoliyatni baholashda iqtisodiy, texnologik, ijtimoiy hamda ekologik omillar o'zaro uzviy bog'liqlikda ko'rib chiqiladi. Maqolada innovatsion faoliyat samaradorligini aniqlashda qo'llaniladigan asosiy ko'rsatkichlar tizimi, ularning metodologik asoslari va tahliliy yondashuvlari yoritilgan. Shu bilan birga, xorijiy mamlakatlar tajribasi misolida sanoat korxonalarida innovatsion boshqaruv tizimini takomillashtirish yo'llari ham ko'rsatib o'tiladi. Innovatsion faoliyat natijadorligini baholashda integral ko'rsatkichlar, ko'p mezonli tahlil usuli hamda investitsion qaytarim koeffitsientidan foydalanish imkoniyatlari tahlil etilgan.

Kalit so'zlar: sanoat korxonasi, samaradorlik, innovatsion faoliyat, baholash usullari, metodologiya, innovatsion rivojlanish, texnologik yangiliklar, innovatsion strategiya, raqobatbardoshlik, iqtisodiy samaradorlik, innovatsion menejment, ilmiy-texnik salohiyat, ishlab chiqarishni modernizatsiya qilish.

Аннотация: В данной статье анализируются вопросы оценки эффективности инновационной деятельности на промышленных предприятиях, а также её теоретические и практические аспекты. Инновационная деятельность рассматривается как ключевой фактор повышения конкурентоспособности предприятия, роста эффективности производства и внедрения новых технологий. При оценке инновационной деятельности в промышленной сфере экономические, технологические, социальные и экологические факторы рассматриваются во взаимосвязи. В статье представлена система основных показателей, используемых для определения эффективности инновационной деятельности, раскрыты их методологические основы и аналитические подходы. Вместе с тем на примере зарубежного опыта показаны пути совершенствования инновационной системы управления на промышленных предприятиях. При оценке эффективности инновационной деятельности анализируются интегральные показатели, возможность применения многокритериального метода анализа и коэффициента возврата инвестиций.

Ключевые слова: промышленное предприятие, инновационная деятельность, эффективность, методы оценки, методология, инновационное развитие, технологические инновации, инновационная стратегия, конкурентоспособность, экономическая эффективность, инновационный менеджмент, научно-технический потенциал, модернизация производства.

INTRODUCTION

They represent a key element of economic and social development, ensuring sustainable growth and modernization. This, in turn, helps increase enterprise efficiency and is closely linked to improving equipment and technologies, reducing costs, saving energy, and using resources rationally. State support for these areas is also of critical importance for the economy. To accelerate the renewal of industrial enterprises, it is essential to consistently prioritize innovation in their operations. Therefore, the effective implementation of state policies aimed at supporting and stimulating innovation should be considered one of the key priorities.

As President Sh. Mirziyoyev noted, "Today Uzbekistan is embarking on the path of innovative development aimed at radically improving all spheres of state and public life" [1]. From this perspective, enhancing the efficiency of construction materials industry enterprises through new ideas is an important task. To achieve this goal, it is necessary to modernize production processes, adopt best practices in project management, develop a portfolio of new projects, and implement economic mechanisms aimed at the efficient allocation of resources in the economy.

It is also advisable to expand research on the scientific justification of forecast indicators for the production of building materials across regions. The analysis of innovation has its own specific methods and approaches, which are determined by its role and content within the economy.

Studying and analyzing innovative processes enables a deeper understanding of scientific and technological progress and helps identify new directions for economic development. As a result, effective strategies for creating and implementing new technologies can be developed. First, the analysis of innovative processes helps identify promising areas of scientific research, which supports more efficient resource allocation and investment attraction. Second, it becomes possible to anticipate potential risks in innovative activity and define appropriate mitigation measures. Moreover, an in-depth analysis of innovation processes contributes to strengthening the technological competitiveness of enterprises and industries. This creates opportunities to assess the economic efficiency of technological innovations and to develop optimal methods for their practical implementation.

LITERATURE REVIEW

According to the research of CIS scholars K.V. Mikhailov, "innovative activity is the competitive force of the consumer and supplier enterprise" [2]. The author emphasizes that an analyst should primarily assess "the enterprise's propensity for innovation, the availability of resources, and innovative competence." In this approach, the enterprise is viewed as a system inclined toward innovation.

O.V. Navoeva interprets an enterprise's innovative activity through the following indicators: "the share of investments directed toward innovative development in the total volume of investments; the structure of innovations; the degree to which innovations meet societal needs; and the contribution of innovations to ensuring competitive advantages" [3].

In studies aimed at the comprehensive assessment of innovative activity effectiveness, a system of indicators characterizing an enterprise's innovative development is commonly used. These include the enterprise's science intensity, the renewal coefficient of manufactured innovative products, the efficiency coefficient of R&D costs, the coefficient reflecting production modernization, and the intensity coefficient of scientific developments within the enterprise [4].

According to another local researcher, Z. Doniyorova, "in the methodology for assessing the innovative activity of an industrial enterprise, innovative activity depends on the initial capabilities and structure of the enterprise's innovative potential" [5]. This perspective highlights the importance of internal resources and organizational capacity in determining innovation performance.

Research and development (R&D) play a key role in improving the effectiveness of innovative activity, as they enable enterprises to generate additional income sources. The enterprise's innovation strategy also directly affects its performance. For the successful implementation of innovative activity, long-term strategic planning is essential. In this process, management should support innovative initiatives and create conditions for enhancing employees' knowledge and skills.

Overall, the effectiveness of innovative activity in industrial enterprises depends on multiple factors. Achieving sustainable innovation outcomes requires alignment between technological development, scientific research, management strategy, financial stability, and market demand. Therefore, enterprises should treat innovation as an integral part of their operations and continuously develop it. Human resource management also plays a significant role in assessing and enhancing innovation effectiveness, since successful implementation requires the ongoing improvement of employees' competencies and qualifications.

RESEARCH METHODOLOGY

During the study, the economic nature of innovative activity, its impact on production efficiency, and the level of resource utilization were examined using economic analysis, comparative analysis, and statistical methods. At the same time, a comprehensive approach was applied to assess the effectiveness of innovative activity, and such criteria as financial indicators, the level of technological renewal, labor productivity, and product quality were analyzed in an interconnected manner.

The methodology of this study is aimed at a systematic analysis of the process of assessing the effectiveness of innovative activity in industrial enterprises, combining both the theoretical and practical foundations of scientific research. The study employed economic and mathematical modeling tools, as well as graphical analysis, to identify and evaluate key indicators of innovation process effectiveness in industrial enterprises.

A systems approach and the principles of functional analysis were selected as the methodological basis, enabling the study to obtain clear and reliable results in assessing innovative activity. In addition, based on the experience of foreign countries and their assessment models, methodological recommendations adapted to the conditions of industrial enterprises in Uzbekistan were developed. Overall, the research methodology is designed to form scientifically grounded approaches that can be effectively applied in practice.

ANALYSIS AND RESULTS

This situation ensures an optimal balance between product quality, functionality, and price. As noted in the scientific literature, the innovative activity of enterprises is manifested in areas such as comprehensive research aimed at diversifying product ranges, improving quality indicators, introducing modern technological solutions into practice, and optimizing production processes. These activities are considered key elements of the enterprise's overall innovation strategy.

Innovative activity should address the following tasks:

- identifying existing problems within the enterprise;
- implementing innovative initiatives;
- establishing and maintaining an effective innovation process.

The main condition for an enterprise's innovative activity is that everything currently in use tends to become obsolete rapidly. Therefore, it is necessary to systematically eliminate outdated and inefficient practices that hinder progress, while also taking into account errors, failures, and shortcomings. For this purpose, enterprises should periodically certify products, technologies, and workplaces, and analyze markets and distribution channels.

In other words, it is necessary to examine all aspects of an enterprise's operations through a comprehensive "X-ray" assessment. This does not merely involve diagnosing production and economic activities, products, and markets. Rather, it encourages business owners to consider proactively replacing products and services that may become morally obsolete, without waiting for competitors to do so. This approach stimulates innovation within enterprises.

In addition, one of the key conditions for ensuring the effectiveness of innovative activity is adopting a systematic approach aimed at strengthening enterprise competitiveness. It is essential to develop employees' creativity and scientific thinking within innovation processes, as well as to foster an internal organizational culture that supports innovation.

Practice shows that awareness of the potential obsolescence of manufactured products in the near future is among the most powerful factors that motivate managers to focus on innovation. Modern scientific literature presents various approaches to assessing an enterprise's innovative activity. The main approaches most commonly applied in practice include the formal approach, the cost-based approach, and the performance-based approach.

Each approach evaluates innovative activity from a specific perspective. In particular, the formal approach analyzes the number of new projects, while the cost-based approach examines the amount of financial resources allocated to research and development. The performance-based approach focuses on identifying and assessing the economic efficiency of activities related to new ideas.

It should be noted that innovative projects are an integral part of innovative activity and represent its core feature. Therefore, due to the theoretical complexity of innovative activity, assessing it from only one perspective does not lead to sufficiently reliable results. In practice, comprehensive analysis and an integrated approach are required to draw sound conclusions. The results of a general analysis of methods for assessing innovative activity proposed by domestic and foreign researchers are presented in the table below.

In line with the topic of this study, it is appropriate to consider these approaches in the context of their application in industrial enterprises. This raises an important issue regarding the number of innovative projects

implemented and formally analyzed within enterprises. However, the direct identification and classification of innovative projects remains a key issue that often receives insufficient attention.

When applying the cost-based approach to an industrial enterprise, it should be emphasized that contradictions may arise within the cost assessment methodology. In particular, this approach does not clearly define which types of costs enterprises should include in calculations. Similar limitations are observed when evaluating coefficients related to employees engaged in R&D activities and property coefficients intended for research purposes.

One of the main aspects of the performance-based approach is determining the economic efficiency of technical, technological, social, and managerial innovations implemented at the enterprise. However, this approach does not always account for the direct economic effect derived from selling innovative products in the market. In many cases, focusing primarily on production processes, the management system, and the level of innovative activity within the social environment may lead to a one-sided assessment of the enterprise.

CONCLUSION AND RECOMMENDATIONS

From this perspective, assessing the effectiveness of innovative activity in industrial enterprises acquires particular scientific and practical significance. In conclusion, the modernization of industrial sectors, the widespread adoption of innovative technologies, and efforts to improve production efficiency remain among the priority directions of state policy. The research findings indicate that establishing an effective mechanism for assessing innovative activity contributes to enhancing enterprise competitiveness, strengthening economic stability, and increasing investment attractiveness.

Based on the results analyzed in the article, it was determined that in many industrial enterprises, innovation outcomes are evaluated mainly through economic indicators, which does not reflect the full picture of innovation performance. Therefore, the need for a comprehensive assessment approach has been substantiated—one that combines economic results with scientific and technical, social, and environmental indicators. The effectiveness of innovative activity is directly related not only to growth in production volumes or profit levels, but also to the development of intellectual potential, the speed of adopting new technologies, and the formation of an innovation-oriented corporate culture.

First, it is necessary to develop a unified methodology for assessing innovative activity in industrial enterprises and approve it as a national standard. This will ensure the comparability of assessment results and enable an objective analysis of the innovative development level of different enterprises. Second, when evaluating innovation efficiency, it is important to consider not only financial outcomes but also intangible factors such as human capital, scientific capacity, and the degree of modernization of production technologies. Third, it is advisable to introduce a digital monitoring system for innovative activity within enterprises. This system would allow real-time tracking of innovative projects and facilitate the assessment of their economic and social effectiveness.

Fourth, to increase the effectiveness of innovative activity, cooperation among research institutions, higher education institutions, and industrial enterprises should be strengthened. This “triple-helix” system (university–industry–research institution) supports mutual knowledge and technology exchange and promotes the development of an innovation-friendly environment within enterprises.

In addition, when assessing the effectiveness of innovative activity, it is important to adopt advanced international experience, particularly the practices of European Union countries, Japan, and South Korea. Their experience demonstrates that an effective assessment system should focus not only on economic benefits but also on social outcomes, sustainable development, and environmental balance.

Overall, improving methodological approaches to assessing the effectiveness of innovative activity in industrial enterprises and implementing them in a comprehensive and systematic manner occupies an important place in Uzbekistan’s industrial innovation development strategy. The proposed approaches provide a solid scientific and practical foundation for increasing enterprise competitiveness, fully utilizing innovative potential, and accelerating economic growth.

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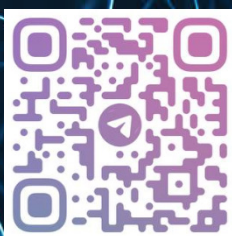
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