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ANALYSIS OF RISKS IN INVESTMENT PROJECTS

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Abstract. *Financial modeling, budgeting, risk assessment, and investment project management strategies are essential tools for the successful implementation of projects. These approaches are crucial for accurately evaluating the financial outcomes of investment projects, mitigating potential risks, and making effective decisions. Since each project has its unique characteristics, the application of methods in these areas can vary depending on the specific requirements of the project. The article provides a comprehensive analysis of the primary methods for risk analysis in investment projects, discussing the types of risks, their assessment, management, and impact on project success. Risk assessment is a key element in ensuring the financial stability and long-term effectiveness of investment projects. The major categories of risks in the financial sector are identified, including market, credit, liquidity, operational, legal, regulatory, and reputational risks. Specific management methods are proposed for each category, including diversification, hedging, insurance, and internal control mechanisms. Particular attention is given to modern risk management methods, such as Value-at-Risk (VaR), the Monte Carlo method, scenario analysis, and sensitivity analysis, which allow for more precise risk evaluation and forecasting, especially in unstable markets and during economic fluctuations. Market and operational risks, which arise from price changes, exchange rates, or business process errors, can significantly impact the financial stability of organizations. The importance of financial modeling and budgeting for making well-grounded decisions is also emphasized. The consideration of new challenges, such as cyber threats and environmental factors, promotes the integration of ESG criteria into investment decision-making processes. Overall, effective risk management is crucial for ensuring the stability and success of investment projects amid global transformations.*

Key words: investor, risk analysis, investment project, market conditions, operational processes, technological changes.

Introduction. Investment projects are significant financial and operational decisions that are carried out in order to ensure the long-term development of enterprises, generate income and strengthen their market position. Since such projects require large investments, especially in an uncertain and volatile economic environment, their implementation also brings with it serious risks. Risk analysis, assessment and effective management of these risks is one of the main factors for the successful completion of investment projects.

Risk is a concept that includes factors that can lead to adverse consequences that are expected or not expected during the implementation of any activity. In investment projects, risks arise mainly from various sources, such as market conditions, operational processes, technological changes, and the legal and regulatory environment. Analyzing these risks, identifying them and assessing their impact on the project allows investors and business leaders to make the right decisions and predict the future outcome of the project.

The challenges of managing investment project risks have become more complex in recent years due to the rapid transformation of the global economic and financial environment. Increasing market instability, geopolitical tensions, and the advent of disruptive technologies have introduced new layers of uncertainty. For example, trade conflicts, the unpredictability of global economic crises, and the rise of digital technologies have the potential to significantly affect the financial performance, operational efficiency, and future success of investment projects. In light of these complexities, risk management has become even more critical, requiring a comprehensive understanding of both traditional and emerging risks that could impact project outcomes.

The dynamic nature of technological developments adds an additional layer of risk to investment projects. As businesses adopt digital solutions, they are not only presented with new opportunities for growth and innovation but also exposed to cybersecurity threats, data privacy concerns, and the challenge of adapting to rapidly changing technological landscapes. Thus, the need for a nuanced and proactive approach to risk management in investment projects has never been greater.

The effective analysis and management of risks in investment projects are paramount for achieving success in an increasingly complex and volatile global market. The insights gained from such analyses empower business leaders to navigate the uncertainties of the investment landscape, make strategic decisions, and enhance the likelihood of delivering value to stakeholders. Therefore, the role of risk management extends beyond the domain of financial engineers and strategy analysts, becoming an essential responsibility for decision-making at all levels of project execution.

Analysis of recent research and publications. Among foreign researchers, studies addressing various aspects of risks stand out. For

example, Bogliacino F. and Pianta M. [4] discuss the impact of R&D on risk management and profitability in the context of corporate innovations, which directly affects the assessment of risks associated with investments in research and development. Bond S., Harnoff D., and Van Reenen J. [5] analyze financial constraints and risks arising from investments in conditions of economic instability, which is particularly important for evaluating risks in investment project design in emerging market countries.

Among Azerbaijani scholars, research on risks and risk management also plays a significant role. Abasova A.A. and Mamedova K.M. [3] study the risks associated with costs and methods of managing them in strategic control, an essential part of risk assessment in investment projects amid uncertainty. In their paper [1] on the development of innovative systems in Azerbaijan's liberated territories, Abasova and Mamedova analyze the risks involved in introducing new technologies and innovations in post-conflict reconstruction settings. Mamedova K.M. [14] in her work on strategic management and leadership touches upon the risks related to managerial decisions and their influence on the successful implementation of investment projects.

Thus, despite the significant contributions to the study of various types of risks, the need for a comprehensive approach to risk analysis at all stages of investment project implementation remains relevant, especially in the context of current economic and technological instability.

The scope and objectives of the article. The aim of this article is to analyze the risks associated with investment projects, explore various risk assessment and management methods, and provide insights into strategies for mitigating financial, operational, and market uncertainties to enhance project success and sustainability.

Statement of the main material of the research. Approaches to risk analysis vary mainly in accordance with the specific characteristics of each project and the current conditions. However, there are several general approaches to identifying, assessing risks and applying appropriate management strategies. These approaches facilitate fundamental decision-making, both in high-risk projects and in less risky investments. Also, thanks to modern technologies and methods of analysis, risk assessment has become a process based on a more systematic and scientific basis.

In this article, a detailed discussion will be held on the main methods of risk analysis in investment projects, types of risks, methods for assessing and managing risks, as well as how these risks can affect the success of the project.

Proper analysis and timely resolution of the risks encountered in investment projects is an important step in ensuring the financial stability of each project and ensuring its long-term success.

In the financial world, risks have always been an important issue for investors, financial institutions and states. Based on the analysis of risk, it is possible to ensure the stability of the financial sector, support the sustainable development of the economy, and also implement transparent decision-making processes. Identifying the main types of risk is very important in this area, as each type of risk has different effects and, accordingly, needs to be managed and balanced.

Financial risks include situations that can have detrimental consequences for organizations and individuals as a result of various changes and impacts that may occur in the financial markets. Risks are a concept that requires managing uncertainties and their potential effects.

This risk management plays a very important role in improving the efficiency of economic activities and avoiding the instability of financial markets.

Financial risks are divided into different categories, and each of them can lead to various negative consequences. Each of these types of risk arises from different factors and factors [15].

Risk in the market describes the risks that occur in connection with changes in prices. Such risk arises as market conditions change, especially as a result of changes in prices, interest rates, exchange rates and the value of other financial instruments.

Credit risk is the risk caused by borrowers not paying their debts. This type of risk occurs due to non-payment of the debt, non-fulfillment of interest or non-repayment of the debt at all. To manage credit risk, credit ratings and financial position of borrowers are analyzed. The most commonly used methods of credit risk management include credit guarantees, insurance and other guarantees.

Liquidity risk arises in connection with the difficulty of a company or individual in finding the cash necessary to fulfill its obligations. That is, it is a situation in which there is not enough cash supply to cover

short-term obligations over a certain period of time. During periods when the market is powerless and financial markets are experiencing instability, the risk of liquidity increases even more [2].

Management risks include the risk that decisions made by the management of a company or organization will have detrimental consequences. This type of risk can occur as a result of improper management strategies, poor decisions, and unprofessional leadership. This has to do with many internal and external factors that affect the performance of the company.

Operational risk is caused by problems that arise with the day-to-day operations of an organization. Such risks include employee errors, technological failures, systemic violations, legal problems, etc. may be related to. Operational risks are of greater importance, especially in modern times, when high technologies and information systems are widely used.

Legal and regulatory risks are related to the legal obligations of organizations and their compliance with local and international legislation. Legal risks arise as a result of non-compliance of a particular activity with the legal framework. Regulatory risks, on the other hand, arise as a result of government or regulatory authorities introducing new laws or changing existing ones.

Reputation risk is associated with damage to the image of an organization or individual in the social and market environment. This type of risk arises due to misjudgments, negative news, customer complaints, or ethical issues. Reputation risk can significantly affect the company's revenues and market position.

There are several different approaches to managing financial risks. The purpose of these approaches is to reduce or minimize risks. The following basic methods are used in the field of financial risk management:

- Diversification - disseminate risk through the division of the portfolio into different assets.
- Hedging (Hedge) - the use of financial instruments to protect against future risks.
- Insurance - taking advantage of insurance mechanisms to protect against hazards.
- Risk monitoring and control - continuously monitoring risks and taking appropriate measures.

– Internal management and legislation - the internal control mechanisms of each company or organization and its functioning in accordance with legislative requirements [4].

In addition to these traditional strategies, modern financial risk management increasingly relies on quantitative analysis models, which allow for a more precise assessment and forecasting of potential risks. Among the most widely used methods are:

– Value-at-Risk (VaR). This method estimates the maximum potential loss of an investment portfolio over a given time period at a specified confidence level. It is widely used in financial institutions to quantify risk exposure and improve decision-making processes [12].

– Monte Carlo Simulation. By generating a large number of possible future scenarios based on probabilistic distributions, this method allows for the modeling of uncertainties in investment projects. It provides a robust risk assessment framework, especially in volatile markets [11].

– Scenario Analysis. This approach evaluates different possible future developments, considering macroeconomic changes, interest rate fluctuations, and geopolitical risks. It helps in formulating adaptive risk mitigation strategies [8].

– Sensitivity Analysis. This method examines how changes in key variables (e.g., interest rates, inflation, or commodity prices) impact financial performance. It is particularly useful for stress-testing investment strategies and ensuring resilience in uncertain environments [16].

By integrating these advanced risk assessment techniques, companies and investors can enhance their ability to anticipate potential financial disruptions and implement proactive risk mitigation measures.

In the financial and business environment, risk management is critical to the success and resilience of organizations. Risks can seriously affect organizations without appropriate management strategies, thereby threatening the sustainability of activities and market position. In this paper, market risks and operational risks will be reasonably analyzed and relevant approaches to managing these types of risks will be discussed.

Market risk refers to the risks that arise in relation to price changes of financial instruments, currencies, commodities, interest rates and other market components. This risk is one of the main factors that increase uncertainty in the activities of organizations and investors.

One of the most basic sources of market risk is price fluctuations. Price changes can be influenced by many factors: economic indicators, political events, natural disasters or technological developments. These changes directly affect the profits and losses of market participants. Commodity prices (oil, gold) or stocks, for example, can change rapidly as a result of uncertainties in the economy.

An increase or decrease in interest rates can pose great risks to debtors and businesses. High interest rates lead to the fact that debt becomes more expensive and, as a result, financial costs increase. At the same time, lower interest rates lead to a decrease in profits for banks and other financial institutions. Interest rate risk is of serious importance, especially for companies that provide long-term borrowing and fixed-rate financial instruments.

Currency risks mean risks arising from changes in exchange rates. This is especially important for organizations engaged in international trade and investments. An increase or decrease in exchange rates can significantly affect the financial results of companies that have debts in foreign currency or export them abroad. For example, with a change in the exchange rate, the income or expenses of companies in foreign markets may change [3].

Operational risks include the risks that arise in the day-to-day operations of an organization. Such risks arise as a result of errors, malfunctions or vulnerabilities in the internal structures of the organization that may occur during the performance of the activity.

One of the biggest sources of operational risk is the human factor. People's mistakes are one of the main causes of operational risk. For example, incorrect decisions, employees submission of incorrect information, or failure to take the necessary measures can lead to termination or disruption of operations. This can happen in areas such as customer service, production processes or financial statements.

Operational risks also arise from technological problems. Failures or cyber attacks that occur in computer systems and networks cause serious damage to the operations of organizations. Such risks can result in data loss, system downtime, and company data breaches. Cyber risks rank among the greatest operational risks in modern times.

Companies and organizations must have internal control mechanisms to manage their operations and reduce risks. Vulnerabilities

in operational processes and deficiencies in internal control systems increase operational risks. This can lead to financial loss due to failure to comply with the correct rules, incorrect reporting, or unusual transactions.

Supply chain failures can also lead to operational risks. For example, delays from suppliers or poor-quality products can negatively affect the production activities of the organization and customer requirements.

The following approaches are used to manage operational risks:

- Internal control – companies reduce operational risks by strengthening internal control systems. This is possible with the introduction of standard operating procedures and systematic checks;

- Technological security - building defense mechanisms against cyber attacks is essential to ensure information security.

Employee training and development: professional development of employees helps to reduce operational errors and increase organization resilience [1]. Investment projects are important financial decisions for businesses that are made in order to generate higher returns in the future. The success of these projects is based on their correct assessment, financial analysis and risk management strategies. Financial modeling, budgeting, risk assessment and management strategies are one of the main components for the effective and sustainable implementation of these types of projects. Below, each area is explained in detail.

Financial modeling is a sophisticated method employed to forecast the future financial outcomes of an investment project and facilitate decision-making based on various hypothetical scenarios. The financial model encompasses a wide range of financial indicators, including income and expenditure projections, profit and loss estimates, capital flow analysis, and other relevant metrics associated with the project's financial performance. The primary objective of constructing such a model is to assess the economic and financial viability of the project.

Key characteristics of financial models include:

1. Income Streams and Expenses. The model identifies and predicts future income streams (such as sales revenue, rental income, etc.) and anticipated expenditures (including production costs, operational expenses, and labor costs), thereby providing a comprehensive picture of the project's financial trajectory.

2. Main Financial Indicators. Critical financial metrics are used to evaluate the cost-effectiveness and financial performance of the project. These include present value calculations, Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period, among others, which serve as benchmarks for assessing the project's potential profitability.

3. Scenario Analysis. Financial models incorporate various scenarios (optimistic, pessimistic, and realistic) based on fluctuating economic conditions and market dynamics. This approach enables a nuanced understanding of potential financial outcomes under different circumstances, assisting stakeholders in preparing for a range of possible future conditions.

The applications of financial models are broad and diverse, including:

1. Capital Acquisition. Financial models aid in identifying and securing the necessary capital sources for investment projects, providing a solid foundation for obtaining financing.

2. Financial Planning and Decision-Making. A precise assessment of projected financial results is crucial for making informed decisions and preparing for potential countermeasures in response to unforeseen events or market changes.

3. Risk Assessment and Mitigation. Financial models provide valuable data to assess risks associated with the project and help formulate strategies for mitigating potential financial threats.

Financial modeling serves as an essential tool for the in-depth evaluation of investment projects, offering insights into their economic feasibility, risk exposure, and financial sustainability [5].

Budgeting is an important financial tool for planning and monitoring the costs and income of an investment project. The budgeting process allows the financial resources allocated for each stage of the project to be used efficiently.

Financial costs (startup costs, operating costs, intangible investments, etc.) that will occur at different stages of the project.) and revenues (sale, rent, etc.) is defined. Budgeting analyzes how much profit the project will bring in the future, determining financial flows (income and expenses). Once the budget has been analyzed, immediate intervention should be made against any cases of cost increase or revenue decrease. This ensures that the project uses limited funds more efficiently.

The analysis and proper allocation of financial resources to be allocated for different parts of the project is worked out. Budgeting ensures continuous monitoring of the financial condition of the project and timely accountability of the results. Within the budget, risks are identified and measures are taken to move the project forward in a sustainable manner [13].

Risk assessment for investment projects is important for analyzing the potential dangers and uncertainties of the project. Risk assessment is carried out in order to ensure the future success of the project and prevent losses.

Risk is a broad concept that expresses the possible negative consequences of any activity or decision. Analysis and classification of risks are essential for better management of decisions made in various areas and for obtaining more effective results. The types of risks, especially in the areas of investment, finance and business, are determined and assessed by various practices and methods. Each type of risk is distinguished by its own characteristics and resources, which exposes them to various management approaches and methods of analysis. Below, the different types of risk will be analyzed extensively.

Market risks are risks that arise depending on changes in market conditions and affect any business or investment activity. These risks are caused by changes in the dynamics of supply and demand of the market, the behavior of market participants, the economic situation and regulatory changes [14].

Rapid and uncertain changes in market prices pose serious risks to investors and businesses. For example, fluctuations in global oil prices or price fluctuations in commodity markets can seriously affect the returns of investment projects.

Macroeconomic factors such as economic crises, inflation, changes in interest rates are also the main sources of market risks. These types of risks can directly affect market conditions and requirements, causing revenue cuts or cost increases.

Financial risks are risks that are associated with the financial structure of a project or organization and can lead to potential losses. These types of risks are especially related to financial instruments, loan terms and interest rates. Operational risks are risks caused by problems that arise in the daily activities of the enterprise. These risks are caused by inter-

nal processes, the human factor and technological failures. Workforce incompetence, labor shortages, task changes, or employee health issues can lead to disruption of operations and failure of the project. In modern times, technological systems and infrastructure are of great importance. System failures, software errors or inoperability of technological equipment lead to the postponement of the project or the emergence of additional costs. Issues related to the supply chain, especially in international operations, logistics problems, financial position of suppliers and uncertainties are among the main causes of operational risks.

Legal and regulatory risks are risks that arise in connection with the policies of the state, legislative changes and decisions of the relevant regulatory bodies. These risks include issues related to compliance with the laws and regulations of each country. New tax laws or changes can change the financial plans and income of businesses. An increase in tax burdens can negatively affect the profitability of projects. Environmental-related legislative changes, such as emission limits or new regulations on the protection of natural resources, can bring additional costs to the operation of the enterprise.

Social and reputational risks arise in connection with existing problems related to public relations of organizations, social responsibility or employees. Existing social and ethical issues related to customers and consumers, such as Product Safety, employee rights and environmental protection, can damage an organization's image and reputation. Negative news turnover, criticism spread through social media, or inaccurate information can threaten the organization's public relations and customer base [1].

Types and analysis of risks help enterprises to make strategic decisions correctly. Each type of risk comes from a wide variety of sources and is assessed using different analysis methods and management strategies. Therefore, an effective risk management approach is an essential component to ensure the success of every investment and operational project. Risk analysis is an important tool that supports long-term success, not only in the economic and financial sphere, but also in the operational, legal and social spheres.

Risk management is essential to ensure the successful implementation of the project. Diversification ensures that risks are reduced by spreading the project or investment to different areas. For example,

investing in different markets, offering different products and services, prevents the accumulation of risks. Hedging involves the use of financial instruments (futures, options, etc.), reducing risks associated with price changes and market volatility. This approach is effective mainly for financial risks. Some of the risks that a project or organization may face (natural disasters, cyberattacks, etc.) are possible.) insurance strategies can be applied to protect [3].

Improving internal control systems and optimizing processes reduce operational risks and ensure that the project is moving in the right direction. Flexible approaches and openness to change are essential to adapt to rapid changes in the project environment. This approach ensures that the project can respond to unexpected changes that are likely to occur.

Financial risk management is very important for the stability of the economy and the success of organizations. Identifying the main types of risk provides opportunities for organizations and individuals to make the right decisions and protect themselves from potential losses. Each type of risk is due to different factors and, therefore, specific strategies are required to manage each one. Therefore, it is important to develop and implement appropriate risk management measures and strategies.

Market and operational risks can seriously affect the performance and financial stability of organizations. While market risks arise from changes in financial markets, operational risks are caused by the daily activities of the organization and its internal structures. Each of these risks requires different analysis and management approaches. The correct identification and management of both market and operational risks provides the basis for the successful functioning of organizations and ensuring a sustainable economic environment.

Financial modeling, budgeting, risk assessment and management strategies in investment projects are important tools for the successful implementation of projects. These approaches are important for correctly assessing the financial results of investment projects, reducing potential risks and making effective decisions. Since each project has its own characteristics, the application of methods in these areas may vary according to the natural requirements of the project.

In the context of rapid global transformations, investment projects are facing emerging risks that require additional analysis and manage-

ment strategies. While traditional risks such as market fluctuations, credit constraints, and operational uncertainties remain relevant, modern investment environments introduce new challenges that must be considered by businesses and investors.

The increasing dependence on digital infrastructure exposes investment projects to cybersecurity threats. Data breaches, ransomware attacks, and system vulnerabilities can lead to financial losses and reputational damage [7]. Companies investing in technology-intensive sectors must incorporate robust cybersecurity protocols, regular vulnerability assessments, and contingency planning to mitigate potential cyber threats.

Investors are now placing greater emphasis on sustainable and responsible investment. Environmental risks, such as climate change and resource depletion, can affect the long-term viability of projects [10]. Social risks, including labor rights and community impact, influence corporate reputation and regulatory compliance. Governance risks, such as lack of transparency and ethical misconduct, can deter investors and stakeholders. The integration of ESG criteria in investment decision-making is becoming an essential factor in risk assessment [9].

Global geopolitical tensions, regulatory shifts, and trade restrictions pose significant threats to investment stability. Sanctions imposed by governments on certain industries or regions can disrupt supply chains and limit market access [6]. Political instability, including conflicts, regime changes, and economic nationalism, adds uncertainty to international investment projects. Businesses must conduct comprehensive political risk assessments and develop adaptive strategies to navigate these uncertainties.

Addressing these modern risks requires a dynamic approach to risk management that incorporates advanced predictive analytics, scenario modeling, and adaptive business strategies. By recognizing and proactively mitigating these challenges, investors can enhance resilience and ensure long-term project sustainability.

Conclusion. The article provides a detailed analysis of the main methods for risk assessment in investment projects. Various types of risks are discussed, including market, credit, liquidity, operational, legal, regulatory, and reputational risks. For each type of risk, specific management approaches are identified, such as diversification, hedging, insurance, monitoring, and internal control mechanisms. Modern risk

assessment methods, including Value-at-Risk (VaR), Monte Carlo simulations, and sensitivity analysis, enable more accurate risk forecasting and the adaptation of management strategies in unstable market conditions.

Particular attention is given to market and operational risks, which can significantly impact the financial stability of organizations. Market risks, related to price fluctuations, interest rates, and exchange rates, require continuous monitoring and adjustments to investment strategies. Operational risks, arising from technological failures, management errors, and supply chain disruptions, necessitate the integration of internal control systems and the improvement of personnel qualifications.

The article also emphasizes the importance of financial modeling and budgeting for successful investment project planning. Risk assessment is an integral part of this process, as it allows for the identification of potential threats and the implementation of mitigation measures. In the context of contemporary challenges, such as cyber threats, environmental and social risks, and geopolitical instability, it is essential to incorporate ESG (Environmental, Social, and Governance) criteria into investment decision-making.

Thus, effective risk management is a critical factor in the success of investment projects. The use of modern risk assessment methods and adaptive strategies ensures the financial stability of organizations and contributes to their long-term development in the face of global transformations.

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АНАЛІЗ РИЗИКІВ В ІНВЕСТИЦІЙНИХ ПРОЄКТАХ

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Анотація. Фінансове моделювання, бюджетування, оцінка ризиків та стратегії управління інвестиційними проєктами є важливими інструментами для успішної їх реалізації. Ці підходи важливі для правильної оцінки фінансових результатів інвестиційних проєктів, зменшення потенційних ризиків та прийняття ефективних рішень. Оскільки кожен проєкт має свої особливості, застосування методів у цих сферах може змінюватися залежно від природних вимог проєкту.

У статті здійснено комплексний аналіз основних методів аналізу ризиків в інвестиційних проєктах, розглянуто типи ризиків, їх оцінку, управління та вплив на успішність проєктів. Оцінка ризиків є важливим елементом для забезпечення фінансової стабільності та довгострокової ефективності інвестиційних проєктів. Визначено основні категорії ризиків у фінансовій сфері, серед яких ринкові, кредитні, ліквідні, операційні, юридичні, регуляторні та репутаційні ризики. Для кожної категорії пропонуються специфічні методи управління, зокрема диверсифікація, хеджування, страхування та внутрішній контроль. Особлива увага приділена сучасним методам управління ризиками, таким як Value-at-Risk (VaR), метод Монте-Карло, сценарний аналіз та аналіз чутливості, які дозволяють точніше оцінити та прогнозувати ризики, особливо в умовах нестабільних ринків та економічних змін. Зокрема, ринкові та операційні ризики, які виникають через зміни цін, валютних курсів або помилки у бізнес-процесах, можуть значно впливати на фінансову стабільність організації.

Також підкреслено важливість фінансового моделювання та бюджетування для прийняття обґрунтованих рішень. Врахування нових викликів, таких як кіберзагрози та екологічні фактори, сприяє інтеграції критеріїв ESG у процес прийняття інвестиційних рішень. У цілому, ефективне управління ризиками є запорукою стабільності та успіху інвестиційних проєктів у умовах глобальних трансформацій.

Ключові слова: інвестор, аналіз ризиків, інвестиційний проєкт, ринкові умови, операційні процеси, технологічні зміни.



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