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## FORMATION OF AN ADAPTIVE MECHANISM FOR ENSURING THE ECONOMIC EFFICIENCY OF OIL AND GAS FIELDS

**Volodymyr Onyshchenko**

National University  
«Yuri Kondratyuk Poltava Polytechnic»,  
Poltava, Ukraine  
ORCID: 0000-0003-3486-1223

**Myron Firman**

National University  
«Yuri Kondratyuk Poltava Polytechnic»,  
Poltava, Ukraine  
ORCID: 0009-0008-8389-8704

**Summary.** The article carries out a comprehensive analysis of theoretical approaches to the formation of an organizational and economic mechanism for managing the efficiency of oil and gas field development in the context of growing volatility of energy markets, technological transformations, and strengthening of requirements for environmental and social responsibility of business. The conceptual foundations for improving the management mechanism, based on the principles of system integration, proactive risk management, digital transformation, ESG orientation, strategic flexibility and long-term value creation, are substantiated. The central element of the proposed approach is the innovative tool of the author's development «Action Matrix», which performs the functions of the analytical core of the adaptive mechanism. The «Action Matrix» implements an iterative process of analysing geological, geophysical, technical and economic data of a particular subsoil area, forming objective conclusions about its current state and predicting the effectiveness of possible management decisions. Based on the results obtained, the system generates optimal options for actions aimed at increasing economic efficiency, reducing risks, and ensuring sustainable development of the enterprise. Its application ensures the transition from reactive to proactive management, improves the quality of investment decisions, reduces non-production costs and minimizes financial risks. The proposed organizational and economic mechanism functions as a comprehensive, dynamic system that combines the principles of digital analytics, ESG compliance, customer focus, and strategic flexibility. Its implementation involves the transformation of management structures, the introduction of innovative technologies, the formation of cross-functional teams, and the creation of transparent investment algorithms. Particular attention is paid to proactive risk management, which is based on the predictive and analytical capabilities of the «Action Matrix» and ensures the stability and sustainability of the enterprise even under the conditions of external crisis fluctuations. The practical implementation of the improved management mechanism involves digital transformation with the integration of intelligent analytical systems, updating the regulatory and methodological framework, improving the personnel motivation system, developing human resources and building an effective dialogue with stakeholders. The complexity and flexibility of the model create opportunities for adaptation to changes in market conditions, increasing operational efficiency and optimizing costs. Thus, the proposed approach forms a new management paradigm that combines digital technologies, data-driven analytics, scenario planning and sustainable development principles. The implementation of the «Action Matrix» as an intelligent core allows for iterative forecasting, multi-scenario modelling and informed management decision-making, which increases economic efficiency, minimizes risks and ensures the sustainable development of the oil and gas industry in conditions of high turbulence of the external environment.

**Key words:** organizational and economic mechanisms, efficiency of oil and gas fields, Action Matrix, digital transformation, system integration, proactive risk management, Big Data, artificial intelligence, ESG, investment optimization, strategic management, digital twins, adaptability, sustainable development.

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## ФОРМУВАННЯ АДАПТИВНОГО МЕХАНІЗМУ ЗАБЕЗПЕЧЕННЯ ЕКОНОМІЧНОЇ ЕФЕКТИВНОСТІ НАФТОГАЗОВИДОБУВНИХ РОДОВИЩ

**Володимир Онищенко**

Національний університет «Полтавська політехніка імені Юрія Кондратюка»,  
Полтава, Україна

**Мирон Фірман**

Національний університет «Полтавська політехніка імені Юрія Кондратюка»,  
Полтава, Україна

**Резюме.** Здійснено комплексний аналіз теоретичних підходів до формування організаційно-економічного механізму управління ефективністю розроблення нафтогазовидобувних родовищ в умовах зростаючої волатильності енергетичних ринків, технологічних трансформацій та посилення вимог до екологічної й соціальної відповідальності бізнесу. Обґрунтовано концептуальні засади удосконалення механізму управління, що базуються на принципах системної інтеграції, проактивного ризик-менеджменту, цифрової трансформації, ESG-орієнтації, стратегічної гнучкості та довготривалого створення вартості. Центральним елементом запропонованого підходу є інноваційний інструмент авторської розробки «Матриця дії», яка виконує функції аналітичного ядра адаптивного механізму. «Матриця дії» реалізує ітераційний процес аналізу геолого-геофізичних, технічних та економічних даних конкретної ділянки надр, формуючи об'єктивні висновки щодо її поточного стану та прогнозує ефективність можливих управлінських рішень. На основі отриманих результатів система генерує оптимальні варіанти дій, спрямовані на підвищення економічної ефективності, зниження ризиків і забезпечення сталого розвитку підприємства. Її застосування забезпечує перехід від реактивного до проактивного управління, підвищує якість інвестиційних рішень, скорочує невиробничі витрати та мінімізує фінансові ризики. Запропонований організаційно-економічний механізм функціонує як комплексна, динамічна система, що поєднує принципи цифрової аналітики, ESG-комплаєнсу, клієнтоорієнтованості й стратегічної гнучкості. Його реалізація передбачає трансформацію управлінських структур, впровадження інноваційних технологій, формування міжфункціональних команд і створення прозорих алгоритмів інвестування. Особлива увага приділяється проактивному ризик-менеджменту, який базується на прогнозно-аналітичних можливостях «Матриці дії» та забезпечує стабільність і стійкість роботи підприємства навіть за умов зовнішніх кризових коливань. Практична реалізація удосконаленого механізму управління передбачає цифрову трансформацію з інтеграцією інтелектуальних аналітичних систем, оновлення нормативно-методичної бази, удосконалення системи мотивації персоналу, розвиток кадрового потенціалу та побудову ефективного діалогу зі стейкхолдерами. Комплексність і гнучкість моделі створюють можливості для адаптації до змін ринкової кон'юнктури, підвищення операційної ефективності й оптимізації витрат. Таким чином, запропонований підхід формує нову управлінську парадигму, що поєднує цифрові технології, аналітику на основі даних, сценарне планування та принципи сталого розвитку. Впровадження «Матриці дії» як інтелектуального ядра дозволяє здійснювати ітераційне прогнозування, багатосценарне моделювання та обґрунтоване прийняття управлінських рішень, що підвищує економічну ефективність, мінімізує ризики й забезпечує сталий розвиток нафтогазовидобувної галузі в умовах високої турбулентності зовнішнього середовища.

**Ключові слова:** організаційно-економічний механізм, ефективність нафтогазовидобувних родовищ, Матриця дії, цифрова трансформація, системна інтеграція, проактивне управління ризиками, Big Data, штучний інтелект, ESG, інвестиційна оптимізація, стратегічне управління, цифрові двійники, адаптивність, сталий розвиток.

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**Problem statement.** The current state of the oil and gas industry of Ukraine is characterized by complex challenges associated with the depletion of fields, obsolescence of the technological base, high energy costs and instability of the investment environment. In the context of post-war economic recovery, the issue of increasing the efficiency of using the country's natural resource potential is of relevance. The existing organizational and economic mechanisms for managing extractive activities do not provide sufficient flexibility and adaptability to external and internal changes, such as fluctuations in world energy prices, environmental restrictions, the transformation of tax policy and the introduction of innovative

technologies. Therefore, there is a need to form an adaptive mechanism for ensuring the economic efficiency of oil and gas fields, which would combine the tools of strategic planning, state regulation, investment stimulation and technological modernization. This will increase the efficiency of the industry, ensure the energy security of the state and contribute to the sustainable development of the national economy.

**Analysis of recent research and publications.** The current state of the oil and gas industry of Ukraine is determined by a high level of technological, economic, and geopolitical challenges, which necessitate the formation of adaptive mechanisms for managing production efficiency. Domestic and foreign scientific literature of recent years is devoted to the issues of increasing the economic efficiency of hydrocarbon production, optimizing investment processes and introducing innovative technologies in the context of energy security of the state.

According to O. G. Belarus, increasing the efficiency of oil and gas producing enterprises is a key factor in Ukraine's energy independence. The author emphasizes that the efficiency of the industry should be considered through the prism of adaptation to external shocks, such as fluctuations in world energy prices, military-political risks, and changes in the tax burden [1]. A similar position is expressed by V. P. Petrenko and the authors, who believe that the adaptability of the production management system is provided by a combination of technological innovations and financial and economic levers of response to changes in market conditions [2].

An important component of the research of recent years is the analysis of mechanisms for increasing the economic efficiency of oil and gas fields through optimization of investment processes. In particular, the work of the team of authors [3] emphasizes that investment activity in the oil and gas sector should be based on a systematic approach to assessing risks, profitability and energy return of projects. The author offers mathematical models for assessing efficiency, considering the variability of geological, technological, and market parameters.

Studies by foreign scientists also focus on the role of digital technologies and modelling systems in ensuring the adaptability of extraction processes. For example, the authors' work [4] shows that the use of digital twins can reduce operating costs by 10–15% due to the optimization of drilling modes, pressure control and energy consumption management. Similar conclusions are made by a team of authors [5], who emphasize that the digitalization of extractive processes creates the basis for building adaptive economic and mathematical management models.

In Ukrainian conditions, considerable attention is paid to the issues of resource and energy efficiency and modernization of deposits. According to the conclusions of E. G. Sklovska, the formation of an adaptive mechanism should provide for a multi-level management system from technological parameters of wells to strategic planning of field development. The author points out that without the integration of environmental and energy aspects, economic efficiency loses stability in the long run [6].

The problem of energy and economic security in the oil and gas sector is also studied in the works of Danyliuk M. O. and Polyanska A. S. [7], which emphasize that national energy strategies should be based on the principles of adaptability, flexibility and innovation. They propose the concept of «adaptive resilience», the ability of an industry to quickly recover from crisis impacts.

Modern research also emphasizes the importance of economic and mathematical modelling. Thus, Krasniuk M. T. and the authors' team developed a model for assessing the economic efficiency of oil and gas projects, considering the stochastic nature of risk factors, which allows forming adaptive management decisions in conditions of uncertainty [8].

Particular attention should be paid to the works that consider scenario forecasting and strategic planning of field development. According to the results of the DNV study (2024), the global energy transition stimulates the need for oil and gas producers to adapt to the requirements of decarbonization and reduce their carbon footprint, which should be considered when forming national efficiency strategies [9].

The analysis shows that the adaptive mechanism for ensuring the economic efficiency of oil and gas fields should be based on an integrated approach that combines: use of digital technologies and intelligent control systems; implementation of economic and mathematical models for efficiency assessment; development of the institutional framework for energy security; increasing the flexibility of financial and investment strategies.

At the same time, the issue of integrating these approaches into a single adaptive management system, which would simultaneously optimize costs, increase profitability, and ensure energy sustainability in crisis conditions, remains insufficiently studied. This is what determines the scientific novelty of further research in this direction.

**Purpose of the study** – to develop the conceptual foundations for the formation of an adaptive organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields, which takes into account the current challenges of the energy market, the needs of technological modernization, and strategic guidelines for sustainable development.

**Statement of the task.** To achieve this goal, the following scientific tasks have been defined: to analyse the existing organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields; to form principles and approaches to improving the mechanism; to develop tools that will allow transforming theoretical provisions into an effective mechanism; to form «Action Matrices», which is positioned as know-how in geological exploration for oil and gas; and based on the «Action Matrix» to form an improved organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields.

**Statements of the main material of the study.** The analysis of theoretical approaches and the assessment of the current state of functioning of the organizational and economic mechanism for ensuring the efficiency of oil and gas field development revealed that traditional management models do not fully consider the growing volatility of energy prices, the need to implement innovative technologies, as well as the requirements for environmental and social responsibility of business. Based on this, there is an objective need for a scientific substantiation of the conceptual foundations for improving the management mechanism, which should ensure its adaptability and long-term effectiveness. In the context of this study, the organizational and economic mechanism is understood as a complex, synergistic system of interrelated elements, covering: organizational structure of project management, which should be flexible and adaptable to external changes; financial and economic instruments, including innovative approaches to planning, investing and budgeting; management methods focused on proactive risk management and continuous monitoring; information and technological support, which is the foundation for making informed decisions. The key principle of improvement is the paradigm shift from a static, hierarchical and production-oriented model to a dynamic, integrated, and innovative one. The conceptual foundations substantiated in this section are based on the synergy of three key components: digitalization, energy efficiency, and strategic risk management. The integration of these principles will create a flexible and sustainable management model that can not only respond to challenges but also form competitive advantages in the global market. This gives grounds to assert that to improve the organizational and economic mechanisms for managing the efficiency of oil and gas fields, it is necessary to formulate new principles and approaches. They should ensure the transition from traditional, hierarchical, and reactive management to a proactive, systemic, and innovation-oriented model.

Principle 1. System Management Integration.

Improving the management mechanism requires abandoning the fragmented approach, when geological, technological and economic aspects are considered in isolation. The new approach is based on system integration, where all components of the field life cycle – from exploration to operation – are considered as a single, interconnected system. This involves the creation of a digital twin of the field, which simulates all processes and relationships in real time, allowing you to

optimize production and reduce operating costs. This approach ensures the adoption of complex decisions that consider not only the immediate economic effect, but also the long-term consequences.

A new principle. Life-Cycle Asset Optimization.

Emphasis on maximizing economic value (NPV – net present value) over the entire period of operation through rational use of resources, technological improvement and risk management. This involves a balance between current production and ensuring future performance.

Principle 2. Reactive risk management.

Traditional risk management in the oil and gas industry is often reactive, i.e. it responds to existing threats.

A new principle. Proactive risk management.

The new approach involves a shift to proactive risk management. This is achieved with modern analytical tools based on artificial intelligence (AI) and machine learning. These technologies make it possible to predict possible risks from energy price volatility to the likelihood of equipment failure and take preventive measures. Thanks to this, the company can minimize potential losses and ensure the continuity of the production process.

Principle 3. Innovative and digital transformation.

Digitalization is seen not just as a tool, but as a fundamental basis for a new management approach. The introduction of innovative technologies such as the Internet of Things (IoT) for equipment monitoring, big data analysis (Big Data) for mining optimization, and process automation can significantly increase efficiency. The use of digital solutions allows you to reduce costs, optimize the use of resources, and increase production safety.

A new principle. Data-Driven Management and Digital Twins.

Creation of a single digital field space that integrates geological, technological, economic, and environmental data in real time. Use of AI/ML for analysis, forecasting reservoir behaviour, optimization of operating modes, and equipment prevention. This ensures objectivity, efficiency, and accuracy of management decisions.

Principle 4. Integration of ESG factors as a key value driver.

Economic efficiency can no longer be the only criterion for success. The new approach involves the integration of sustainable development (ESG) principles into all aspects of management. This means not only compliance with environmental standards, but also the active implementation of technologies that reduce emissions, optimize the use of water and energy. Social responsibility involves engaging with local communities and ensuring safe working conditions. The integration of ESG factors into management decisions allows you to reduce risks, increase the company's reputation and gain access to green finance, which ultimately strengthens its long-term economic sustainability.

A new principle. Effectiveness = Economics + ESG.

The implementation of sustainable development principles (carbon footprint reduction, water use, reclamation, occupational safety, dialogue with communities) not only reduces risks but also increases the attractiveness of the object for investment, improves reputation and ensures long-term licensing legitimacy. The efficiency of the field is evaluated through the prism of creating complex value.

Principle 5. Flexibility and adaptability to market dynamics.

The functioning of management mechanisms, characterized by a high level of rigidity and limited flexibility, makes it impossible to respond on time to market price dynamics, changes in consumer demand and the emergence of technological breakthroughs.

A new principle. Adaptive strategic management and scenario planning.

Development of flexible business planning models that can quickly adapt to changes in the external environment. Using Real Options to Estimate the Cost of Management Flexibility.

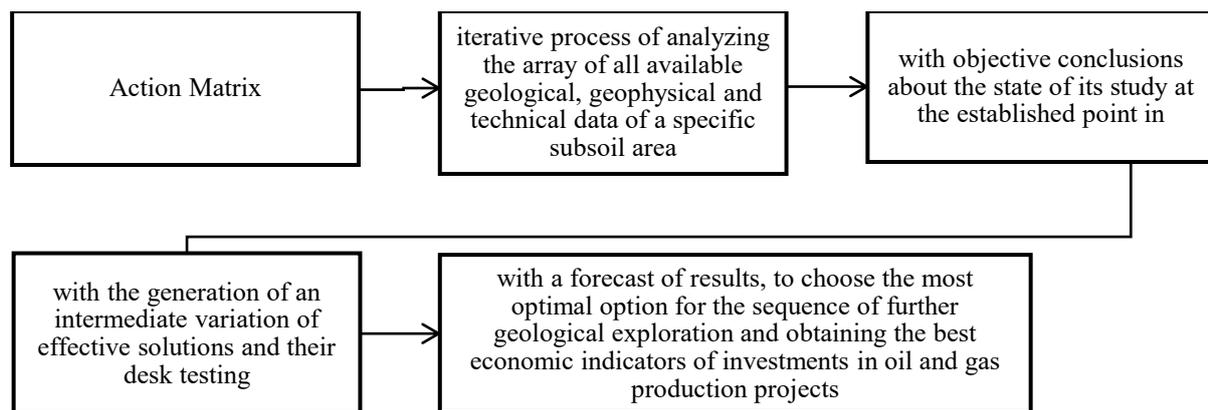
Principle 6. Long-term value-oriented incentive system.

Key performance indicator systems (KPIs) and personnel motivation mechanisms are mostly focused on achieving short-term results in the field of production, which leads to ignoring aspects of long-term efficiency and sustainable operation of the field.

A new principle. Value-Based Incentives.

Linking the remuneration of management and staff with indicators reflecting long-term economic efficiency and sustainability (e.g., NPV, IRR, capital expenditure efficiency indicators, achievement of ESG goals, level of use of information from digital systems).

Based on the well-grounded conceptual foundations and formulated new principles, the need for the development and implementation of specific tools that will allow transforming theoretical provisions into an effective mechanism becomes obvious. To achieve this goal and increase the level of economic efficiency of oil and gas fields, it is proposed to implement the «Action Matrix» (fig. 1), which is positioned as know-how in geological exploration for oil and gas. This matrix, which is the central element of the improved mechanism, provides: iterative process of analysing the array of all available geological, geophysical and technical data of a specific subsoil area; formation of objective conclusions about the state of its study at the established moment; generation of an intermediate variation of effective solutions and their desk testing; forecast of results for choosing the most optimal option for the sequence of further geological exploration and obtaining the best economic indicators of investments in oil and gas production projects.



**Figure 1.** «Action Matrix» to improve the organizational and economic mechanism that will contribute to increasing the level of economic efficiency of oil and gas fields [author's development]

Since the «Action Matrix» is an iterative process that serves as the central element of the new mechanism, its implementation has a direct impact on key aspects of management.

The application of the «Action Matrix» radically transforms the existing organizational and economic mechanism, transferring it to a qualitatively new level:

- Transition from reactive to proactive management. Instead of reacting to existing problems, the matrix allows you to assess the condition of the site in advance, with objective conclusions. It generates variations of effective solutions, which minimize risks.
- Optimization of investments. The matrix helps to predict the results and choose the most optimal option for further work, which allows you to get the best economic indicators of investments. This is especially important given the need for funding in the amount of 1–1.5 billion. dollars annually.
- Improving operational efficiency. The use of the matrix will make the drilling services market more predictable, because it provides for the need for 250–300 wells per year.

The described «Action Matrix» can significantly affect the existing organizational and economic mechanisms for ensuring the economic efficiency of oil and gas fields, transforming it from reactive and intuitive to proactive and scientifically grounded.

Impact on organizational and managerial aspects: a) Consistency and iterative process. The action matrix is an iterative process of analysing an array of all available data on a specific subsoil area. This approach transfers management from disparate stages to an integral, continuous system; b) Objectivity of conclusions. The matrix form's objective conclusions about the state of study of the site at a certain point in time. This eliminates subjective decisions and allows you to make more informed management decisions based on evidence; c) Forecasting and optimization. The tool generates intermediate variations of solutions, tests them, and predicts the results. This makes it possible to choose the optimal option for the sequence of geological exploration, which directly affects the efficiency and risk reduction.

Impact on economic aspects: a) Increasing the economic efficiency of investments. The use of the action matrix allows you to obtain the best economic indicators of investments in oil and gas production projects. The optimal choice of the sequence of work and an accurate forecast of the results help to avoid unjustified costs; b) Reduction of financial risks. By analysing data and testing solutions, it is possible to reduce the likelihood of failure, which is especially important given the need for annual funding in the amount of 1–1.5 billion dollars; c) Market predictability. The matrix helps to plan the development of the drilling services market, which implies the need for 250–300 wells per year. Such analysis makes the market more predictable.

Therefore, it is advisable to emphasize that the concept of the «Action Matrix», which requires large-scale implementation, is an effective tool for improving the organizational and economic mechanisms of management. Its application ensures the transition to a systematic and scientifically based model of managerial decision-making, which, in turn, contributes to increasing economic efficiency, reducing the level of risks, and optimizing investment processes in the industry. At the same time, it should be noted that the current organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields has significant potential for transformation and modernization through the integration of the «Action Matrix» and other innovative tools. The key task in this context is a gradual departure from the linear, reactive management model and the formation of a dynamic, integrated and proactive system of management practices. In view of this, it is advisable to emphasize that the existing management scheme defines the «management components» mainly as establishing development paths, identifying key factors of influence and making forecasts. In turn, the implementation of the «Action Matrix» can radically transform these components, translating them into the plane of data and iterative management processes, which corresponds to modern trends in digitalization and adaptive management. The transition from the traditional paradigm of determining development paths to data-driven optimization decisions occurs due to the application of the concept of the «Action Matrix». It functions as an iterative process that involves a comprehensive analysis of the full array of available data to form objective conclusions. Thus, instead of the classic approach to determining the directions of development, the new mechanism provides an opportunity to form, test and select the most effective management decisions, in particular in the field of planning and implementation of geological exploration. A similar logic can be traced in the transformation of approaches to working with risk factors, namely from their static detection to a system of proactive management. The ability of the «Action Matrix» to predict the results of economic processes allows not only to identify key risks, but also to implement a set of preventive measures. This helps to minimize financial losses and increase the economic sustainability of investment projects in the oil and gas industry.

No less important is the evolution from classical forecasting to the application of predictive analytics. The main function of the «Action Matrix» is to generate predictions based on data processing methods and machine learning tools. This approach increases the accuracy of performance forecasting, transferring forecasting from an auxiliary stage of the management process into a systematic, scientifically based tool that ensures strategic decision-making based

on the most relevant and reliable information. The improved organizational and economic mechanism provides for the integration of the «Action Matrix» and other innovative tools directly into its key structural components. This makes it possible to move from traditional management models to a holistic, digitally oriented system capable of ensuring the sustainable development of the oil and gas industry in conditions of high turbulence of the external environment. It is worth noting the fact that the improved organizational and economic mechanism will contain updated components, such as:

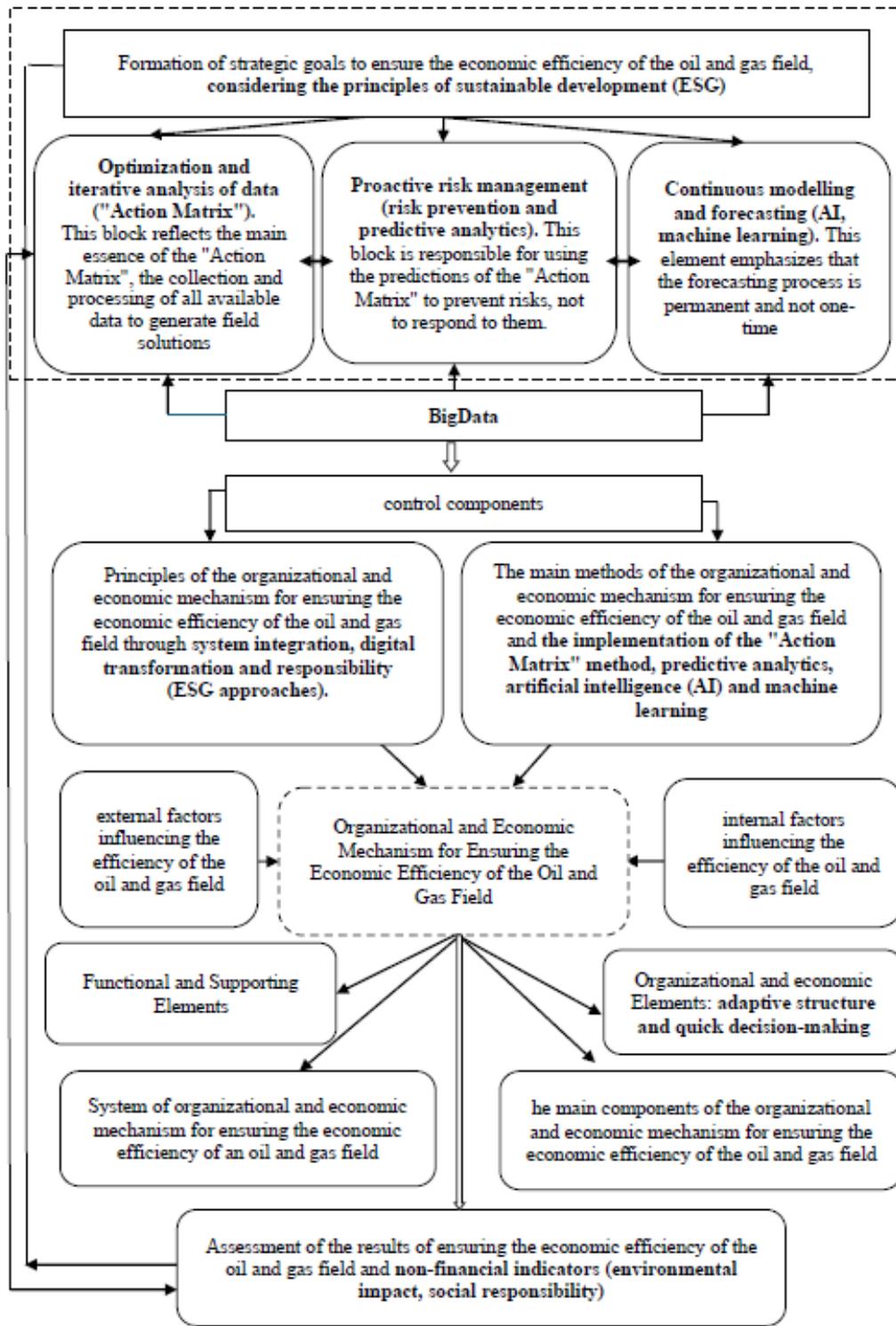
**Principles of the mechanism.** The main principles of the functioning of the improved mechanism are system integration and digital transformation. The «Action Matrix» is their conceptual personification, since it allows you to consider the entire array of data as a single interconnected system. This provides a transition from a fragmented approach to a comprehensive data-driven management model, which significantly increases the validity of management decisions.

**Mechanism methods.** The «Action Matrix» is being formed as an independent methodological tool, reinforced by digital technologies of a new generation. The use of Big Data and artificial intelligence provides constant updating of the information base, which allows for adaptive adjustments in real time. This creates prerequisites for optimizing mining processes and increasing their economic efficiency.

**Organizational and economic elements.** The introduction of innovations requires a transformation of the organizational structure, which must acquire greater flexibility and cross-functional interaction. The formation of teams capable of interpreting the results of the «Action Matrix» analytics becomes a key condition for its effective application. In the financial aspect, the mechanism should justify attracting annual investments at the level of USD 1–1.5 billion, demonstrating a transparent and optimized algorithm for achieving maximum economic results.

**Functional and supporting elements.** The implementation of the «Action Matrix» provides for large-scale deployment in production processes, which requires the formation of a drilling services market with a capacity of 250–300 wells per year. This necessitates the modernization of the functional and supporting elements of the system, which must meet the requirements of high digitalization and automation. Abandoning traditional workflows and moving to digitally optimized operations is becoming a prerequisite for increasing the competitiveness of the industry. Thus, the improved organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields can be characterized as a comprehensive, dynamic system based on the principles of system integration, digital transformation, and proactive risk management. Unlike the traditional linear model, the proposed mechanism has a cyclical nature and data orientation, which provides increased stability, adaptability and the ability to ensure long-term profitability and sustainable development of the industry (fig. 2). The central tool of the improved model is the «Action Matrix», an iterative process based on a comprehensive analysis of geological, geophysical, technical and economic data of a specific subsoil area. It plays the role of an intellectual core that transforms disparate information flows into objective conclusions and forms a set of options for managerial decisions focused on maximizing the efficiency of production and investment activities. Thus, the new model is formed since interrelated components, each of which performs a clearly defined function in ensuring the adaptability and effectiveness of the organizational and economic mechanism:

**Proactive risk management.** The improved mechanism is based on the principles of anticipatory response, which provides for the transition from reactive actions to predictive and preventive management. The use of the analytical capabilities of the «Action Matrix» allows for the identification and quantification of potential risks, such as market volatility, technological failures, or logistical constraints. This creates the basis for the development of preventive measures aimed at minimizing financial losses and stabilizing operational activities.



**Figure 2.** Model of Improved Organizational and Economic Mechanism for Ensuring the Economic Efficiency of Oil and Gas Fields

Continuous modelling and optimization. «Action Matrix» implements the principle of iterative forecasting and multi-scenario modelling, which ensures the formation of a range of possible management decisions. This, in turn, allows you to reasonably determine the optimal sequence of geological exploration and production works, taking into account changes in the external and internal environment. Thanks to this approach, the economic indicators of investments are maximized, and the adaptability of the industry to unstable operating conditions increases.

Digital transformation. The key tool for the functioning of the improved mechanism is digital technologies that integrate large data sets and artificial intelligence algorithms into a single system. The use of Big Data, machine learning, and digital twins of deposits provides not only comprehensive information analysis but also the ability to dynamically monitor and promptly adjust production and investment processes in real time. This creates the basis for the industry's transition to a qualitatively new level of efficiency and managerial effectiveness.

Improved model of the functioning of the organizational and economic mechanism is based on updated principles that differ significantly from traditional approaches and form a qualitatively new methodological basis for its implementation.

The principle of system integration. All components of the sectoral mechanism, starting from geological exploration processes and technological operations to financial and investment planning and management decisions, are considered as a single, interconnected system. This approach eliminates fragmentation of management, increases the coherence of strategic and tactical decisions and contributes to the comprehensive optimization of production and economic processes.

The principle of sustainable development (ESG). Ensuring economic efficiency is integrated with environmental and social parameters of the oil and gas industry. The «Action Matrix» allows you to quantify environmental risks and integrate them into the management decision-making system. At the same time, the investment strategy provides for priority financing of environmentally oriented («green») projects, which meet modern ESG compliance requirements and international standards of corporate responsibility.

The principle of customer focus. The improved mechanism provides for a focus not only on internal production and financial indicators, but also on the needs of end consumers of energy resources. Improving the economic efficiency of fields directly correlates with the increase in the reliability of energy supply, which contributes to strengthening the country's energy security and building long-term confidence in the national energy sector. Since the improved organizational and economic mechanisms have been developed, it is possible to determine the main directions of their implementation. They include the introduction of innovative technologies, restructuring of the management structure, and the integration of sustainable development principles into all business processes. Based on the proposed improved organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields, it is advisable to single out the key directions of its practical implementation. They provide for a comprehensive transformation of sectoral management and include several interrelated components.

1. Digital transformation and integration of the «Action Matrix». The central direction of the implementation of the improved mechanism is the implementation of the «Action Matrix», which functions as an iterative process of processing and analysing the full range of geological, geophysical, and technical data of a specific subsoil area. The main goal of this process is the formation of objective conclusions, the generation of alternative scenarios of decisions, and their preliminary desk testing to minimize risks and increase economic efficiency. Ensuring the functioning of the Action Matrix involves significant investments in technological development (at the level of USD 1–1.5 billion annually), which will allow the introduction of Big Data analytics, artificial intelligence (AI), the Internet of Things (IoT), and digital twins as the basis of a modern ecosystem for managing oil and gas production enterprises. An important element is the automation of operational processes, which will free up human resources to perform high-level analytical functions, improving the quality of management decisions.

2. Restructuring of the organizational structure. For the effective functioning of the «Action Matrix», it is necessary to move from the traditional hierarchical management model to a flexible system of cross-functional teams. Such teams should integrate specialists in the

field of geology, engineering, finance, and information technology, which will contribute to quick and comprehensive decision-making. The key aspect is the decentralization of managerial powers, which allows for prompt response to changes in the market environment and technological conditions of production. An important addition is the introduction of training and development programs for personnel focused on digital competencies, data analytics, and interpretation of the results of the «Action Matrix».

3. Integrating the principles of sustainable development (ESG). The modern model of development of the oil and gas industry provides for the mandatory consideration of environmental, social and managerial aspects. Investment policy should focus not only on financial profitability, but also on environmental and social performance, which includes financing green projects, introducing energy-efficient technologies, reducing carbon emissions and rational use of water resources. An important place is occupied by increasing transparency and regular publication of ESG reports, which ensure the formation of trust on the part of society, investors, and government institutions.

4. Development and implementation of regulatory and methodological support. Effective practical implementation of the mechanism requires updating standards and methods for accounting, planning, and evaluating the efficiency of deposits, taking into account the principles of LCAO, ESG and cost approach. It is important to develop recommendations for the use of digital twins and data analytics, as well as to formalize ESG risk management procedures.

5. Optimization of the organizational structure and processes. The implementation of the new management paradigm requires a transition to cross-functional teams focused on the cost indicators of field development. The decentralization of operational decisions should be carried out within the framework of the overall strategy, supported by the improvement of the processes of strategic planning, budgeting and controlling. The key success factor is the implementation of continuous improvement processes (Kaizen, Lean), which increases the flexibility and adaptability of management.

6. Improvement of the motivation system. Modern conditions require a revision of the KPI system at all levels of management with a focus on long-term efficiency and sustainable development. It is advisable to integrate ESG indicators into the performance assessment system and introduce value-based motivation models that will help align the interests of employees with the company's strategic goals.

7. Human resources development. Large-scale training and retraining programs with a focus on digital competencies, ESG management, data analytics, and cost management are needed. It is important to attract highly qualified data scientists, experts in the field of AI and ESG, which will form the personnel base for the implementation of new management practices.

8. Formation of an effective dialogue with stakeholders. The improved mechanism should provide for the development of transparent mechanisms for communication with local communities, authorities, investors and other stakeholders. This is implemented through regular information about plans, the impact of activities, and achieved ESG indicators, as well as through the implementation of corporate social responsibility practices.

Thus, the practical implementation of the improved organizational and economic mechanism for ensuring the economic efficiency of oil and gas fields requires a multi-vector approach that covers digital transformation, organizational changes, ESG orientation, regulatory and methodological support, personnel development and dialogue with stakeholders. The complexity and consistency of this approach ensure not only the growth of economic performance but also form the long-term sustainability and competitiveness of the industry.

**Conclusions.** As a result of the study, the need to transform the traditional organizational and economic mechanisms for managing the efficiency of oil and gas fields in the direction of their adaptation to modern challenges of the energy sector has been

substantiated. It is found that the current management models do not provide an adequate level of flexibility, proactivity, and technological integration, which limits their ability to ensure long-term economic efficiency. The proposed concept of an improved mechanism is based on the principles of system integration, digital transformation, ESG compliance, and proactive risk management. The central element of the new model is the Action Matrix, an innovative tool that implements an iterative process of data analysis, management decision-making, and forecasting the effectiveness of investment projects. Its implementation allows you to move from fragmented and reactive management to a comprehensive, dynamic, and scientifically based decision-making system. The improved mechanism provides for the restructuring of the organizational structure, modernization of functional elements, the formation of new methodological approaches, and the integration of digital technologies into all stages of the field life cycle. This approach ensures increased economic efficiency, risk reduction, investment optimization, and the formation of a sustainable competitive position in the global energy market. Thus, the proposed management model is not only a response to modern challenges, but also a strategic basis for the sustainable development of the oil and gas industry of Ukraine in the conditions of high turbulence of the external environment.

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