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IMPROVEMENT OF THE SYSTEM OF ACCOUNTING AND ANALYSIS OF MATERIAL COSTS IN OIL AND GAS INDUSTRY ENTITIES BASED ON MODERN MANAGEMENT REQUIREMENTS

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Annotation. Cost accounting at enterprises is an important source of information for ensuring economic efficiency. It serves as a methodological tool for optimizing strategic planning, operational control, and managerial decision-making. In modern conditions, improving cost accounting contributes to strengthening the competitiveness of an enterprise.

The formation of costs at the enterprises of Uzbekneftegaz JSC is multifactorial in nature and is determined by the complex interaction of natural and geological conditions, technological development, resource prices, and the institutional environment. Analyzing these factors and assessing the degree of their influence provide an effective basis for cost optimization.

Keywords: oil and gas industry, material costs, cost accounting, cost analysis, management accounting, cost management, product cost, Life Cycle Costing (LCC), value chain, cost drivers, upstream, midstream, downstream, resource efficiency, cost optimization, strategic management, economic efficiency.

Аннотация. Учет затрат на предприятиях является важным источником информации, обеспечивающим экономическую эффективность деятельности. Он выступает методологическим инструментом оптимизации стратегического планирования, оперативного контроля и принятия управленческих решений. В современных условиях совершенствование системы учета затрат способствует повышению конкурентоспособности предприятия.

Формирование затрат на предприятиях АО «Узбекнефтегаз» носит многофакторный характер и определяется сложным взаимодействием природно-геологических условий, уровня технологического развития, цен на ресурсы и институциональной среды. Анализ данных факторов и оценка степени их влияния создают основу для эффективной оптимизации затрат и повышения результативности хозяйственной деятельности.

Ключевые слова: нефтегазовая отрасль, материальные затраты, учет затрат, анализ затрат, управленческий учет, управление затратами, себестоимость продукции, калькулирование затрат жизненного цикла (Life Cycle Costing, LCC), цепочка создания стоимости, драйверы затрат, upstream, midstream, downstream, ресурсоэффективность, оптимизация затрат, стратегическое управление, экономическая эффективность.

INTRODUCTION

Since the oil and gas industry is characterised by a multi-stage and complex production system, several cost accounting methods are widely and effectively applied in this sector [1, 2]. The traditional method of cost accounting has stood the test of time and has already been systematised, particularly in large oil and gas enterprises [1]. In continuous and standardised production processes, such as distillation, cracking and reforming units, as well as finished product production departments at oil refineries, it is relatively easier to allocate costs per unit of output [2]. In addition, traditional costing methods are still widely used in auxiliary production, repair and mechanical workshops, logistics, warehousing, and administrative management.

A comprehensive analysis of the factors influencing material costs enables the effective use of resources and supports the prevention or reduction of excessive expenditures. In this study, natural and geological factors, technological factors, production volume, resource prices, transport and logistics conditions, state policy and regulation, management and organisational factors, and environmental factors are assessed as key determinants of costs. These factors constitute the methodological basis for effective cost control. Factor analysis of costs is recognised as a priority method in the scientific literature on management accounting, industrial economics, and cost management [3, 4].

LITERATURE REVIEW

According to Horngren et al. (2021), cost management is the process of measuring, analysing, and reporting financial and non-financial information that helps managers make informed decisions aimed at achieving organisational objectives. The authors emphasise that the primary purpose of cost management is not merely to reduce costs, but to ensure the efficient use of resources in order to maximise value creation.

Kaplan and Cooper (1998) argue that traditional cost accounting systems often fail to provide sufficiently accurate information for managerial decision-making in complex production environments. They proposed the Activity-Based Costing (ABC) approach, which enables organisations to identify the real drivers of costs and improve resource allocation. Their research demonstrates that strategic cost management contributes significantly to enhancing operational efficiency and competitive advantage.

Drury (2018) considers cost management to be an integral part of management accounting that supports planning, control, and performance evaluation processes. According to the author, cost information plays a vital role in strategic and operational decision-making, particularly in industries characterised by high production costs and resource intensity.

RESEARCH METHODOLOGY

In the oil and gas industry, upstream, midstream, and downstream represent the three main segments of the value chain, covering the process from crude oil exploration to the delivery of finished products to consumers [6]. The upstream segment involves the exploration and extraction of crude oil and natural gas, while the midstream segment includes the transportation and storage of these resources. The downstream segment is related to the processing of crude oil and natural gas into usable products for consumers.

Understanding these segments is essential for analysing operational processes, assessing the economic performance of enterprises, and improving decision-making in the energy industry. In this study, the value chain approach is used as a methodological basis for examining cost formation and identifying the key factors influencing material costs in oil and gas enterprises (Table 1).

Table 1

Factors affecting the formation of costs at the enterprises of Uzbekneftegaz JSC¹

Cost Formation Factor	Description of Impact	Cost Category Affected	Impact on Material Costs	Impact Level
Geological and Reservoir Conditions	Reservoir depth, pressure, permeability, and hydrocarbon composition determine extraction complexity	Upstream production costs	Increases consumption of drilling materials, chemicals, casing pipes, and spare parts	High
Drilling Technology and Well Complexity	Horizontal drilling, multilateral wells, and enhanced recovery methods require additional resources	Exploration and production costs	Raises costs of drilling fluids, cement, tubing, and equipment maintenance	High
Material Resource Prices	Fluctuations in prices of steel, pipes, chemicals, fuel, and imported equipment	Material procurement costs	Directly affects unit cost of production inputs	High
Production Volume and Capacity Utilization	Higher utilization spreads fixed costs over larger output volumes	Production costs	Reduces material cost per unit of output through economies of scale	Medium-High
Transportation and Logistics Conditions	Distance between fields, processing facilities, and consumers	Midstream costs	Increases fuel, maintenance, and transportation material costs	Medium
Energy Consumption	Consumption of electricity, gas, and fuel in extraction and processing operations	Operating costs	Influences indirect material and auxiliary resource consumption	High
Equipment Condition and Depreciation	Aging equipment causes higher material losses and maintenance requirements	Maintenance costs	Increases spare parts, lubricants, and repair materials consumption	High

¹ author's development

Supply Chain Efficiency	Procurement planning, inventory management, and supplier reliability	Procurement and storage costs	Affects inventory holding costs and material losses	Medium-High
Regulatory and Environmental Requirements	Environmental standards, safety regulations, and compliance obligations	Compliance costs	Requires additional chemicals, protective materials, and waste-treatment resources	Medium
Technological Losses and Waste	Material losses during extraction, transportation, and processing	Production costs	Directly increases material consumption per unit of output	High
Exchange Rate Fluctuations	Dependence on imported equipment and materials	Procurement costs	Raises costs of imported materials and technologies	Medium-High
Digitalization and Cost Management Systems	ERP, cost monitoring, and digital supply-chain management	Management costs	Improves material usage efficiency and reduces waste	Medium

Economic and financial analysis is essential for assessing the feasibility and profitability of oil and gas projects across upstream, midstream, and downstream operations. In the upstream segment, the analysis focuses on high-risk and capital-intensive activities, such as exploration and production. In this segment, project viability is evaluated using reservoir estimates, production forecasts, oil price scenarios, break-even analysis, and discounted cash flow techniques, including net present value (NPV) and internal rate of return (IRR), while taking into account fiscal terms and price volatility.

In the midstream segment, the analysis emphasises the economics of transportation and storage. Financial evaluation is centred on throughput capacity, tariff structures, capital recovery, and stable cash flows generated through long-term fee-based contracts. Therefore, debt financing and cash flow stability are key considerations in this segment.

In the downstream segment, economic and financial analysis focuses on refining and marketing margins, demand forecasting, cost optimisation, and working capital management. Profitability in this segment is mainly driven by refining spreads, market conditions, and regulatory compliance.

Overall, these analyses support informed investment decision-making, effective risk management, and strategic planning across the oil and gas value chain (Figure 1).

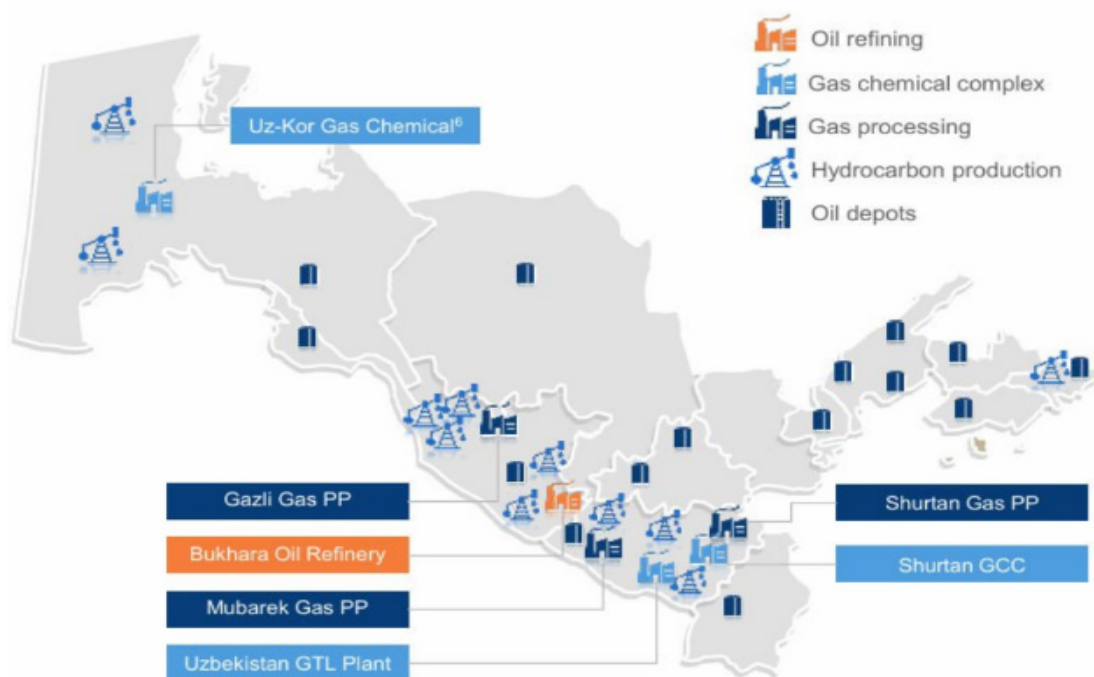


Figure 1. Geographical presence of Uzbekneftgaz JSC's enterprises in Republic of Uzbekistan²

² author's development

RESULTS AND ANALYSIS

The analysis revealed that the oil and gas industry is characterised by a complex, multi-stage production structure that requires the application of various cost accounting methods depending on technological and organisational conditions. The study showed that traditional cost accounting methods remain effective in production processes with standardised outputs, particularly in distillation, cracking, reforming, and finished product manufacturing units. In these production segments, the homogeneous nature of output enables the accurate allocation of costs to individual units of production, thereby facilitating cost control and performance evaluation.

Furthermore, the research confirmed that traditional costing methods continue to play an important role in auxiliary production activities, including repair and mechanical workshops, transportation services, warehousing operations, and administrative departments. Their continued use can be explained by their simplicity, methodological consistency, and compatibility with existing accounting systems.

The factor analysis of material costs demonstrated that material expenditures in oil and gas enterprises are influenced by a combination of internal and external determinants. The assessment identified eight major groups of factors affecting material costs: natural and geological conditions, technological factors, production volume, resource prices, transportation and logistics costs, government regulation, management and organisational factors, and environmental requirements (Figure 2).

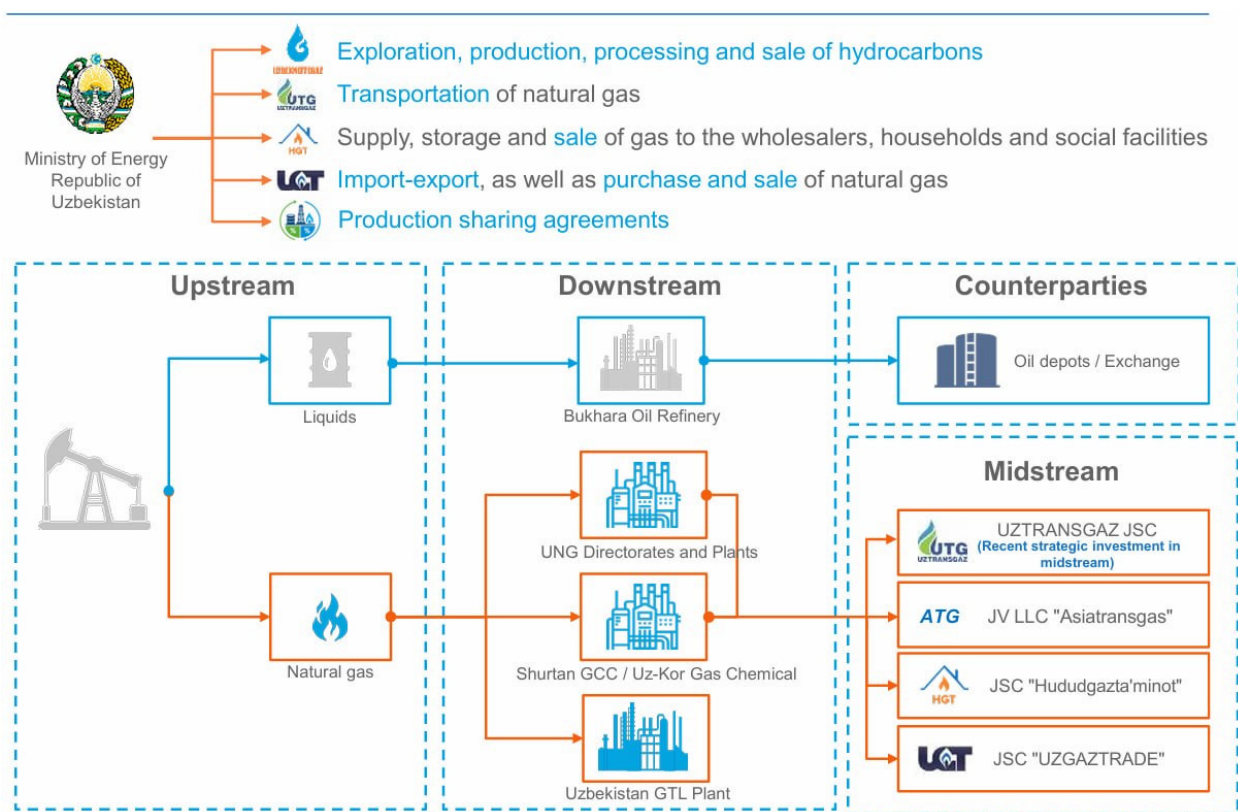


Figure 2. Activities of Uzbekneftgaz JSC enterprises according to upstream, midstream and downstream segments³

The results indicate that natural and geological factors exert the strongest influence during the exploration and extraction stages, where reservoir characteristics, deposit depth, and geological complexity directly affect the consumption of materials and production inputs. Technological factors were found to be significant across all stages of the value chain, as modern extraction, processing, and transportation technologies contribute to reducing material consumption and increasing resource efficiency.

³ Prepared by the author based on research findings.

The analysis also revealed a positive relationship between production volume and material cost efficiency. As production scale increases, fixed material-related expenditures are distributed across a larger output volume, leading to lower unit costs. However, fluctuations in resource prices and transportation expenses were identified as major external risks that may significantly increase production costs and reduce enterprise profitability.

State policy and regulatory requirements, including taxation, environmental standards, and energy pricing mechanisms, were found to influence material cost formation indirectly through compliance costs and operational adjustments. At the same time, effective management practices, inventory control systems, procurement strategies, and organisational coordination were shown to reduce material waste and improve resource utilisation [7].

Based on the obtained results, it can be concluded that factor analysis serves as an effective methodological tool for identifying the sources of material cost fluctuations and evaluating their impact on production costs. The findings support the view widely accepted in the management accounting and cost management literature that systematic factor analysis enhances managerial decision-making, strengthens cost control mechanisms, and contributes to the sustainable development and competitiveness of oil and gas enterprises.

CONCLUSION AND RECOMMENDATIONS

The study confirms that the oil and gas industry requires a comprehensive approach to cost accounting due to its multi-stage production processes, technological complexity, and resource-intensive operations. The findings demonstrate that traditional cost accounting methods continue to be effective in standardised production processes and supporting activities, as they provide reliable information for operational control and managerial decision-making.

The research results indicate that material costs are influenced by a wide range of interconnected factors, including natural and geological conditions, technological characteristics, production volume, resource prices, transport and logistics expenses, government regulation, management practices, and environmental requirements. Among these factors, natural and geological, technological, and managerial factors have the most significant impact on the formation and dynamics of material costs in oil and gas enterprises.

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