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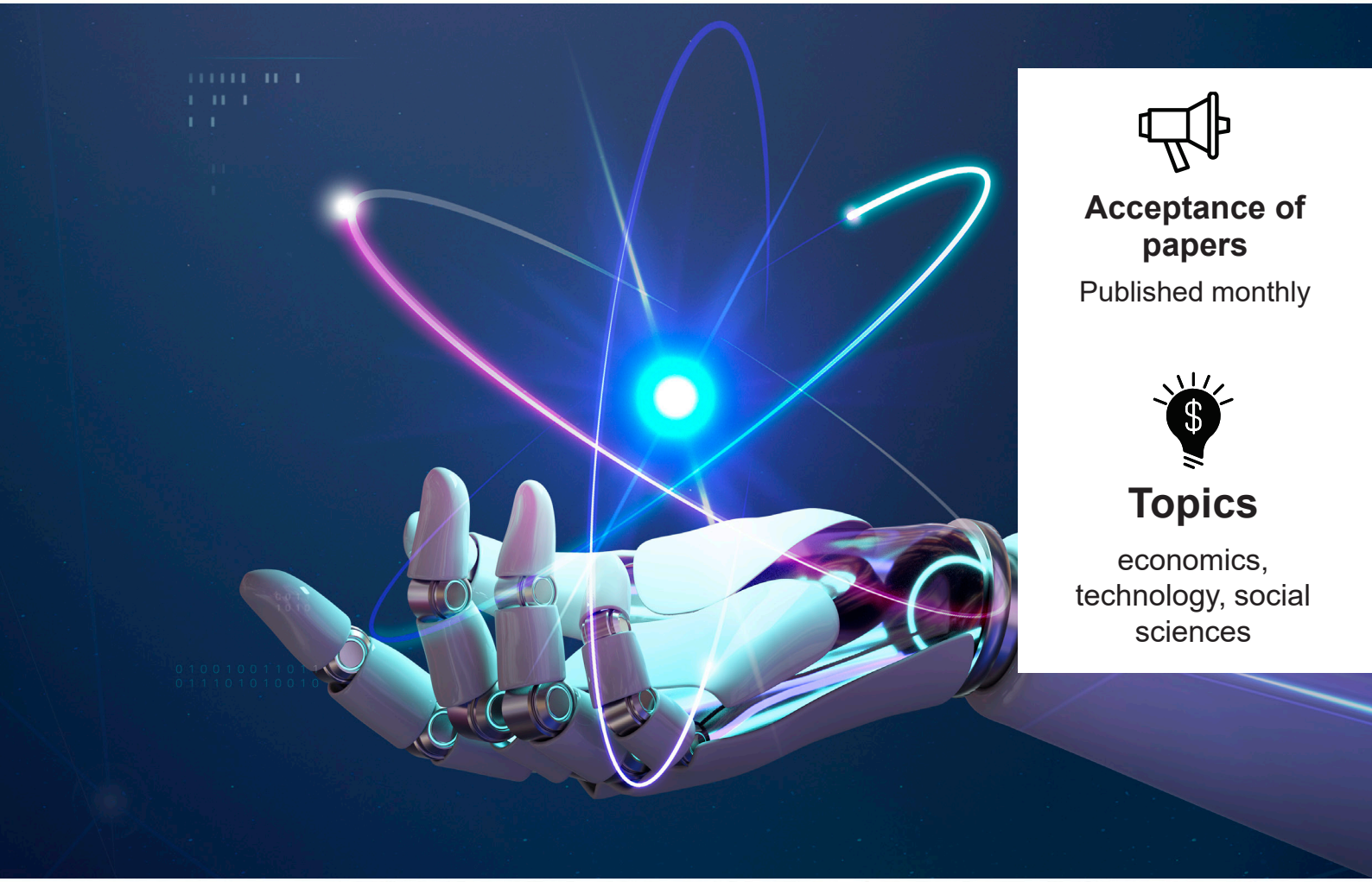

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MODERN SYSTEMS OF PRODUCT COST CALCULATION: METHODOLOGICAL FOUNDATIONS AND DIRECTIONS OF PRACTICAL TRANSFORMATION

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Abstract: This article examines modern product costing systems, their methodological foundations, and directions for practical transformation. The study explores both traditional costing methods and advanced approaches such as Activity-Based Costing (ABC), target costing, and life-cycle costing. The role of digital transformation, ERP systems, and analytical tools in improving cost management efficiency is substantiated. The findings demonstrate that modern costing systems serve as a strategic instrument for ensuring financial stability and enhancing enterprise competitiveness.

Key words: product cost, costing systems, Activity-Based Costing, target costing, life-cycle costing, management accounting, digital transformation, cost analysis.

INTRODUCTION

In the increasingly competitive global economic environment, the stability and financial performance of enterprises largely depend on the correct formation and effective management of product cost. The volatility of market conditions, fluctuations in the prices of raw materials and energy resources, rising logistics expenses, and the increasing complexity of production processes under the influence of digital technologies require new approaches to cost calculation methods. Traditional costing systems often fail to ensure sufficient accuracy in the allocation of indirect costs, which negatively affects the effectiveness of managerial decision-making.

Modern management accounting concepts, including Activity-Based Costing, Target Costing, Life-Cycle Costing, as well as costing mechanisms integrated with “just-in-time” systems and digital ERP platforms, are fundamentally transforming the methodological foundations of cost calculation. These systems enable deep cost segmentation, value chain analysis, and provide greater accuracy in strategic decision-making.

The relevance of this topic lies in the fact that processes such as the modernization of industry, the improvement of production efficiency, and the expansion of export-oriented products in the economy of Uzbekistan require the enhancement of cost management mechanisms. In particular, in the context of digital transformation, opportunities are expanding for integrating production and financial data, monitoring costs in real time, and forecasting based on analytical models. This strengthens the need for the practical implementation of modern costing systems from a methodological perspective.

From this standpoint, the theoretical and methodological analysis of modern product costing systems, the identification of their directions of practical transformation, and their adaptation to the activities of national enterprises acquire both scientific and practical significance. This article is devoted to a comprehensive analysis of these issues.

REVIEW OF LITERATURE ON THE SUBJECT

Issues related to product cost calculation and cost management represent one of the key directions in the theory of management accounting. The foundations of the standard costing system and the normative approach have been widely covered in national economic literature. In particular, M. A. Rasulov reveals the theoretical essence of the standard costing system and substantiates the mechanisms for identifying variances and applying them in managerial decision-making [1]. Z. E. Karimova analyzes the development of a normative cost management system within enterprises and its relationship with production efficiency [2]. T. K. Yo'ldoshev examines the methodological aspects of variance analysis in accounting and management accounting, demonstrating the practical importance of identifying differences between planned and actual indicators [3]. N. S. Qurbonova develops the theoretical and methodological foundations of cost analysis based on the normative approach and emphasizes the need to improve control and evaluation mechanisms [4]. B. Sh. Tursunov reveals the relationship between standard costs and efficiency indicators and proposes a systematic approach to evaluating enterprise performance [5].

Within the framework of management accounting, the role of cost indicators in the process of operational and strategic decision-making is widely recognized. A. X. Pardayev, Z. A. Pardayeva, and Sh. A. Pardayeva develop the concepts of operational and strategic management accounting and present a comprehensive model for planning and controlling costs [6]. In addition, A. X. Pardayev and Z. A. Pardayeva conduct an in-depth analysis of the theoretical and practical foundations of management accounting and substantiate the impact of product cost calculation on management efficiency [7].

In foreign literature, the Activity-Based Costing (ABC) system is recognized as an innovative model for the accurate allocation of costs. Peter B. B. Turney evaluates the ABC system as a tool for improving efficiency and highlights the advantages of cost allocation based on cost drivers [8]. Gary Cokins analyzes the practical application of the ABC method and interprets it as an instrument for optimizing managerial decision-making [9]. Jane-Claude Nana explains the role of the ABC method in strategic management and substantiates it as a tool for increasing enterprise value [10]. In studies edited by Christopher Jackiw, mechanisms for integrating the ABC system with the SAP platform are presented, highlighting practical aspects of automating costing systems in the digital environment [11].

Overall, the analysis of national and international literature demonstrates that normative, standard, and activity-based approaches to product cost calculation collectively form the methodological foundation of modern management systems.

RESEARCH METHODOLOGY

In this study, both primary and secondary data sources were used to examine modern systems of product cost calculation. Secondary data included national and international scientific literature, international standards, financial reports, and internal management accounting data of enterprises. Primary data were collected through surveys and semi-structured interviews conducted in selected manufacturing enterprises. Based on empirical data, the structure of costs, mechanisms for allocating indirect costs, and the practical application of modern costing systems were analyzed. The collected data were processed using economic-statistical methods, comparative analysis, time-series analysis, and correlation assessment techniques, allowing the efficiency of traditional and modern costing systems to be compared. In addition, methodological directions of transformation were generalized using a systemic approach, and practical conclusions were formulated.

ANALYSIS AND RESULTS

Product cost calculation systems represent a central element of the internal management mechanism of an enterprise. Cost is not only the total of production expenses but also an important indicator determining strategic decisions, pricing policy, profit margins, investment planning, and the level of competitiveness. Therefore, under modern conditions, the need arises to reconsider the methodology for forming product cost.

Traditional costing systems are usually based on full costing (absorption costing) or variable costing methods. In these systems, direct costs are assigned directly to products, while indirect costs are allocated relative to a specific base (for example, labor hours, machine hours, or production volume). However, under modern production conditions, the share of indirect costs has been increasing significantly. Automation, digital infrastructure, logistics, and administrative expenses are becoming more dominant compared with traditional production factors. As a result, simplified allocation bases may inaccurately reflect product cost, leading to situations where some types of products appear excessively expensive or undervalued.

In order to address this issue, the Activity-Based Costing (ABC) system was developed. This approach assigns costs first to activities rather than directly to products and then allocates them to products based on

the resource consumption of each activity. The ABC system enables more accurate identification of indirect costs because calculations are performed based on cost drivers. For example, the number of setup operations, order volumes, or quality control processes may have a real impact on cost formation. In this way, product cost becomes closer to the actual consumption of resources.

The advantage of the ABC system lies in its ability to conduct deep analysis along the value chain. It becomes clear which activities create value and which generate excessive costs. As a result, the enterprise gains the opportunity to optimize processes, reduce inefficient operations, and develop a strategy for cost management. However, the implementation of the ABC system requires a high level of data accuracy, integration of information systems, and a developed management culture.

Along with the theoretical foundations of modern costing systems, it is also important to visually represent the mechanism of their practical application. In particular, within the activity-based costing approach, the cost management process is implemented through sequential stages, and presenting these stages systematically helps to more clearly reveal the methodological essence. The following figure illustrates the main stages of the cost management process using the ABC method (Figure 1).

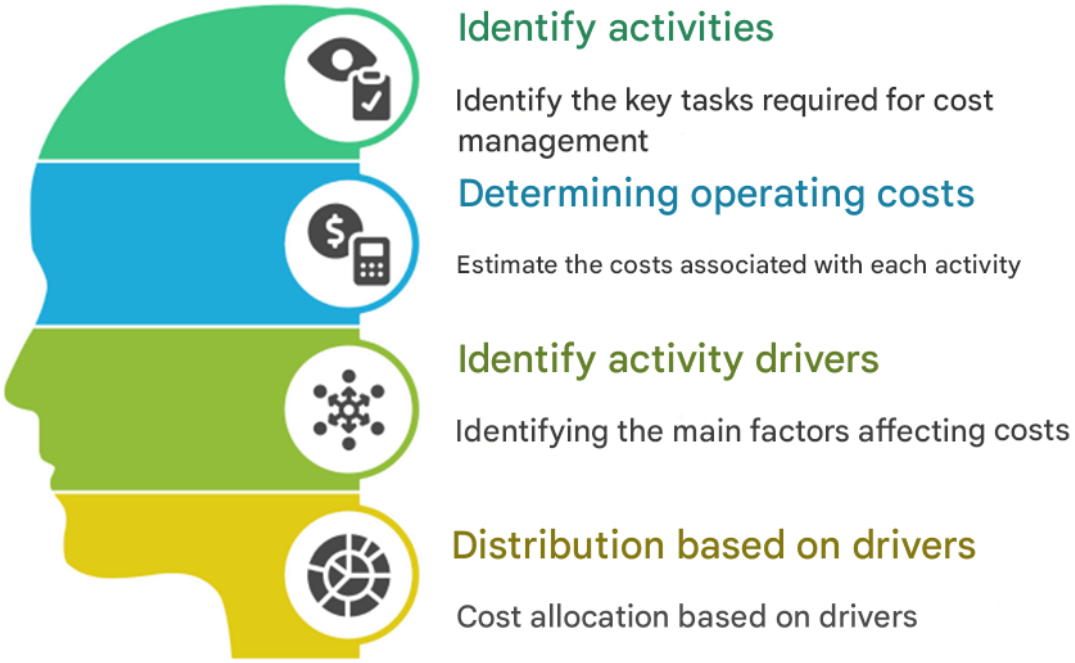

Figure 1. Cost Management Process Using the ABC Method[1] [12]

Figure 1 illustrates the step-by-step process of cost management using the ABC (Activity-Based Costing) method. The diagram consists of four main elements: identifying activities, determining activity costs, identifying activity drivers, and allocating costs based on these drivers. In the first stage, the main processes that generate costs are identified. In the second stage, the consumption of resources associated with each activity is evaluated. In the third stage, the factors influencing costs—namely cost drivers—are determined. In the final stage, costs are allocated to products or services based on these drivers. This approach makes it possible to calculate indirect costs more accurately, reduce misallocation, and increase the validity of managerial decisions.

In the context of Uzbekistan, the implementation of the ABC system may be carried out through the following stages:

- Identifying activities and forming cost centers;
- Introducing ABC modules into existing enterprise information systems (1C, ERP, Moliya.uz);
- Organizing training courses and practical seminars for specialists;
- Testing the system across sectors through pilot projects.

Compared with traditional costing methods, the ABC system ensures greater accuracy, an analytical approach, managerial flexibility, and evidence-based decision-making. Through the full implementation of this system, enterprises in Uzbekistan can increase cost efficiency, optimize product cost, and strengthen competitiveness in the global market.

1 Source: Author's elaboration based on international sources

Another modern costing system is the Target Costing concept. This approach begins with the market price, subtracts the acceptable level of profit, and defines the remaining amount as the maximum allowable cost. In this case, cost is formed not from internal calculations but from market demand and competitive conditions. This system is widely applied in the production of innovative products, particularly in highly competitive industries. The target costing method encourages enterprises to optimize costs and consider economic efficiency starting from the product design stage.

Life-Cycle Costing, in turn, encompasses the costs arising throughout the entire life cycle of a product. In traditional systems, attention is often focused mainly on production-stage costs, while expenses related to research, design, marketing, service, and disposal receive less consideration. The life-cycle approach enables a comprehensive assessment of the overall economic efficiency of a product. This is especially important in capital-intensive industrial sectors.

Digital transformation processes are significantly influencing the methodological foundations of costing systems. Through ERP, MRP, and BI systems, costs can be monitored in real time, automatic calculations can be performed, and analytical reports can be generated. Big Data and artificial intelligence technologies further enhance the accuracy of cost forecasting. For example, costs can be modeled in advance based on indicators such as production capacity utilization rates, energy consumption dynamics, and the efficiency of logistics chains.

Another important aspect of modern costing systems is their integration with strategic management. Cost is no longer viewed merely as an accounting indicator but as a tool for strategic decision-making. Within the framework of the Value-Based Management concept, cost is assessed in close connection with capital profitability, investment efficiency, and competitive advantage. In addition, “Lean production” and “Just-in-time” systems contribute to reducing cost by minimizing inventories and eliminating excessive expenses.

In the process of practical transformation, it is advisable for enterprises to apply a multi-stage approach. At the first stage, the existing costing system is diagnosed and the structure of costs is analyzed. At the second stage, elements of modern systems are gradually introduced. At the third stage, mechanisms of digital integration and automation are strengthened. In this process, improving employees’ qualifications and enhancing corporate governance culture become important factors (Table 1).

Table 1. Comparative Characteristics of Product Cost Calculation Systems [13]

Costing System	Main Principle	Advantages	Limitations
Traditional full costing	Allocation of costs based on production volume	Simplicity of calculation, widely used in practice	Indirect costs are allocated inaccurately
Variable costing	Accounting only for variable costs	Convenient for short-term decisions	Does not reflect the full cost structure
ABC (Activity-Based Costing)	Allocation based on activities and cost drivers	High accuracy, reflects resource utilization	Complex implementation and requires detailed data
Target costing	Determining cost based on market price	Increases competitiveness	Depends on the accuracy of market forecasts
Life-cycle costing	Accounting for costs throughout the product’s entire life cycle	Enables long-term strategic analysis	Complex calculation process

The table above presents the methodological differences of product costing systems and their practical characteristics in a comparative form. As shown in the table, traditional full costing and variable costing systems are distinguished by their simplicity of calculation; however, under modern production conditions they cannot fully ensure the accurate allocation of indirect costs. The ABC system, by allocating costs based on activities and drivers, provides higher accuracy and enables a deeper analysis of resource utilization efficiency. The target costing method enhances adaptability to market demand and competitive environments, while life-cycle costing allows a comprehensive assessment of the long-term economic efficiency of a product. Overall, the table demonstrates that modern costing systems are more aligned with the needs of strategic management.

In the conditions of the national economy, the introduction of modern costing systems is directly related to industrial modernization and the expansion of export potential. In order to produce competitive products, it is necessary to calculate costs accurately, identify excessive expenditures, and use resources efficiently. In particular, the development of simplified but precise costing models for small and medium-sized enterprises represents an urgent task.

CONCLUSIONS AND SUGGESTIONS

Modern product costing systems are emerging as important instruments that ensure the strategic effectiveness of enterprise management. The results of the study show that traditional costing methods cannot provide sufficient accuracy in modern production conditions due to the growing share of indirect costs and the increasing complexity of processes. In contrast, Activity-Based Costing (ABC), target costing, life-cycle costing, and models integrated with digital ERP systems allow for deep cost segmentation, improved resource utilization efficiency, and well-founded managerial decision-making.

In the context of digital transformation, cost management systems are increasingly integrated with real-time monitoring, analytical forecasting, and strategic planning. This contributes to strengthening the financial stability and competitiveness of enterprises. From this perspective, the following recommendations are proposed for further development of the field:

1. Gradually introduce modern costing systems in enterprises and adapt them to the conditions of the national economy.
2. Develop methodological guidelines for the wider application of ABC and target costing methodologies in industrial sectors.
3. Implement automated cost monitoring and real-time analysis mechanisms through ERP and BI systems.
4. Improve the qualifications of management accounting specialists and develop their digital competencies.
5. Develop simplified but highly accurate costing models for small and medium-sized enterprises.
6. Integrate cost analysis with strategic planning and value chain management.

The implementation of these recommendations will contribute to improving the methodological foundations of product cost formation, ensuring the efficient use of resources, and strengthening the long-term performance of enterprises.

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