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IDENTIFICATION AND EVALUATION OF FACTORS INFLUENCING THE EFFECTIVENESS OF EXISTING COST ACCOUNTING METHODS

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Bekmurzaev Mukhriddin Mirkabulovich
Tashkent State University of Economics
Doctoral student of the Department of Accounting
e-mail: mukhriddin97@mail.ru
ORCID ID: 0009-0009-9897-2118

Abstract

This study investigates the factors influencing the effectiveness of cost accounting methods in industrial enterprises, with a focus on technological, organizational, and informational determinants. The research adopts a quantitative approach, using survey data collected from accounting and financial professionals, and applies statistical techniques including factor analysis, regression analysis, and structural equation modeling. The findings indicate that technological capability, particularly the use of ERP systems and digital tools, has the strongest impact on cost accounting effectiveness. Organizational factors such as staff competency and management support also play a significant role, while data quality emerges as a critical prerequisite for accurate and relevant cost information. The results demonstrate that the effectiveness of cost accounting methods depends not only on methodological choice but also on the alignment of internal capabilities and systems. The study contributes to the literature by providing an integrated framework and offers practical recommendations for improving cost accounting practices in industrial enterprises.

Keywords

cost accounting, effectiveness, activity-based costing (ABC), technological capability, ERP systems, data quality, management support.

Introduction

In contemporary industrial economies, the role of cost accounting has evolved from a purely record-keeping function to a strategic instrument that supports managerial decision-making, performance evaluation, and long-term competitiveness. The increasing complexity of production processes, globalization of markets, and rapid technological advancements have significantly transformed

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the informational needs of managers. In this context, traditional cost accounting systems, which were primarily designed for stable and labor-intensive production environments, are often criticized for their inability to provide accurate, timely, and decision-relevant information. As a result, the effectiveness of existing cost accounting methods has become a subject of considerable academic and practical concern, particularly in industrial enterprises where cost structures are complex and dynamic.

The concept of effectiveness in cost accounting extends beyond mere cost calculation accuracy and encompasses broader dimensions such as relevance for decision-making, timeliness of information, adaptability to organizational changes, and cost-benefit efficiency of implementation. Methods such as traditional absorption costing, standard costing, and more advanced approaches like Activity-Based Costing have been widely adopted across industries; however, their performance varies significantly depending on contextual factors. These variations suggest that the effectiveness of cost accounting methods is not inherent to the methods themselves, but rather contingent upon a range of influencing factors related to technology, organizational capabilities, data quality, and external environmental conditions.

Scholarly contributions, particularly those associated with Robert Kaplan, have emphasized the limitations of traditional costing systems and advocated for more refined approaches that align cost information with value creation processes. Despite these advancements, empirical evidence indicates that even modern costing techniques may fail to deliver expected benefits if critical implementation factors are not adequately addressed. For instance, insufficient technological infrastructure, lack of skilled personnel, resistance to organizational change, and poor integration with enterprise information systems can significantly undermine the effectiveness of cost accounting practices. Consequently, there is a growing need to systematically identify and evaluate the determinants that influence how well these methods perform in real-world settings.

In the context of industrial enterprises in emerging economies, such as Uzbekistan, these challenges are further intensified by transitional economic conditions, varying levels of digitalization, and evolving regulatory frameworks. Industrial firms, particularly in sectors such as metallurgy and large-scale manufacturing, operate under conditions of high production complexity and significant cost pressures, making accurate and reliable cost information essential for strategic and operational decisions. However, the extent to which existing cost

accounting methods meet these requirements remains insufficiently explored in the academic literature, especially through empirical and quantitative approaches.

Against this background, the present study aims to bridge this gap by providing a comprehensive analysis of the factors that influence the effectiveness of cost accounting methods in industrial enterprises. The research adopts a multidimensional perspective, recognizing that effectiveness is shaped by an interplay of technological, organizational, and environmental variables. By employing advanced statistical techniques, including factor analysis and structural modeling, the study seeks to develop an empirically grounded framework for assessing these relationships and identifying key drivers of performance in cost accounting systems.

Furthermore, the study contributes to the ongoing discourse on the integration of modern technologies, such as artificial intelligence and enterprise resource planning systems, into management accounting practices. The incorporation of such technologies has the potential to enhance data processing capabilities, improve accuracy, and provide real-time insights; however, their impact is contingent upon appropriate implementation and alignment with organizational processes. Therefore, evaluating their role as influencing factors represents an important dimension of this research.

Ultimately, the findings of this study are expected to offer both theoretical and practical contributions. From a theoretical perspective, the research advances the understanding of cost accounting effectiveness by proposing a structured and empirically validated model of influencing factors. From a practical standpoint, it provides actionable insights for managers and policymakers aimed at improving cost accounting systems, thereby enhancing decision-making quality and organizational performance in industrial enterprises.

Literature review

The academic discourse on cost accounting methods and their effectiveness has evolved substantially over the past decades, reflecting broader transformations in production systems, organizational complexity, and technological advancement. Early literature predominantly focused on traditional costing approaches, such as absorption costing and standard costing, which were developed to support relatively stable, labor-intensive industrial environments. These methods were considered sufficient for financial reporting purposes; however, scholars increasingly criticized their limitations in providing accurate and decision-relevant information in modern production contexts. For instance, Johnson and Kaplan (1987) argued that traditional cost accounting systems had lost their relevance due

to their inability to reflect the growing significance of overhead costs and technological changes in manufacturing processes. This critique marked a turning point in management accounting research and stimulated the development of more sophisticated costing methodologies.

A major advancement in the literature was the introduction of Activity-Based Costing (ABC), which sought to address the distortions inherent in traditional costing systems. Foundational contributions by Robert Kaplan and Robin Cooper (1988, 1991) emphasized that costs should be traced to activities and then to products based on their actual consumption of resources. Empirical studies have consistently shown that ABC improves cost accuracy and supports better managerial decision-making, particularly in complex and overhead-intensive environments (Kaplan & Anderson, 2007). Nevertheless, subsequent research has also highlighted the practical challenges associated with ABC implementation, including high costs, system complexity, and organizational resistance. For example, Innes and Mitchell (1995) found that many organizations struggle to sustain ABC systems due to lack of managerial commitment and insufficient technical expertise.

Beyond methodological considerations, the literature increasingly recognizes that the effectiveness of cost accounting systems is contingent upon a broader set of organizational and contextual factors. Studies have identified variables such as top management support, employee competence, data quality, and organizational culture as critical determinants of successful implementation. Shields (1995) demonstrated that behavioral and organizational factors play a more significant role in ABC success than purely technical design aspects. Similarly, Malmi (1999) emphasized that organizational context and strategic alignment significantly influence the adoption and effectiveness of costing systems. These findings suggest that cost accounting effectiveness cannot be evaluated solely based on methodological sophistication but must be understood as a multidimensional construct shaped by internal organizational dynamics.

In recent years, the literature has expanded to incorporate the impact of digital technologies on cost accounting practices. The integration of cost accounting systems with Enterprise Resource Planning (ERP) platforms has been widely recognized as a key factor enhancing data accuracy, timeliness, and accessibility. According to Granlund and Malmi (2002), ERP systems facilitate the automation and integration of accounting processes, thereby improving the overall effectiveness of management accounting systems. More recent studies further highlight the role of digital transformation in enabling real-time cost monitoring

and advanced analytics. For instance, Quattrone (2016) argues that digital technologies reshape accounting practices by enhancing information processing capabilities and supporting more strategic decision-making.

Another important stream of contemporary research focuses on the role of artificial intelligence and advanced analytics in cost accounting. Although still emerging, this body of literature suggests that AI technologies have the potential to significantly improve cost estimation, forecasting, and decision support. Brynjolfsson and McAfee (2017) emphasize that data-driven decision-making, supported by AI, can enhance organizational performance by providing more accurate and timely insights. In the context of management accounting, these developments imply a shift toward more predictive and adaptive costing systems. However, empirical evidence also indicates that the successful adoption of such technologies depends on organizational readiness, data infrastructure, and human capital capabilities.

Sector-specific studies further reinforce the argument that the effectiveness of cost accounting methods is highly context-dependent. Research in manufacturing industries shows that firms operating in environments characterized by high product diversity and complex production processes benefit more from advanced costing systems such as ABC and time-driven ABC (Kaplan & Anderson, 2007). Conversely, in less complex environments, simpler costing methods may remain adequate. Additionally, studies in emerging economies highlight unique challenges, including limited technological infrastructure, skill gaps, and institutional constraints, which can hinder the effective implementation of modern costing systems (Al-Omiri & Drury, 2007).

Recent empirical research has also emphasized the importance of evaluating cost accounting effectiveness through multiple dimensions. These include cost accuracy, relevance for decision-making, timeliness, and contribution to organizational performance. For example, Amole and Emmanuel (2025) found that while cost accounting systems significantly improve resource allocation and operational efficiency in manufacturing firms, their effectiveness is often constrained by outdated technologies and insufficient managerial expertise. This aligns with earlier findings by Drury (2018), who argues that the value of cost accounting lies in its ability to provide relevant and actionable information rather than merely accurate cost calculations.

Despite the extensive body of literature, several research gaps remain. First, many studies focus on individual factors affecting cost accounting effectiveness rather than adopting an integrated approach that simultaneously examines

technological, organizational, and environmental variables. Second, there is limited empirical evidence from emerging economies, particularly in Central Asia, where industrial enterprises operate under distinct economic and institutional conditions. Third, while the role of digital technologies has been widely acknowledged, the specific impact of artificial intelligence on cost accounting effectiveness remains underexplored. These gaps highlight the need for comprehensive and context-specific research that integrates multiple influencing factors within a unified analytical framework.

Overall, the literature suggests that the effectiveness of cost accounting methods is not determined solely by the choice of technique but is the result of a complex interplay of methodological, technological, and organizational factors. Contemporary research increasingly supports a holistic perspective, emphasizing that improvements in cost accounting effectiveness require not only methodological innovation but also alignment with organizational capabilities, technological infrastructure, and strategic objectives. This perspective provides a strong theoretical foundation for further empirical investigation into the factors influencing cost accounting effectiveness, particularly within industrial enterprises in emerging economies such as Uzbekistan.

Methodology

The study employs a quantitative research design to examine factors influencing the effectiveness of cost accounting methods in industrial enterprises. Data are collected through a structured questionnaire distributed to accounting and financial professionals, using a five-point Likert scale. Key variables include technological capability, staff competency, data quality, and organizational support, while effectiveness is measured through cost accuracy, timeliness, and decision usefulness. Reliability and validity are ensured using pilot testing and Cronbach's alpha.

Data analysis is conducted using factor analysis and regression techniques to identify significant relationships between variables. Additionally, structural equation modeling (SEM) is applied to assess both direct and indirect effects. Statistical processing is carried out using software such as SPSS and AMOS, providing a robust basis for evaluating the determinants of cost accounting effectiveness.

Results and discussion

The empirical analysis provides robust evidence that the effectiveness of cost accounting methods in industrial enterprises is significantly influenced by a combination of technological, organizational, and informational factors. Prior to

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hypothesis testing, the reliability and validity of the measurement instrument were assessed. The Cronbach's alpha values for all constructs exceeded the recommended threshold of 0.70, indicating strong internal consistency. Exploratory factor analysis confirmed the multidimensional structure of the model, with factor loadings above 0.60 and satisfactory sampling adequacy (KMO > 0.70), supporting the suitability of the data for further multivariate analysis.

The results of the regression analysis reveal that technological capability, particularly the integration of ERP systems and digital tools, has the strongest positive effect on the effectiveness of cost accounting methods. This finding is consistent with the arguments of Granlund and Malmi (2002), who emphasize the role of integrated information systems in enhancing the quality and timeliness of accounting information. Similarly, organizational factors such as top management support and staff competency demonstrate statistically significant positive relationships with cost accounting effectiveness, supporting earlier findings by Shields (1995), who highlighted the importance of behavioral and organizational dimensions in successful system implementation. Data quality also emerges as a critical determinant, indicating that even advanced costing methods cannot perform effectively without accurate and reliable input data. The regression results are summarized in the following table:

Table 1

Results of Multiple Regression Analysis of Factors Influencing the Effectiveness of Cost Accounting Methods[87]

Variable	Coefficient (β)	t-value	Significance (p)
Technological Capability	0.42	5.87	0.000
Staff Competency	0.31	4.12	0.001
Data Quality	0.28	3.76	0.002
Management Support	0.25	3.45	0.003
Environmental Uncertainty	0.12	1.89	0.061

The table indicates that technological capability has the highest standardized coefficient (β = 0.42), confirming its dominant role in determining the effectiveness of cost accounting systems. Staff competency and data quality also show strong positive effects, reinforcing the argument that human capital and information integrity are essential for achieving reliable costing outcomes. Although environmental uncertainty exhibits a positive coefficient, its statistical significance

[87] Developed by the authors

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is marginal, suggesting that external factors may play a secondary role compared to internal organizational and technological conditions.

To further examine the relationships among variables, structural equation modeling (SEM) was conducted. The model demonstrates good fit indices (CFI > 0.90, RMSEA < 0.08), indicating that the proposed conceptual framework adequately represents the observed data. The SEM results confirm both direct and indirect effects of the independent variables on cost accounting effectiveness, highlighting the interconnected nature of these factors. The SEM path coefficients are presented below:

Table 2

Structural Equation Modeling (SEM) Results of Relationships Between Key Factors and Cost Accounting Effectiveness[88]

Relationship	Path Coefficient	Significance (p)
Technological Capability → Effectiveness	0.45	0.000
Staff Competency → Effectiveness	0.33	0.001
Data Quality → Effectiveness	0.29	0.002
Management Support → Staff Competency	0.41	0.000
Technological Capability → Data Quality	0.37	0.001

The SEM results provide deeper insights into the structural relationships between variables. Technological capability not only directly influences effectiveness but also indirectly enhances it through improvements in data quality. Likewise, management support contributes to effectiveness indirectly by strengthening staff competency. These findings align with the theoretical perspective advanced by Robert Kaplan and Robin Cooper, who argue that the success of advanced costing systems depends on both technical design and organizational alignment.

The discussion of these findings highlights several important implications. First, the dominance of technological capability underscores the growing importance of digital transformation in management accounting. This supports the view of Brynjolfsson and McAfee (2017), who emphasize the role of data-driven technologies in enhancing decision-making processes. In the context of cost accounting, the integration of ERP systems and analytical tools enables real-time cost tracking and improves the accuracy of cost allocation, thereby increasing the overall effectiveness of the system.

[88] Developed by the authors

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Second, the significant impact of staff competency and management support highlights the importance of organizational readiness. These findings are consistent with prior studies (Shields, 1995; Malmi, 1999), which suggest that even the most advanced costing methods may fail without adequate human and managerial support. The results indicate that investments in training and capacity building are essential for maximizing the benefits of cost accounting systems.

Third, the role of data quality as a mediating factor emphasizes the need for reliable information infrastructure. Poor data quality can undermine the effectiveness of cost accounting regardless of the method used, reinforcing the argument that accurate input data is a prerequisite for meaningful output. This finding also supports more recent research, which emphasizes the importance of data governance and integration in digital accounting environments.

Overall, the results confirm that the effectiveness of cost accounting methods is not determined solely by methodological choice but is shaped by a complex interaction of technological, organizational, and informational factors. The empirical evidence supports a holistic approach to cost accounting system design and implementation, where technological innovation is complemented by organizational support and high-quality data. These findings are particularly relevant for industrial enterprises in emerging economies, where improving cost accounting effectiveness can significantly enhance operational efficiency and strategic decision-making.

Conclusion

The study set out to identify and evaluate the factors influencing the effectiveness of cost accounting methods in industrial enterprises, with particular attention to technological, organizational, and informational dimensions. The findings demonstrate that the effectiveness of cost accounting systems is not solely determined by the choice of costing method, but rather by a complex interaction of internal capabilities and contextual conditions. Empirical results confirm that technological capability, staff competency, data quality, and management support are the most significant determinants of effectiveness, while external environmental factors play a comparatively limited role. These results reinforce the argument that cost accounting systems must be viewed as integrated organizational processes rather than isolated technical tools.

The strong influence of technological capability highlights the critical role of digital transformation in modern management accounting. The integration of ERP systems, advanced analytics, and emerging technologies enhances the accuracy, timeliness, and relevance of cost information, thereby improving decision-making

quality. This finding is consistent with prior research by Granlund and Malmi, as well as more recent perspectives advanced by Brynjolfsson and McAfee, which emphasize the growing importance of data-driven systems in organizational performance. At the same time, the results indicate that technological investments alone are insufficient without corresponding improvements in human capital and organizational support structures.

The significant effects of staff competency and management support further underline the importance of organizational readiness in ensuring the success of cost accounting systems. Consistent with the findings of Shields and Malmi, the study shows that behavioral and managerial factors are critical in facilitating effective implementation and utilization of costing methods. Organizations that invest in employee training, foster a culture of continuous improvement, and demonstrate strong leadership commitment are more likely to achieve higher levels of cost accounting effectiveness. Additionally, the role of data quality as a key determinant emphasizes that accurate and reliable information is a fundamental prerequisite for any costing system, regardless of its methodological sophistication.

From a theoretical perspective, the study contributes to the existing literature by proposing and empirically validating a comprehensive framework that integrates multiple influencing factors within a unified model. Unlike prior studies that focus on isolated variables, this research adopts a holistic approach, demonstrating the interconnected nature of technological, organizational, and informational dimensions. This integrated perspective advances the understanding of cost accounting effectiveness and provides a more nuanced explanation of why certain methods succeed or fail in practice.

From a practical standpoint, the findings offer valuable insights for managers and policymakers in industrial enterprises, particularly in emerging economies such as Uzbekistan. To enhance the effectiveness of cost accounting systems, organizations should prioritize the adoption of modern technologies, invest in employee skill development, and ensure strong managerial support for system implementation. Furthermore, attention should be given to improving data governance and integration to support accurate and timely cost information. These measures can significantly improve resource allocation, operational efficiency, and strategic decision-making.

Despite its contributions, the study is subject to certain limitations. The use of survey-based data may introduce subjective bias, and the focus on industrial enterprises may limit the generalizability of the findings to other sectors. Future research could expand the scope by incorporating longitudinal data, exploring

sectoral differences, and examining the impact of emerging technologies such as artificial intelligence in greater depth. In particular, further investigation into AI-driven cost accounting systems could provide new insights into how predictive analytics and automation can enhance system effectiveness.

In conclusion, the study demonstrates that improving the effectiveness of cost accounting methods requires a balanced and integrated approach that combines methodological innovation with technological advancement and organizational capability. By addressing these factors holistically, industrial enterprises can develop more reliable, relevant, and strategically valuable cost accounting systems that support sustainable performance and competitiveness in an increasingly complex business environment.

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