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Modern Cost Management Techniques and Future Trends: Literature Review

***Saba Kareem Abbood** [1], **Ghazi Maan Faisal** [2]

[1] (Post-graduate Institute for Accounting and Financial Studies, University of Baghdad, Baghdad, Iraq).
Saba.k@pgiafs.uobaghdad.edu.iq
https://orcid.org/0009-0007-9466-8157

[2] (Post-graduate Institute for Accounting and Financial Studies, University of Baghdad, Baghdad, Iraq).
ghazi.maan@uobaghdad.edu.iq
https://orcid.org/0009-0002-9338-1713

Correspondence*: Post-graduate Institute for Accounting and Financial Studies, University of Baghdad, Iraq. Saba.k@pgiafs.uobaghdad.edu.iq

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Abstract

This study aims to conduct a systematic and analytical review of the most prominent modern Cost Management Techniques (CMTs), including Target Costing (TC), Value Engineering (VE), Kaizen Costing (Kaizen), and Lean Accounting Tools (LATs). It also highlights the role of DT, driven by Artificial Intelligence (AI), Big Data (BD), and the Internet of Things, in improving cost accuracy and enhancing financial performance. The review addresses key future trends, including the integration of ERP systems with predictive analytics, the growing emphasis on sustainability, and the repositioning of the CMT function as a strategic component in decision-making support. The study employed a systematic literature review (SLR) approach spanning the period from 2021 to 2025 (Until April), analyzing 24 studies published in peer-reviewed scientific journals across multiple industrial and service sectors. The results highlight the importance of integrating digital technologies with contemporary costing concepts, thereby enhancing the role of management accountants as strategic partners in achieving efficiency, innovation, and sustainability.

Keywords: Cost Management Techniques, Target Costing, Kaizen Costing, Lean Accounting, Artificial Intelligence, Digital Transformation.

JEL Classification: M41, M11, M15, L23, O33.

1. Introduction

Business environments have undergone significant transformations in recent decades, driven by the accelerating technological revolution, increasing competition, and rising customer expectations. These transformations have weakened the effectiveness of traditional CMT methods, necessitating the adoption of modern techniques that aim to rationalize costs, improve efficiency, and enhance the value provided (Daway et al., 2025). Techniques such as TC, VE, kaizen, and LATs are essential responses to these changes, particularly in a dynamic

business environment that demands swift and reliable decisions. In addition, the digital revolution has led to the emergence of BD analytics and AI tools, enhancing the role of management accountants from an executive function to one that is analytical and strategic. This study aims to review the literature on these modern techniques, highlighting future trends and identifying unexplored research opportunities (Hashim et al., 2024). This study aims to provide a systematic analytical review of the most prominent modern CMTs, highlighting their development, practical applications, and associated challenges in industrial and service environments. It also explores future trends related to DT and the role of management accountants. The study aims to demonstrate how these technologies align with organizations' objectives of achieving operational efficiency, innovation, and sustainability. These technologies are becoming increasingly important in supporting decision-making, improving performance efficiency, and enhancing competitiveness. The study's questions for the literature are as follows:

Q1: *What are the most prominent modern CMTs addressed in the literature during the period 2021-2025 (Until April)?*

Q2: *How does the effectiveness of these techniques differ among the industrial and service sectors?*

Q3: *What is the role of the management accountant in light of the use of these traditional and digital technologies?*

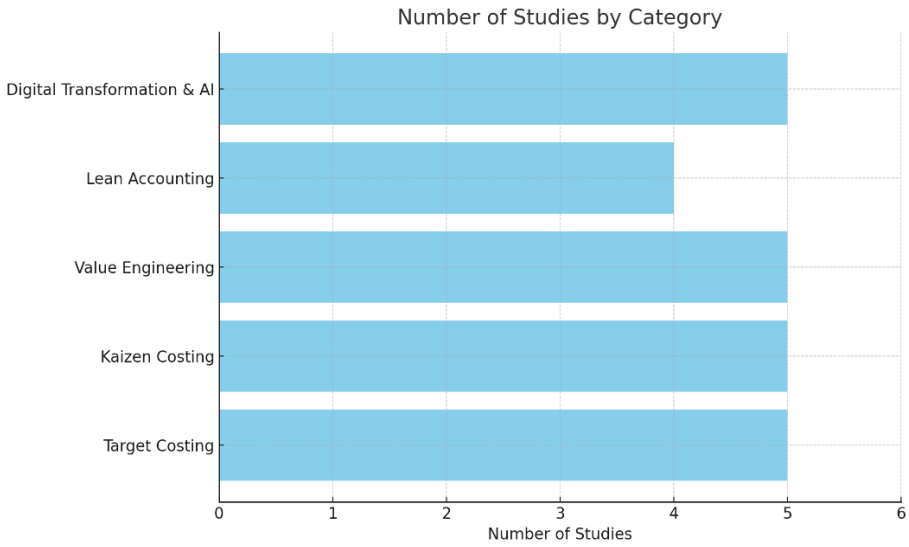
Q4: *What are the challenges facing the implementation of CMTs in Arab and global environments?*

Q5: *What future trends does the literature indicate in the field of sustainable CM?*

2. Literature Review

Illustrates the distribution of academic studies, **Figure 1** on modern CMTs from 2021 to 2025 (Until April), based on a systematic review of the literature. Which were chosen to ensure consistency of techniques when discussing and presenting future dimensions. Studies were categorized by the technique used, with the number of studies that explicitly addressed each technique identified.

This distribution reflects the extent to which research interest has focused on specific approaches over others. TC and AI in CMTs topped the list in terms of the number of studies, while Kaizen, VE, and LATs received close attention.



Source: Prepared by the researchers.

Figure 1: Number of studies on modern CMTs

Academic studies addressing modern CMTs will be presented as follows:

2.1. Target Costing: A study by Al-Zamili (2022) demonstrated that TC, when combined with decomposed analysis, contributes to the implementation of competitive strategies. Amin et al. (2023) also demonstrated that TC contributes to improving efficiency and reducing environmental impact when combined with green considerations. The study by Fauziah et al. (2024) examined the application of TC in Indonesian small and medium-sized enterprises (SMEs) and demonstrated its ability to improve profitability by over 25%. Ghali (2024) emphasized the importance of green TC in enhancing quality and minimizing environmental costs. A study by Al-Shanti et al. (2025) added that TC, when combined with ERP systems, enhances planning accuracy and reduces deviations in major industrial companies. Thus, most studies confirm that TC represents an advanced framework for strategic cost planning, especially in the design phase.

2.2. Kaizen Costing: A study by Kazem (2021) combined Kaizen and TC in a textile factory, resulting in improved efficiency and reduced costs. Plescaci (2022) presented the application of Kaizen as a CI tool for companies across various sectors to enhance the efficiency of their manufacturing processes. Meanwhile, Fawaid et al. (2023) demonstrated the importance of reducing inefficient activities using Kaizen to increase profits. Amin et al. (2023) demonstrated that adopting a Kaizen culture reduces resistance to change and enhances participation in continuous cost analysis. A study by Shihab et al. (2023) demonstrated that implementing Kaizen in an Iraqi industrial environment requires organizational support and cross-functional collaboration.

Thus, we conclude that Kaizen costing depends on an organizational culture that supports CI and is highly effective in production settings.

2.3. Value Engineering: A study by Kazem (2022) demonstrated the effectiveness of this approach in reducing costs in the cement industry while maintaining quality. Abdul Abbas and Al-Moussawi (2023) presented an integrated framework that combines VE and green TC in construction projects. Waheed (2024) reviewed the applications of VE in construction projects to reduce costs without compromising performance. Ongbali et al. (2024) discussed their role in enhancing design sustainability and product quality. Ghali (2024) also demonstrated how VE enables design teams in the construction sector to improve long-term operational performance while reducing initial costs. Thus, we conclude that VE has been employed in complex environments and is effective when multidisciplinary teams are present.

2.4. Lean Accounting Tools: A study by Abdul Mohammed (2021) reviewed the impact of lean tools on Iraqi companies, highlighting their role in enhancing efficiency and minimizing waste. Fonou-Dombeu and Nomlala (2022) compared their applications in the manufacturing and healthcare sectors. Popova and Petrova (2024) noted that integrating LATs with real-time performance analysis tools enhances the management accountant's ability to detect deviations, particularly in dynamic production environments, in real-time. Al Shanti et al. (2025) demonstrated a strong correlation between LATs and competitive advantage in Jordanian companies.

This means that the effectiveness of LATs depends on the readiness of the organizational system, and is particularly evident in repetitive production environments.

2.5. Artificial Intelligence and Data Analysis Tools: A study by Karras et al. (2023) discussed the importance of integrating AI with the Internet to achieve real-time analysis and provide accurate forecasts. In another study, Karras et al. (2023) demonstrated that adopting machine learning algorithms to predict deviations can increase the accuracy of cost decisions by up to 30% in smart factories. Popova & Petrova (2024) highlighted the vital role of AI in creating a smart, data-driven environment. Faisal & Abbood (2024) demonstrated the role of BD and blockchain technology in managing the costs of electronic payment services. Al-Shahmani (2024) highlighted the effectiveness of utilizing ERP and sensors in enhancing production efficiency and reducing costs

within an Iraqi contracting company. This indicates that AI and predictive analytics tools have become the cornerstone of developing future costing systems, especially in digital sectors.

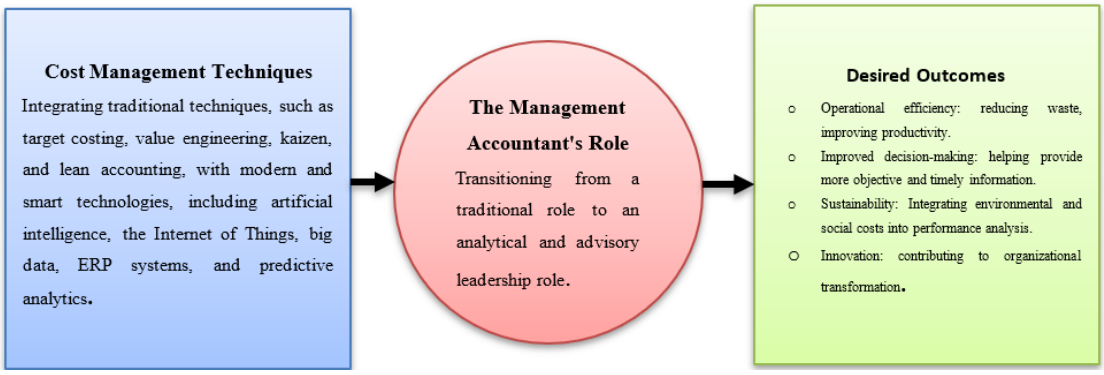
3. Data and Methodology

This study followed a systematic literature review approach, analyzing studies published in peer-reviewed journals within databases such as Scopus, Google Scholar, and ResearchGate between 2021 and 2025 (Until April). Keywords such as TC, Kaizen Costing, Value Engineering, Lean Accounting, and AI in CMTs were identified and used individually and in combination to access relevant literature. Studies were filtered based on:

- **A.** Their direct relevance to CMTs.
- **B.** Their analysis of the applications of these techniques in industrial or service settings.
- **C.** Their demonstration of the actual impact of these methods on improving performance and reducing costs.

The final number of approved studies is 24. These studies were analyzed qualitatively using content analysis and categorized by: type of technology, applied sector, and analytical methodology used.

Figure 2 reflects the interactive relationship among the types of CMTs (traditional and modern), the role of the management accountant, and the desired outcomes at the organizational level. This framework represents a theoretical perspective that reflects how advanced costing tools and techniques, when employed to support effective managerial decision-making, contribute to long-term financial and environmental sustainability within contemporary organizations.



Source: Prepared by the researchers.

Figure 2: Conceptual framework of the study

4. Results and Discussion

4.1. Comparing the Effectiveness of Cost Management Techniques in Different Contexts: An analysis of the literature review reveals that TC is appropriate during the product development phase, especially in manufacturing industries. CI requires an organizational culture because of its ability to encourage continuous change, and its effectiveness increases in stable environments. VE is practical for complex, high-cost products but requires multidisciplinary teams. Agile accounting techniques are closely linked to the lean manufacturing approach and lose their effectiveness outside of it. AI and data analytics tools represent the future of CM, but they require digital readiness and a data-rich environment. Ultimately, there is no single ideal technology that suits all contexts. The effectiveness of each technology depends on the nature of the sector, the company's size, the degree of DT, and the company's objectives. Therefore, it is preferable to integrate traditional technologies in industrial environments and use modern technologies in digital and rapidly changing environments. Selecting one or more technologies serves the company's strategy to achieve efficiency, innovation, and sustainability**. Appendix A**, **Table 1**.

***4.2. Limitations and Challenges in Implementing Modern Methods*:** It can be argued that organizational resistance to change is due to the difficulty employees and management have accepting new methods due to fear of change or loss of control; a lack of analytical and technical skills due to the lack of qualified personnel capable of using AI and predictive analytics tools effectively and efficiently; and a weak digital infrastructure due to the absence of advanced and sophisticated ERP systems and data analysis tools. The limitations and challenges include the following:

A. Skills Lack: These methods require new skills such as data analysis, design thinking, and the ability to handle AI tools and advanced software.

B. Organizational Resistance: The transition from traditional to modern systems may encounter resistance within companies, particularly in the absence of sufficient awareness.

C. Technological Environment: Implementing these methods requires an advanced technological infrastructure, which may not be available in MSMEs.

D. Transition Costs: Transitioning to modern and advanced technologies and methods requires high initial investments.

E. Measurement and reporting challenges: Some modern methods may produce reports that are not easily understood by decision makers accustomed to traditional systems.

4.3. The need for new skills for management accountants: Management accountants are required to be data analysts, strategic partners, and proficient users of technology, not just perform traditional accounting tasks. This is achieved through the following:

A. Focus on data analysis and statistical analysis skills, as management accountants must be able to analyze BD using tools such as Power BI and Python.

B. Understanding AI, predictive analytics, and engineering and design principles by interpreting algorithmic outputs and using them to estimate costs and forecast performance.

C. Proficiency in using ERP and digitization systems by working with integrated resource planning systems and linking financial information to operational processes in real time.

D. Strategic thinking through the ability to link costs to strategic objectives by focusing on CMTs.

E. The ability to work multidisciplined, as these techniques require collaboration among accounting, engineering, production, and technical teams.

Illustrates **Appendix B, Table 2**, outlines the role of the management accountant in CMTs across the industrial and service sectors.

***4.4. Future Trends in Cost Management, as per the Literature Review*:** Reflecting the evolution of business environments and the increasing complexity of operations, along with the growing influence of digital technologies.

Illustrates **Appendix C, Table 3**, Future trends in CM.

5. Research Gaps and Paths Future:

A literature review revealed that CMTs have witnessed significant development in both concept and application. However, there are apparent gaps that have not received their due scholarly attention, particularly in Arab environments and service sectors.

5.1. The most prominent gaps can be summarized as follows:

A. Limited field studies in Arab studies, particularly those that apply AI or ERP systems in real production or service environments.

B. Lack of comparisons among sectors (industrial and service) in terms of the effectiveness of techniques such as Kaizen or VE in light of DT.

C. Lack of literature linking CMTs and customer experience analysis, particularly in sectors that rely on human interaction, such as healthcare, education, and tourism.

D. Weak integration of the ethical and environmental dimensions within the cost framework, despite the growing trend toward sustainable accounting and ESG reporting.

E. Lack of unified conceptual models that integrate modern costing techniques with the roles of strategic management accountants in dynamic business environments.

5.2. Suggested Paths for Future Studies:

A. Conducting experimental field studies in Arab organizations (industrial and service) that apply TC or VE using business intelligence (BI) tools or BD analytics.

B. Analyzing the impact of integrating sentiment analysis and user experience (UX) in calculating actual service costs.

C. Building a conceptual framework that links smart costing tools (AI + RPA + IoT) with financial and environmental performance outcomes.

6. Conclusion

A review of the literature on modern CMTs revealed that these techniques have evolved in response to shifting business environments, increasing operational complexity, and accelerating digital innovation. Traditional approaches are no longer sufficient to keep pace with market dynamics and operational challenges, giving way to advanced tools such as TC, kaizen, VE, lean accounting, and smart DT, including AI and BD analytics. The effectiveness of each technique depends on the nature of the sector, the readiness of the infrastructure, and the extent of senior management support. Industrial sectors have greatly benefited from the integration of production systems and smart costing systems. In contrast, the service sector has focused on allocating costs and improving the customer experience through behavioral and interactive analytics tools. The role of management accountants is also central to this transformation, as their role is no longer limited to preparing reports. They are now responsible for providing predictive insights, conducting strategic analysis, and leading efforts to enhance value and minimize waste. With the advancement of technological tools, the skills required now include data analysis, systems design, and interaction with multidisciplinary teams. Several future trends affecting CMTs have been identified, most notably predictive costing and VE. These trends suggest that CMTs will transform from a supportive accounting activity to a pivotal strategic element in building a sustainable competitive advantage.

Conflict of Interest
The authors declare no conflict of interest.

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Appendices

Appendix A: Table 1 presents a comparison of the effectiveness of CMTs across various contexts.

Cost Management Techniques	Efficiency in the Industrial Sector	Effectiveness in the Services Sector	Benefits	Challenges	Future Trends
Target Costing	Effective in controlling costs from design to market price.	Used to price services based on expected value.	Focus on customer satisfaction and targeted costing to enhance strategic planning and decision-making.	Difficulty in predicting market price, and poor communication between the design and marketing teams.	Evolve towards "green TC" to support sustainability.
Kaizen Costing	Very effective in continuously improving daily production processes.	Limited effectiveness necessitates specialized adaptation in evolving service business environments.	CI, promoting a culture of waste reduction.	A long-term commitment requires an organizational culture that supports CI.	Link it to ERP systems to track real-time optimization.
Value Engineering	Effective in designing products with high efficiency and improved quality.	Used to streamline service delivery processes and improve cost-to-value.	Low costs without compromising functional value.	There is a need for multidisciplinary teams, and a lack of awareness of their benefits in some companies.	Integrate it with analytical intelligence and digital design.
Lean Accounting Tools	Very effective in reducing waste, improving productivity, and lowering costs.	Less effective in services, requiring adaptation of agility concepts to the nature of the service.	Providing management with accurate and rapid information to improve decisions.	Difficulty adapting to traditional systems – employee resistance to change.	Integrate it with AI to promote CI.
Artificial Intelligence and Data Analysis Tools	Very effective in predictive control and reducing quality and maintenance costs.	Effective in improving service delivery, particularly in health, education, and finance.	Process automation, high-accuracy analytics, and the discovery of hidden patterns. Data security, immutability, and transparency.	Lack of digital skills, need for a robust data infrastructure.	Increase reliance on predictive analytics and intelligent interactive systems.

Source: Prepared by the researchers based on a literature review.

Appendix B: Table 2 The role of the management accountant in CMTs in the industrial and service sectors

The Future of CM	The Role of the Management Accountant in the Industrial Sector	The Role of the Management Accountant in the Service Sector
Smart Predictive Costing	Developing AI models to forecast material, energy, and production costs with scenario analysis.	Using behavioral and interaction data to predict service delivery costs and customer experience.
Adaptive Costing Systems	Designing dynamic costing systems that adapt to changing production and technology.	Developing flexible pricing models based on consumer behavior and interaction quality.
Intelligent VE	Collaborating with engineering teams to improve value for money using advanced analytics techniques.	Analyzing the customer journey, identifying waste stages, and improving perceived value immediately.
Integration with DT	Using the Internet of Things (IoT) and RPA for real-time cost analysis.	Integrating interaction intelligence tools and user experience metrics into service systems.
BD Analytics and Machine Learning	Production line data processing and predictive maintenance to improve profitability.	Extracting insights from customer data to reduce acquisition costs and improve loyalty.
Ethical and Sustainable Control	Integrating environmental and social costs into performance reporting and supplier decision-making.	Monitoring service practices and ensuring fair, transparent, and socially responsible pricing.
Smart Interactive Economy	Using augmented reality for cost analysis and employee training via digital simulation.	Supporting front-end teams with real-time information to improve engagement and reduce response time.
New Skills Required	AI, data analysis, systems design, and ethical assessment.	Emotional intelligence, experimental analysis, experience design, and lean programming.
Strategic Role	Predictive costing, sustainability, and continuous engineering improvement consultant.	Customer experience leader, controlling value-added costs, and behavioral impact analysis.
Supporting Tools	Power BI, Python, ERP digital simulation	CRM, Customer Experience (UX) tools, advanced analytics, and chatbots.

Source: Prepared by the researchers.

Appendix C: Table 3 Future trends in CM.

Future Trends	Explanation	Tools and Applications	Efficiency in the Industrial Sector	Efficiency in the Service Sector
Digital Integration with Traditional Methods	Integrating techniques such as TC and VE with AI and data analytics.	ERP Systems, Dynamic Market Analysis.	High, for improving production planning.	High, to improve resource allocation.
Modern Costing Systems	Using AI to monitor costs and predict variances automatically.	Automated Cost Analysis, Real-Time Alerts.	Effective for monitoring variable costs.	Effective in predicting operational deviations.
Sustainable CM	Incorporating environmental and social impact into cost decisions.	Lifecycle Analysis, Emission Reduction.	Essential, due to the environmental impact of production.	Growing, especially in the healthcare and tourism sectors.

Evolving Role of the Management Accountant	From a reporting executive to a strategic and analytical expert.	BI Skills, Data Analysis, Python.	Very important, for supporting flexible production processes.	Pivotal, to link costs to service quality.
Data-Enhanced Decision Making	Using dashboards and BD analytics to make real-time decisions.	Real-Time KPI, Scenario Simulation.	High, for supporting decisions in supply chains.	High, to improve customer experience.
Deep Costing	Allocating costs based on customer or product behavior.	AI + IoT, Cost-Based Consumption.	Suitable for multi-option products.	Critical in personalized services.
Cloud-Based Costing Platforms	Using flexible cloud-based cost accounting systems.	Instant Data Access, Real-Time Collaboration.	Increasing, for integrating production chains.	Essential to support remote work.
Predictive Costing	Machined self-learning systems that predict future costs using continuous learning models and AI.	Intelligent ERP Systems, Demand and Cost Forecasting Algorithms.	Ideal for reducing raw material costs and minimizing pre-production expenses.	Improving resource allocation and demand forecasting.
Emotional Costing	Incorporating customer and employee sentiment and satisfaction as influential factors in cost analysis.	Customer and Employee Response Analysis Using AI and NLP.	Less usage.	Highly effective in tourism, education, and healthcare.
Adaptive Autonomous Costing Systems	Accounting systems that automatically learn and recalibrate cost models based on changes in market or operational behavior.	AI Integration with IoT and Market Data.	Valid in smart manufacturing.	Highly flexible in customer service.
VE	Improving customer value in real time based on changes in live data.	Instant Product or Service Personalization Based on Customer Preferences.	Rapidly improving product experience.	Enhancing loyalty in digital services.
Augmented Reality in Cost Analysis	Using augmented reality to visualize value chains and costs.	AR Glasses Display Cost Paths Through the Production Line.	Ideal in complex production lines.	Interactive training support and visual analysis.
Interactive Knowledge Economy	Costs are built on adaptable cognitive models using interactive AI.	Accounting Through Smart Agents that Interact with Customers.	Supporting analytics in smart factories.	Intelligent accounting tools for consultants and managers.

Source: Prepared by the researchers.