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Role of management accounting in supporting internal inventory management

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Abstract

The accuracy of inventory data is critical for a company's operational efficiency; however, the relationship between management accounting and internal inventory management remains under-researched. This article addresses that gap by examining management accounting as an active tool underpinning the entire inventory cycle. The study employs systematic analysis and synthesis of established frameworks [COSO; Activity-Based Costing/Management; Theory of Constraints], industry best practices [ABC/XYZ analysis; perpetual inventory accounting; PDCA cycle] and relevant scholarly literature. A theoretical model illustrating the integration of management accounting and inventory processes is developed, demonstrating their mutual influence at every stage. The findings show that management accounting fulfills key roles throughout the inventory cycle: in planning—through ABC/XYZ analysis, inventory standard-setting and budgeting; in execution—via perpetual inventory systems integrated with RFID and barcoding; in analysis—by calculating variances and assessing financial impacts; and in adjustment—by providing optimization recommendations and performance metrics. The discussion emphasizes the evolution of inventory management from an isolated procedure into a core element of an integrated inventory control system with management accounting at its center. Practical steps are proposed, including implementation of perpetual inventory, segmental analysis and IT integration (ERP, WMS), while future research directions include development of an integration-maturity model and exploration of digital technologies (IoT, blockchain, AI). The conclusion underscores the need to invest in management accounting capabilities to enhance inventory effectiveness: such integration minimizes risks, optimizes stock levels and strengthens overall business controllability. This article will be of interest to researchers in enterprise management and practicing accountants responsible for inventory accounting.

Keywords: Management Accounting; Internal Inventory Management; Systems Integration; ABC/XYZ Analysis; Perpetual Inventory Accounting; Inventory Control; Theoretical Model; COSO Framework; Business Process Optimization; Accounting Digitalization

1. Introduction

Commercial organizations in the trade, services and manufacturing sectors pursue a common strategic aim: maximizing profit by optimizing the use of available resources. Among the primary resource categories are material and product inventories. These assets play a crucial role in a company's operations, given their involvement in most business processes. In particular, profit arises from sales, which are inextricably linked to inventory movements throughout the operating cycle [7].

The accuracy and reliability of materials and work-in-progress inventory data represent one of the fundamental determinants of a company's operational efficiency. Establishing management accounting within an organization constitutes one of the most important conditions for successful business-process reengineering or optimization.

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Significant changes in management accounting procedures—driven by rapid technological advancement and intensified corporate competition—have necessitated the development of management accounting systems tailored to top management's information requirements and capable of adapting to external environmental conditions. To address the challenges that arise in this context, a number of specialized management accounting tools has been developed to enhance the effectiveness of both operational and strategic management [1].

Inventory information influences the formation of key financial-reporting indicators such as the balance sheet and income statement, and it directly determines product costing, cost management and logistics processes. Errors in inventory accounting (for example, overstating or understating quantities and values) create serious risks: financial losses due to excess stock or write-offs; misrepresentation in financial statements, which can mislead investors and regulatory bodies; and disruptions in procurement and production, resulting in delays and loss of customers. Internal inventory audits of tangible (physical verification of stock availability and condition) and intangible assets serve as critical control mechanisms, ensuring that accounting records reflect actual conditions and revealing any discrepancies. Researchers assert that strategic management accounting exerts a greater influence on inventory management than management accounting information systems [8]. Its effectiveness has traditionally been associated with technical accounting aspects or the functions of internal-control services; nevertheless, contemporary demands require a more systemic approach.

Despite the importance of management accounting and inventory audits, their interrelationship remains insufficiently explored in both academic literature and practice. Often, attention is focused solely on the counting procedure or on isolated aspects of material-inventory accounting, while the role of management accounting as an active tool supporting the entire inventory cycle—from planning through analysis—remains inadequately revealed.

The objective of this article is to fill the identified theoretical gap. Based on a comprehensive analysis of existing concepts, principles and best practices in management accounting, internal control and inventory management, this study sets the following goals:

Determining and systematizing the key roles that management accounting systems and tools play in ensuring the effectiveness of internal inventory processes.

Developing a theoretical model that vividly illustrates the interconnection and mutual influence of management accounting systems and the success of inventory procedures throughout their lifecycle.

The work is theoretical and conceptual in nature and includes practical recommendations for further implementation.

The principal contribution of the article lies in proposing a new paradigm: considering internal inventory audits not as an isolated technical control procedure but as an essential managerial process whose effectiveness depends on the quality of informational and methodological support provided by management accounting. For the first time at a theoretical level, the functions and tools of management accounting have been systematized with reference to each stage of the inventory cycle—planning, execution, variance analysis and corrective actions—revealing the multifaceted nature of its contribution. Moreover, the necessity of deep integration between management accounting subsystems (particularly inventory accounting and analysis) and internal inventory processes is substantiated, demonstrating that such integration is a prerequisite for enhancing data reliability and overall business controllability.

2. Materials and Methods

The methodological foundation of the study is based on systematic analysis and synthesis of existing theories, concepts and best practices in related disciplines. This approach involves deconstructing and critically examining individual theoretical constructs, then integrating the insights gained into a unified model that explains the role of management accounting in supporting the entire inventory cycle. Such a method reveals the interrelationships among system components and establishes a theoretical basis for future empirical investigations.

The theoretical underpinnings are formed through analysis of authoritative sources, including scholarly literature on management accounting, the Theory of Constraints, inventory management, internal control and the process approach.

Dlamini B. argues that the evolution of management accounting has been less thoroughly studied than that of financial accounting: "Researchers agree that management accounting is critically important to a company's success and competitiveness, providing tools for planning, cost control and decision-making (Mitchell & Reid; Horngren; Azudin & Mansor; Lucas). However, the relevance of traditional management accounting methods is being challenged. Johnson

and Kaplan contend that management accounting has lost significance by failing to supply managers with the necessary information. Kamal notes that, since the 1990s, management accounting has faced severe criticism for its inability to adapt to change, and that managers are dissatisfied with the inefficiency of its methods” [2].

The study also employs professional standards and guidelines from international organizations, alongside recognized best practices such as ABC analysis, perpetual inventory systems and PDCA management cycles. The ABC method enables companies to reassess their product mix for pricing adjustments. In some cases, it can uncover opportunities for cost reduction through improved product design and continuous process refinement, yielding customer benefits, higher retention rates and stronger competitive positioning [4]. One of the PDCA cycle’s foremost principles is to analyze all potential factors before concentrating on those that cause the problem, thereby eliminating the risk of overlooking any factor [5].

The analysis proceeded in stages: identification of key concepts, objectives of internal inventory management and information requirements; systematization of management accounting tools and methods by their functions at each stage of the cycle; and construction of a logical chain of cause-and-effect relationships between implementation of specific systems and procedural effectiveness. Throughout, theoretical limitations and practical conditions for tool application were taken into account, resulting in a substantiated model that reflects relevant contextual factors.

3. Results and Discussion

Internal control over inventories is regarded as effective because it comprises the elements of internal control: control environment, risk management processes, information and communication, control activities and monitoring [9].

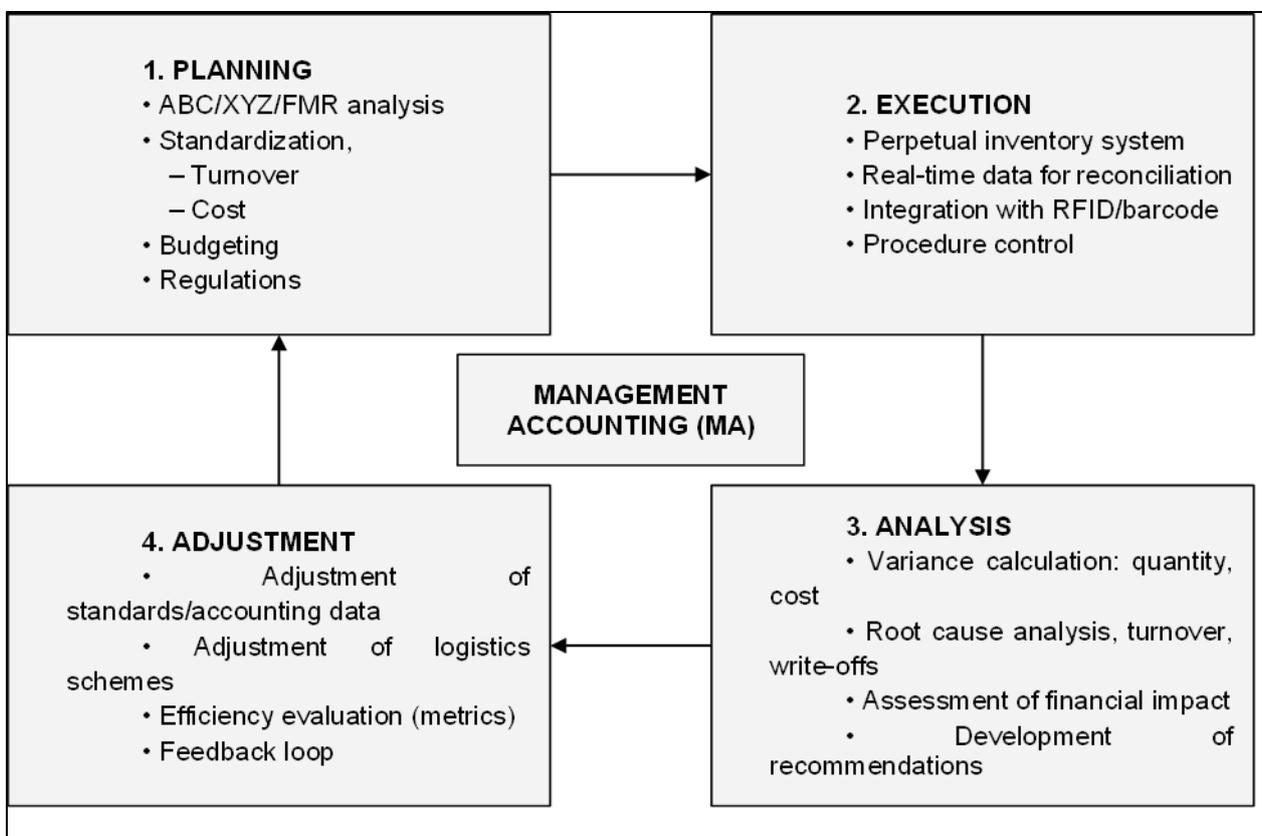


Figure 1 Diagram of the inventory lifecycle with integrated management accounting tools (compiled by the author based on original research)

The analysis structured the roles of management accounting at each stage of the inventory cycle. In the preparatory phase, segmental analysis tools (ABC/XYZ/FMR) classify inventory by value, demand predictability and turnover frequency, enabling the planning of audit frequency and scope to optimize costs. Management accounting data are used to establish standards based on turnover and cost, to shape budgeting and to develop procedures that ensure consistent execution of processes.

During the inventory execution phase, management accounting ensures the timeliness of stock data through a perpetual inventory system, allowing operations to be recorded promptly and information accuracy to be maintained. It also supplies real-time reconciliation data and integrates with automatic identification systems (barcoding, RFID), accelerating verification and reducing error risk. The inventory lifecycle is illustrated in Figure 1.

In the results analysis phase, management accounting automatically computes variances in quantity and value, identifies the causes of deviations with consideration of turnover, write-offs and cost, and assesses their financial impact. The system then generates recommendations for adjusting standards, accounting records and logistics schemes, and provides metrics for evaluating inventory effectiveness and process improvement measures.

These results confirm the central thesis of the study: management accounting functions not as a passive recorder or mere data provider for reconciliation, but as an active, integral system supporting the entire internal inventory cycle. Management accounting delivers the methodological foundation (standard-setting, classification), the information base (perpetual inventory accounting, costing), analytical instruments (ABC analysis, turnover metrics, variance calculation) and the feedback mechanism for continuous improvement (performance metrics, standard adjustments). The reliability (accuracy, timeliness) and efficiency (resource-cost optimality) of inventory processes are directly causally linked to the quality and maturity of the corresponding management accounting systems. Inventory management thus transforms from a disconnected control procedure into a component of an integrated inventory-control system, with management accounting at its core. The roles identified for management accounting are confirmed and supplemented within established theoretical frameworks, as outlined in Table 1.

Table 1 Theoretical justification of management accounting roles in supporting internal inventory based on recognized models [4;6;10]

Model	Key Component / Principle of the Model	Confirmed / Supplemented Role of Management Accounting in Inventory
COSO Internal Control Model(Committee of Sponsoring Organizations)	The internal auditor conducts continuous analysis to establish baseline data for measurements and integrates industry procedures to assess the impact of changes in corporate processes on organizational performance. Ultimately, when evaluating communication deficiencies, internal auditors focus on their consequences and monitor corrective actions taken to improve communication [10].	Information & Communication Management accounting is the primary source of relevant information (standards, actual balances, cost). Control Activities Inventory procedures are built upon management-accounting data and protocols. Monitoring Inventory-effectiveness metrics are developed and analyzed within management accounting. Risk Assessment ABC/XYZ analysis in management accounting serves as a key tool for evaluating inventory-related risks (impairment, stockouts, surpluses). Control Environment The presence of a sophisticated management accounting system fosters an environment conducive to effective control, including inventory audits.
Activity-Based Costing/Management (ABC/M)	The ABC/M approach is ideally suited for analyzing the causes of inventory variances, as it identifies cost-consuming activities (inefficient storage, movement, control processes) that lead to losses. Activity-based costing has become an essential tool for accurately determining the costs of products, services and processes,	Cost Causality Analysis Enables identification of the true causes of variances (losses, surpluses) via activity-based analysis. Costing Accuracy

	enabling more effective assessment of financial performance. Traditional costing methods often produce distortions due to arbitrary overhead allocations; by contrast, ABC allocates costs based on activities and resource consumption, offering superior opportunities for cost control and decision-making [3].	Provides a more precise assessment of the financial impact of inventory discrepancies.
Theory of Constraints (TOC)	The Theory of Constraints helps organizations improve competitiveness by focusing on earning more money today and in the future through more effective management of constraints. In this context, TOC advocates the use of throughput accounting to facilitate decision-making and constraint management [6].	<p>Constraint Management</p> <p>Management-accounting data (turnover analysis) are used to identify inventory constraints (slow-moving or shortage items).</p> <p>Throughput Focus</p> <p>Integration of inventory data into management accounting enables optimization of material flows and reduction of risks uncovered by inventory audits.</p>

Management accounting and inventory should be regarded as a single, integrated system for managing stock data. This requires the development of new, comprehensive metrics that evaluate not only the effectiveness of the inventory process itself but also the synergy of the management-accounting–inventory linkage—for example, a measure such as “cost to ensure data accuracy per inventory unit.” Moreover, it is increasingly important to study how modern automation and digitalization technologies (ERP, WMS, IoT, blockchain) influence the depth of integration between management accounting and inventory processes.

Moving to practical recommendations, several priorities stand out. First, the foundation of any effective inventory process is the implementation or enhancement of a perpetual (continuous) inventory accounting system—without it, meaningful inventory control is unattainable. Second, organizations must systematically apply segmental inventory analysis (ABC/XYZ/FMR) to optimize audit resources and concentrate on the most critical items. Mandatory inventory standards establish an objective basis for assessing variances and managing stock levels. It is vital to integrate inventory outcomes (discrepancies, root causes, financial impact, performance metrics) into regular management accounting reports for trend analysis. Finally, investing in integrated IT systems (ERP, WMS) that enable seamless data exchange between management accounting and inventory/inventory-control modules is essential.

To address the limitations of this study and extend the research, several promising avenues are proposed. The first is empirical validation of the theoretical model through case studies, surveys, or controlled experiments to assess the real-world impact of specific management accounting tools on inventory effectiveness across diverse enterprises. The second direction involves an in-depth exploration of digital technologies: how IoT (for automated tracking), blockchain (for data immutability), advanced analytics and AI reshape the roles of management accounting and inventory control, further strengthening their integration. The third focuses on industry-specific implementations of the model in key sectors such as FMCG, manufacturing, pharmaceuticals and logistics.

Additionally, it is important to develop a framework for assessing the maturity of management accounting–inventory integration within organizations. Such a diagnostic tool would help identify weak points and guide development planning. Lastly, investigating the barriers to adopting this integrated approach—organizational, technical and human factors, especially in small and medium-sized enterprises—merits dedicated attention.

A key direction for future research is the creation and validation of a maturity model for integrating management accounting and internal inventory management. The proposed conceptual five-level model (see Figure 2) describes the progression from fragmented, inefficient processes (Level 1) to a fully integrated, data-driven and AI-optimized system (Level 5).

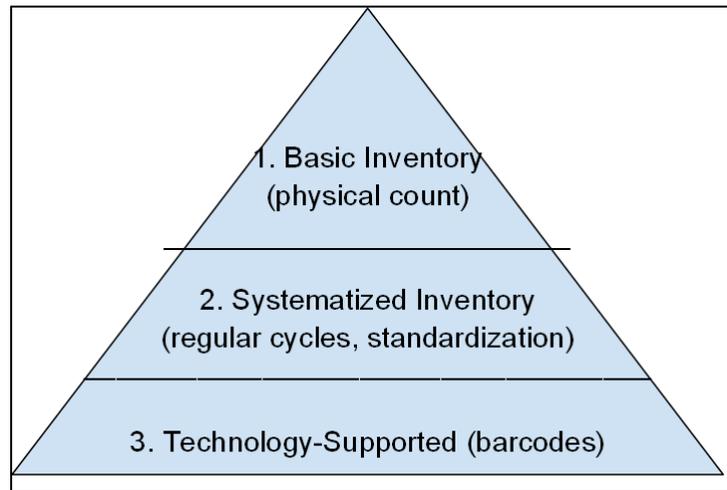


Figure 2 Pyramid of inventory process development within the inventory management system (compiled by the author based on original research)

The principal criteria for assessing maturity at each level include the presence and quality of perpetual inventory accounting, the application of segmental analysis (ABC/XYZ/FMR), integration of management accounting and inventory data within IT systems, use of inventory performance metrics in management accounting and the depth of causal variance analysis. This model can serve as the basis for a practical diagnostic framework.

4. Conclusion

This study has systematized and substantiated the fundamental role of management accounting in ensuring the effectiveness and reliability of internal inventory management. First, management accounting performs critically important functions at every stage of the inventory cycle: from strategic planning (utilizing ABC/XYZ analysis to focus resources, setting inventory standards as the basis for evaluation, and budgeting) and operational execution (ensuring data accuracy through perpetual inventory accounting and integration with identification systems) to in-depth analysis of results (quantifying and costing variances, diagnosing root causes) and initiation of corrective measures (formulating optimization recommendations and assessing effectiveness via tailored metrics). Second, it has been convincingly demonstrated that the reliability of inventory data and the economic justification of related costs depend directly on the quality of management accounting systems. Management accounting thus serves not merely as a data provider but as the integral methodological and informational foundation of the entire process, transforming inventory management from a routine technical procedure into a powerful managerial tool for control and optimization.

The objective of identifying and systematizing the key roles of management accounting in supporting inventory procedures and developing a theoretical model of their interrelationships has been successfully achieved. The main contribution of this work lies in proposing a holistic view of internal inventory as a managerial process intrinsically linked to management accounting. A detailed systematization of management accounting functions and instruments across each phase of the cycle has revealed the multidimensional nature of its support. The proposed theoretical model vividly illustrates this dynamic interplay and includes a feedback loop for continuous improvement. The strategic importance of management accounting is underscored not only for the quality of inventory data but also for the effectiveness of the primary control mechanism—internal inventory management.

The principal practical takeaway is clear: investing in the enhancement of management accounting systems—particularly in critical components such as perpetual inventory accounting, scientifically grounded inventory standard-setting and comprehensive analytical tools (ABC/XYZ analysis, turnover analysis, variance reporting)—is indispensable. Such investments not only elevate the quality of management accounting itself but also dramatically improve the efficiency (optimal resource utilization) and reliability (accuracy, timeliness) of inventory processes. In turn, robust internal inventory management directly contributes to loss minimization, stock optimization, enhanced reporting accuracy and strengthened financial health and operational performance. Implementing the proposed model of integrated management accounting and inventory management demands deliberate effort and resources from leadership, yet yields dividends in enhanced controllability and reduced risks associated with one of the company's key assets—its inventory.

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