



Management Accounting - From Manual Bookkeeping to Artificial Intelligence (AI)

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ABSTRACT

Over the past half century, management accounting has undergone profound transformations, shifting from manual, experience-driven bookkeeping grounded in intuition to integrated data-analytic models enhanced by artificial intelligence (AI). This evolution is not merely a matter of tools or technologies, but a reconfiguration of how enterprises conceive information, manage risk, and formulate decisions. This article examines the trajectory of management accounting within the broader movement of digital transformation, contrasting traditional and contemporary approaches while illuminating the enduring essence of “numerical discipline” the core value that safeguards transparency across all accounting systems. Through theoretical analysis, a review of relevant research, the development of a renewed analytical framework, and an in-depth discussion of AI’s implications, the paper argues that the future of management accounting lies not in a contest between humans and machines, but in the harmonious integration of traditional principles with modern technologies.

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1. INTRODUCTION

Management accounting has long been regarded as the “silent brain” of enterprise governance, where numerical data are filtered, analyzed, and transformed into knowledge that supports strategic planning. While financial accounting looks outward to meet the information needs of investors, regulators, and the public, management accounting turns inward, illuminating the internal dynamics of the firm, the efficiency of resource utilization, and the integrity of its governance structure.

For decades, before the rise of digital technologies, accounting activities were conducted mainly through manual procedures: voluminous ledgers, paper sheets yellowed by time, hand-drawn tables arranged in meticulous rows, and careful calculations executed with ink pens. This environment nurtured a deeply traditional professional ethos strict discipline, near-absolute precision, and an unwavering commitment to integrity that treated each figure with the solemnity of an oath. Such values forged the “foundational qualities” of accountants: composure, prudence, and perseverance, reminiscent of master craftsmen preserving the flame of their trade across generations.

Entering the twenty-first century, the sweeping tide of digital transformation has fundamentally reshaped the landscape of accounting practice. Integrated Enterprise Resource Planning (ERP) systems, intelligent accounting software, cloud computing technologies, and most notably, the increasing presence of artificial intelligence have replaced a substantial portion of the repetitive, time-consuming mechanical tasks. Real-time data collection, predictive modeling for risk assessment, cost-benefit analysis, and scenario simulation have become commonplace. Consequently, the role of management accountants has gradually shifted: from meticulous “record keepers” to “monitors and analysts,” and further toward becoming “strategic advisors” to corporate leadership. Yet, despite the horizons opened by technology, the essence of the accounting profession remains unchanged. Rigor in handling data, precision in every calculation, honesty in reporting, and responsibility for transparency constitute the very roots of professional credibility. These principles serve as a compass that enables practitioners to navigate increasingly complex systems. In the digital era when information can be generated at unprecedented speed and inaccuracies may spread more rapidly than before these

traditional values have become more indispensable than ever. They not only safeguard the quality of managerial processes but also preserve trust, an intangible yet enduring asset of every organization.

2. LITERATURE REVIEW

The Era of Traditional Management Accounting

Before the 1990s, management accounting operated under conditions of limited technology, relying heavily on manual recording and personal experience. Its core functions included handwritten bookkeeping and classification on paper ledgers, cost categorization based on original documents, static norm-setting, and cost-profit forecasting through simple linear models. According to Nguyen (1998), traditional accounting systems cultivated strict bookkeeping discipline. Accountants were required to conduct repeated verification, manually cross-check ledger entries, assume personal responsibility for any discrepancies, and maintain a high degree of meticulousness. Three core values shaped the profession's culture: data integrity, individual accountability, and manual processing as an inherent control mechanism.

Johnson and Kaplan (1987) noted that although traditional methods were slow, they offered a distinct advantage in enabling accountants to deeply understand the movement of data from source to report. This profound awareness helped practitioners grasp the intrinsic dynamics of information an aspect that many automated systems cannot fully replicate.

The Rise of ERP and Digital Transformation

Since the early 2000s, integrated Enterprise Resource Planning (ERP) systems have marked a significant turning point by synchronizing all essential business functions including production, supply chains, accounting and finance, sales, and human resources within a unified platform. ERP established interconnected data flows, allowing management accounting to shift from retrospective monitoring to real-time managerial control.

As a result, indicators such as inventory turnover, cash conversion cycles, production efficiency, and unit costs began to be updated continuously rather than calculated manually by period. Tran and Le (2012) reported that ERP reduced manual workload by 30 - 60%, shortened reporting time, enhanced forecasting accuracy, and strengthened data-driven decision-making.

Davenport (1998) regarded ERP as a "new organizational infrastructure" that compels firms to redesign processes and management culture. Granlund and Malmi (2002) argued that ERP reshaped management accounting through three major changes: shifting the focus from recording to analysis, enhancing control via data standardization, and providing the foundation for technologies such as Business Intelligence and artificial intelligence.

Thus, ERP has become the core platform of digital transformation in management accounting while simultaneously imposing new requirements related to analytical competency and technological risk management.

Artificial Intelligence in Management Accounting

AI introduces three major transformations: (1) automated predictive analytics, (2) algorithm-based cost optimization, and (3) anomaly detection. Machine learning models are capable of forecasting cost trends, fraud risks, supply chain efficiency, and short- and long-term cash flows. According to Smith (2020), AI can increase the accuracy of financial forecasts by 40% in large-scale data environments.

Research Gaps

Despite a substantial body of work on technology in accounting, several gaps remain. First, few studies analyze the role of data discipline in the era of AI. Second, limited research compares traditional professional values with technology-driven reasoning. Third, there is a need for an integrated analytical framework to evaluate the transformation of management accounting. This study seeks to contribute to addressing these gaps.

3. THEORETICAL FRAMEWORK

Agency Theory

Management accounting mitigates information asymmetry between managers and owners. Technology functions merely as an instrument; transparency ultimately depends on the discipline exercised by individuals operating the system.

Information Theory

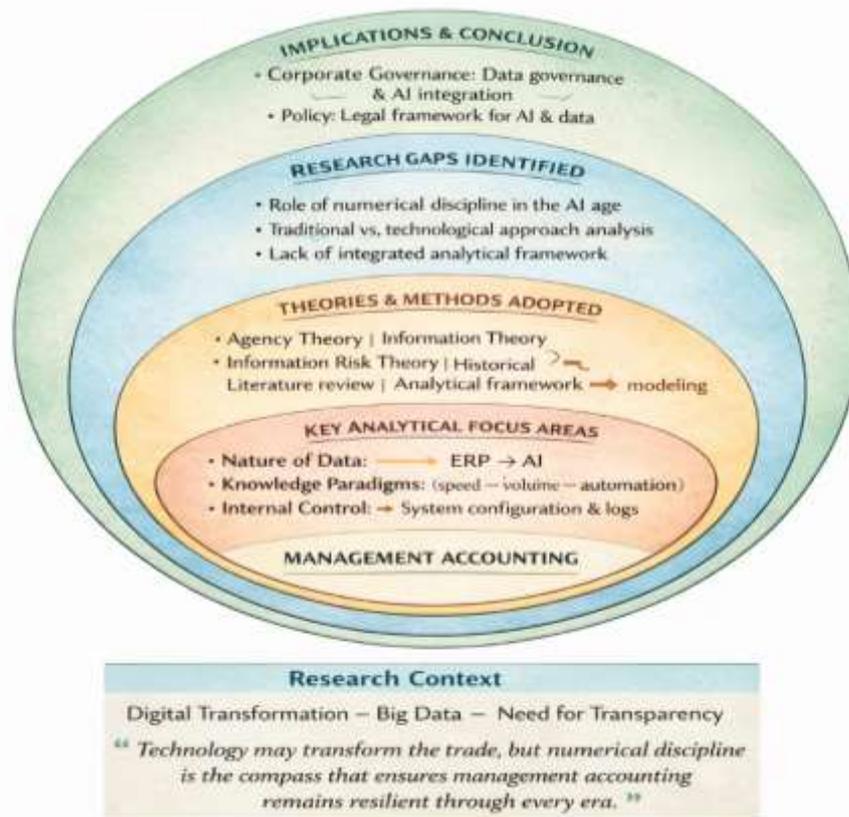
Information quality is determined by data accuracy, processing speed, reliability of sources, and the possibility of verification. Although AI accelerates processing, it cannot ensure accuracy without robust control over input data.

Information Risk Theory

The more complex the system, the higher the potential for distortion in the absence of transparency. AI may amplify errors if input data are contaminated.

4. RESEARCH METHODOLOGY

This study employs historical-comparative methods, theoretical analysis, synthesis of secondary data, analytical framework modeling, and logical reasoning based on contemporary research traditions.



5. IN-DEPTH ANALYSIS

The transition from manual management accounting to AI-driven operational models is not merely a shift in tools or working methods; it represents an ontological transformation - one that reshapes the structure of knowledge, the mechanisms of information acquisition and processing, and the role of humans within the corporate governance ecosystem. A profession once associated with ink pens, thick ledger books, and computations bearing personal imprints now enters an era governed by powerful yet impersonal algorithms. Nevertheless, beneath all layers of transformation, data discipline, the symbolic spirit of the profession remains the red thread preserving its integrity and identity. This transition can be understood through three foundational axes: the nature of data, the form of knowledge, and internal control mechanisms.

First: The Nature of Data from Static Entities to Dynamic Flows

In the age of handwritten ledgers, accounting data were static, closed, and confined within tangible documents such as receipts, vouchers, invoices, and schedules. Every number entered into the books corresponded to a sequence of manual actions: reading, understanding, verifying, reconciling, and recording. Having to physically interact with each unit of information allowed accountants to absorb knowledge through direct experience, nurturing a cautious mindset and a profound attachment to data quality. Although slow, this approach created three enduring layers of value: (1) Deep data understanding, as each number was examined through a trained professional lens; (2) Multi-layered manual control rooted in personal independence and procedural discipline; (3) Continuous cultivation of professional ethics, as accountants bore individual responsibility for every calculation and every pen stroke. This “bookkeeping discipline” became a silent yet resilient legacy that sustained the profession over time.

With the emergence of computerized accounting, ERP systems, and centralized data processing, the nature of data shifted to a dynamic flow: entered once and automatically transmitted across the entire managerial cycle. The advantages are evident—accelerated speed, enhanced accuracy, unified information across departments, and a substantial reduction in repetitive tasks. Yet automation introduces new risks: an error at the input point can propagate exponentially; misconfigurations generate systemic distortions; employees lose the ability to “sense” data; and tracing failures becomes difficult when processing chains grow complex. Thus, data discipline is not eliminated but redefined. Rather than focusing on manual entries and enumerations, it now centers on monitoring system configurations, designing data flows, authorizing access rights, and ensuring system integrity—a new form of discipline that demands stronger technological literacy, system logic, and data ethics from accountants.

Second: Forms of Knowledge from Tacit Knowledge to Algorithmic Knowledge

In the traditional context characterized by limited data, stable patterns, and repetitive operational cycles management accounting relied heavily on tacit knowledge: insights accumulated through experience, professional intuition, and the ability to

read contextual cues from subtle variations in numerical patterns. Yet this knowledge is difficult to transmit, hard to standardize, and increasingly inadequate as firms scale up, markets fluctuate rapidly, and data volumes grow exponentially.

Artificial intelligence emerges as a transformative tool, offering algorithmic knowledge: machine-learning-based forecasting, operational scenario simulations, cost optimization, and anomaly detection using advanced statistical models. The power of AI is undeniable processing vast datasets, operating at exceptional speed, and detecting hidden patterns beyond human capacity. However, AI has inherent limitations: it lacks contextual understanding, has no intuition, and is prone to severe distortions if trained on contaminated or non-representative data.

Thus, the role of the management accountant does not disappear but evolves into a more elevated function:

- Interpreting algorithmic outputs, ensuring that decision-makers understand underlying realities rather than merely viewing modelled figures;
- Validating models to prevent ethical deviations, statistical biases, or logical errors;
- Linking algorithmic knowledge with practical operations to avoid the disjunction between “machines reading markets from textbooks” and “businesses operating in real-world complexity.”

The modern management accountant becomes a “knowledge interpreter,” positioned at the intersection of technology and operational experience, mediating between the rigidity of algorithms and the nuanced reasoning of human judgment.

Third: Internal Control—from Manual Supervision to Mechanized Control

In the traditional model, internal control was grounded in human oversight and task segregation: preparers, approvers, recorders, and reconcilers functioned separately; internal auditors acted as a safety net; and professional ethics served as the pillar of transparency. This method offered flexibility, situational adaptability, and reliance on real-world observation qualities that machines struggle to replicate.

As ERP and AI became embedded in processes, internal control shifted toward mechanization: system logs automatically recorded all actions; logical authorization was configured according to responsibility levels; warning mechanisms were activated upon detection of abnormal behaviors; and multiple layers of data protection were implemented to prevent unauthorized access. The system became stronger, more consistent, and less dependent on subjective judgement.

Yet any automated system is only as strong as its designers. Misconfigured permissions, poorly designed data flows, or low-quality input datasets can compromise the entire system on a large scale often without immediate detection. Hence, human involvement remains paramount: individuals define principles, verify appropriateness, uphold ethical safeguards, and make final decisions when the automated system encounters unforeseen circumstances.

Viewed holistically, the shift from paper-based accounting to AI-driven operations does not diminish the traditional values of the management accounting profession. Instead, it reinforces a core truth: in any era, data discipline and professional integrity are indispensable. If meticulousness once resided in handwriting every ledger line and balancing every punctuation mark, today it is embedded in system design, algorithm validation, data quality management, and transparent operational governance.

No matter how turbulent technological waves may become, the vessel of management accounting requires an anchor to withstand incessant disruptions. That anchor is data discipline, professional ethics, and a deep sense of responsibility—elements that have defined the profession’s dignity for centuries. Technology may alter tools, pace, and even knowledge structures, but it is ultimately humans—through professional character and ethical integrity—who shape the enduring value of management accounting across all eras.

Comparative Summary Table of Criteria Between Traditional Accounting and AI-Based Accounting

Criteria	Traditional Accounting	AI & Digital Accounting
Speed	Slow	Very fast
Sources of Error	Human-derived	System- or data-derived
Transparency	Dependent on individual practitioners	Dependent on system configuration
Analytical Basis	Intuition-based	Algorithm-driven
Risk Profile	Small errors repeated over time	Large-scale errors propagated through system chains

6. DISCUSSION

Data discipline, at its core, is not merely a collection of procedural guidelines codified into documents; it represents a professional culture accumulated over generations of accountants who have guarded rigor as an essential ethical foundation. In the era of manual accounting when every ledger line was handwritten and every voucher had to be held, read, and scrutinized through the lens of professional judgment accountants did more than perform technical tasks. They trained themselves through each number they touched. This meticulous labor cultivated four fundamental qualities: integrity, prudence, meticulousness, and personal responsibility. These values shaped not only professional conduct but also formed the “ethical backbone” of the accounting profession, an intangible yet enduring asset that has long upheld the credibility of the field.

In today's environment where data is processed automatically, many manual verification steps have gradually disappeared. Yet the essence of data discipline has not weakened; on the contrary, it has become more critical than ever. When data operates in a digital environment where flows move in milliseconds and information grows exponentially a minor input error can amplify, creating systemic risks that are difficult to detect. Furthermore, the increasing complexity of algorithms makes deviations less visible than in the era of paper-based accounting. Thus, the three pillars of data discipline accuracy, honesty, and control capability—remain unwavering principles. No AI system, however sophisticated, can ensure these elements if the individuals operating it lack integrity and disregard professional discipline. For this reason, data discipline is not merely procedural; it is the spiritual heritage of the accounting profession, passed down through both its predecessors and the emerging generation.

In academic discourse on the future of management accounting, the question of whether artificial intelligence can replace human judgment has been widely debated. Today, the prevailing view leans toward a more mature conclusion: AI does not replace but expands and enhances human capabilities. Research shows that traditional accountants possess the ability to interpret the essence of transactions, understand contextual nuances, and analyze situational subtleties elements rooted in tacit knowledge and professional intuition. Conversely, AI excels at processing massive datasets, detecting hidden patterns, analyzing complex fluctuations, and supporting multi-scenario forecasting. When these two capabilities are integrated, a new model of management accounting emerges: human-led, technology-augmented, and values-guided. This constitutes the strategic development trajectory of the discipline in the coming decades.

Alongside digital transformation, the role of accountants has undergone a profound shift. From their long-standing image as record-keepers, accountants have become “data gatekeepers,” responsible for preserving the integrity of the entire information system. Specifically, they now assume several new roles:

- System supervisors, ensuring the integrity of input–output flows, overseeing updates, adjustments, and access permissions.
- Data logic evaluators, verifying classification rules, cost allocations, detecting model deviations, and assessing algorithmic soundness.
- Interpreters and translators of AI outputs, transforming complex analytical results into actionable insights for executives and linking data with long-term organizational goals.
- Strategic advisors, as accountants more than anyone understand the structure of operations and the financial health of the organization through data.
- And perhaps most critically, guardians of ethical standards, upholding the transparency of financial reporting in an environment where automation can obscure errors.

As a result, the contemporary accountant assumes the role of “architect of data integrity,” contributing to the creation of a sustainable governance ecosystem. The accountant of the digital era therefore practices not only with competence but with character.

However, excessive dependence on technology while neglecting ethical foundations and professional discipline can lead to serious consequences. Minor distortions in data structures may cause algorithms to misinterpret contexts; forecasting models may go astray if fed biased or corrupted inputs; crucial managerial decisions such as resource allocation, capacity planning, or investment valuation may become flawed. Moreover, accounting systems themselves may generate legal risks if financial reports are distorted by algorithmic errors deviations that are difficult to trace and even harder to assign responsibility for. When data discipline is compromised, AI ceases to be a supportive tool and instead becomes a source of instability.

Therefore, a strong value foundation integrity, accountability, and disciplined data stewardship remains the prerequisite for ensuring that modern accounting systems operate safely, effectively, and transparently. Technology can liberate labor, but only professional ethics can safeguard the quality of information.

Policy and Governance Implications

For enterprises, modern governance models must be grounded in data discipline: standardizing input processes; establishing change-control mechanisms; strengthening digital internal audits; continuously monitoring anomalies; and equipping accountants with new competencies—from understanding data models and AI algorithms to translating analytical insights for decision-makers. The descriptive mindset of the past must give way to an interpretive mindset, in which accountants answer not only “what happened” but also “why,” “whether it is sustainable,” and “what strategic implications it entails.”

For policymakers, the priority is to build a regulatory framework for an “algorithmic economy”: updating accounting standards to reflect AI-driven environments; defining corporate responsibilities concerning data and algorithms; requiring model transparency; controlling data bias; and establishing algorithmic safety standards to protect financial markets while fostering innovation.

For academia, further research is needed on algorithmic risks, data bias, and the impact of model deviations on financial reporting; developing governance models that integrate traditional qualitative analysis with data science; and promoting interdisciplinary collaboration among accounting, data science, information technology, and law.

From these perspectives, it is evident that a new form of management accounting is gradually emerging one that integrates traditional professional virtues with the analytical power of data science, where technology and human judgment reinforce rather

than replace each other. The transition from manual bookkeeping to AI is not merely a shift in operational methods but a transformation in professional philosophy. Technology may automate processes, but it cannot alter the ethical essence of accounting: accuracy, honesty, and discipline.

Thus, the future of management accounting is not a competition between humans and algorithms but a synergy: technology enhances productivity and analytical depth, while humans—through responsibility, intuition, and contextual understanding—preserve the profession’s integrity. Ultimately, a sustainable accounting profession stands not on advanced tools but on enduring ethical values. It is humans who give meaning to data, and this is what ensures the longevity of management accounting in the age of AI.

REFERENCES

1. Hoàng, T. M. (2017). Ethics and Control in Management Accounting. *Journal of Accounting Research*, 12(3), 45–59.
2. Nguyễn, P. Q. (1998). Manual Costing Systems in Developing Economies. *Vietnam Economic Review*, 5(2), 22–31.
3. Trần, D. H., & Lê, T. T. (2012). ERP Systems and Their Impact on Managerial Decision-Making. *Asian Journal of Technology and Business*, 7(4), 63–78.
4. Ministry of Finance. (2015). Circular 200/2014/TT-BTC – Corporate Accounting Regime. Hanoi: Financial Publishing House.
5. Ministry of Finance. (2020). Vietnamese Accounting Standards and the Orientation for Digital Transformation. Hanoi: Ministry of Finance. “The author sincerely acknowledges the support of AI-based tools in facilitating searches, generating suggestions, and providing a rich collection of reference materials that contributed to the completion of this article”.
6. Davenport, T. H. (1998). Putting the enterprise into the enterprise system. *Harvard Business Review*, 76(4), 121-131.
7. Granlund, M., & Malmi, T. (2002). Moderate impact of ERPs on management accounting: A lag or permanent outcome? *Management Accounting Research*, 13(3), 299–321.
8. Johnson, H. T., & Kaplan, R. S. (1987). *Relevance Lost: The Rise and Fall of Management Accounting*. Harvard Business School Press.
9. Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37.
10. Smith, A. L. (2020). Artificial intelligence in managerial accounting: Opportunities and challenges. *International Journal of Management Accounting*, 18(1), 1–15.
11. European Commission. (2021). Ethics guidelines for trustworthy AI. Brussels: EC.\