Review of Previous Research on Blockchain Adoption in Accounting with Examination of Organizational Decision-Making Factors

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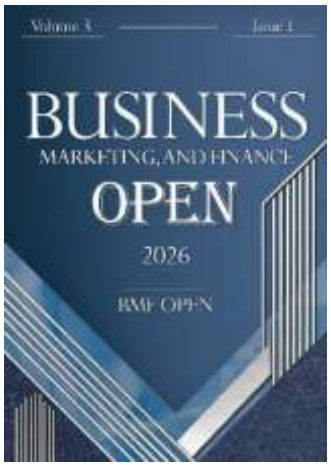

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Abstract: The objective of this study is to explore the opportunities, challenges, and transformative implications of blockchain adoption in accounting and auditing, with a focus on identifying key factors that shape organizational decision-making. This research employed a qualitative design using structured content analysis. Data collection was conducted through the Critical Appraisal Skills Programme (CASP) method to ensure quality and relevance of sources. An initial pool of 42 articles was identified through academic databases, from which 15 sources were selected following CASP evaluation. These sources included empirical studies, conceptual articles, and case analyses on blockchain applications in accounting and auditing. The data were analyzed through open coding, categorization, and thematic abstraction, resulting in a set of emergent themes reflecting the role of blockchain in financial transparency, efficiency, risk management, and organizational transformation. The analysis revealed five overarching themes: (1) blockchain enhances financial transparency and reliability by ensuring immutability and reducing information asymmetry; (2) blockchain improves efficiency in accounting and auditing through real-time data access, smart contract automation, and reduced transaction costs; (3) blockchain strengthens risk management and internal control by facilitating continuous auditing and fraud detection; (4) adoption challenges remain significant, including high costs, scalability limitations, lack of interoperability, and regulatory uncertainty; and (5) blockchain serves as a driver of strategic transformation, enabling innovation, cross-industry collaboration, and alignment with digital economy demands. The study concludes that blockchain represents both a disruptive innovation and a strategic opportunity for accounting and auditing. While its capacity to enhance transparency, efficiency, and trust is widely recognized, adoption is constrained by technological and institutional barriers. Successful integration requires coordinated efforts involving technological readiness, regulatory frameworks, and organizational adaptation.

Keywords: Blockchain; Accounting; Auditing; Transparency; Efficiency; Risk Management; Digital Transformation

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1. Introduction

The rapid advancement of digital technologies has brought about unprecedented changes in the fields of accounting and auditing, compelling organizations to rethink traditional practices and adopt innovative tools that enhance efficiency, transparency, and accountability. Among these emerging technologies, blockchain has attracted significant scholarly and professional attention due to its potential to fundamentally reshape the landscape of financial reporting, auditing, and corporate governance. Blockchain, often described as a decentralized, immutable,

and transparent distributed ledger system, has been heralded as a transformative innovation capable of addressing long-standing challenges in accounting, such as information asymmetry, fraudulent reporting, and inefficiencies in transaction processing [1]. Scholars have widely emphasized that blockchain's impact extends beyond mere technological adoption, offering a structural shift in the way financial information is recorded, verified, and communicated to stakeholders [2]. For organizations operating in highly complex environments, such as those with dispersed ownership structures, multiple subsidiaries, or inter-organizational collaborations, blockchain represents a means of reducing information gaps and enhancing the quality of financial communication [3]. In addition, blockchain's unique properties—immutability, traceability, and transparency—hold the potential to reinforce the principles of agency theory by mitigating conflicts of interest between managers and shareholders, thus elevating trust and accountability in corporate governance [4].

A growing body of literature has systematically examined the potential applications of blockchain in accounting practice, ranging from transaction recording and real-time auditing to supply chain finance and public sector accountability [5]. These studies highlight that blockchain may not only streamline accounting procedures but also serve as a mechanism for achieving regulatory compliance, continuous assurance, and ethical reporting practices [6]. The application of blockchain in financial information sharing, for instance, can significantly improve accuracy, speed, and reliability of reporting, leading to better evidence-based decision-making by auditors and stakeholders alike [7, 8]. Recent investigations underscore the increasing interest of regulators, academics, and practitioners in understanding how blockchain can enhance accounting information systems (AIS). For example, research on blockchain-based AIS design demonstrates how distributed ledgers can create tamper-resistant and auditable records, thereby reducing opportunities for manipulation and enhancing system security [9]. However, despite these benefits, blockchain adoption in accounting is far from straightforward. Multiple challenges—technological, regulatory, financial, and organizational—limit its large-scale implementation, particularly in developing countries and in traditional accounting environments [10].

While blockchain is widely recognized as a revolutionary tool, scholars caution against exaggerated expectations and emphasize the importance of understanding both opportunities and challenges. Blockchain's ability to improve trust, transparency, and real-time reporting is evident, yet its integration into accounting systems requires significant investment in infrastructure, training, and change management [11]. Moreover, adoption often depends on industry-specific requirements, regulatory frameworks, and the readiness of organizations to embrace digital transformation. In the banking sector, for instance, blockchain adoption has been linked to improvements in accounting information quality and the strengthening of corporate governance practices [12]. Empirical studies suggest that factors such as cost, scalability, interoperability, and regulatory clarity are critical determinants of adoption. For instance, the adoption of blockchain in accounting practice in Middle Eastern contexts has shown improvements in financial data quality, but these gains are tempered by the absence of comprehensive regulatory frameworks and the persistence of technical barriers [13, 14]. In developing economies, blockchain is increasingly seen not only as a tool for efficiency but also as a driver of digital transformation in accounting and auditing practices [15]. Furthermore, blockchain is reshaping auditing by enabling continuous assurance, automated compliance through smart contracts, and enhanced traceability of financial data. Literature reviews show that blockchain combined with artificial intelligence (AI) could fundamentally alter auditing methodologies, providing auditors with near real-time access to high-integrity financial records [16, 17]. This integration is particularly relevant for detecting anomalies, preventing fraud, and improving audit efficiency in increasingly digitized business environments.

The adoption of blockchain is not confined to the private sector. In public accounting systems, blockchain has been proposed as a mechanism to enhance transparency, accountability, and efficiency in managing public funds. Research in countries such as Indonesia illustrates how blockchain can improve public sector accounting by reducing corruption opportunities and ensuring greater accountability in resource allocation [7, 18]. Similarly, its adoption in the public sector has been linked to improvements in accounting and analytical support for decision-making processes [19]. The implications of blockchain for managerial accounting are equally noteworthy. For instance, blockchain has been modeled as a tool for enhancing management accounting in manufacturing firms, where real-time monitoring of production and cost data can provide managers with actionable insights [4]. Likewise, structural models have been proposed to measure blockchain's efficiency in accounting and auditing units of government organizations, highlighting its role in reducing inefficiencies and enhancing transparency in public sector entities [3].

The scholarly discourse also reflects a global interest in understanding blockchain's broader implications. Studies highlight its role in overcoming accountability and assurance barriers in supply chain finance [1], ensuring tax compliance and financial regulation [2], and improving human resource management systems through transparent recordkeeping [20]. Furthermore, blockchain is increasingly studied in relation to its educational implications, with attention to preparing accounting professionals and students for a digitalized environment [21]. Systematic reviews have further consolidated this body of knowledge, identifying recurring themes and setting future research agendas. Bibliometric analyses indicate a growing concentration of research on blockchain adoption in accounting, though much of the discourse remains conceptual and requires further empirical validation [22, 23]. Moreover, qualitative inquiries in different contexts, such as Sri Lanka, provide evidence of the cultural, regulatory, and organizational factors that shape blockchain adoption in accounting [24]. Meta-synthesis studies have also contributed to the debate by examining factors influencing blockchain efficiency in the audit profession, underscoring the interplay between technological innovation, professional judgment, and regulatory oversight [25]. At the same time, global adoption studies highlight disparities in uptake across regions, pointing to differences in institutional readiness and technological infrastructure [26].

Beyond accounting, blockchain adoption is influencing related fields such as supply chain management, finance, and even pharmaceutical cold chains. Applications in these areas provide valuable insights into how blockchain can secure transactions, trace goods, and enforce smart contracts across industries [27, 28]. These lessons are increasingly relevant to accounting practice, as they underscore blockchain's role in enhancing data integrity and fostering cross-industry collaboration. At the same time, blockchain's role in combating fraud and counterfeiting has attracted attention. For example, applications in medicine and product authentication illustrate the potential for blockchain to create tamper-proof records and secure value chains [29]. Such innovations provide important parallels for accounting, where ensuring the authenticity of transactions and protecting against manipulation are central concerns. Legal and governance dimensions are also crucial in the blockchain debate. The regulation of smart contracts and their enforceability is an emerging area of research, highlighting the intersection of blockchain with legal systems and corporate governance [30]. This perspective aligns with findings that blockchain adoption requires not only technological readiness but also institutional frameworks to govern its use effectively.

The cumulative evidence underscores that blockchain represents both an opportunity and a challenge for the accounting profession. On one hand, it holds the promise of enhancing financial transparency, improving efficiency, and strengthening trust in corporate governance [11, 12, 14]. On the other hand, challenges related to scalability, costs, regulation, and organizational resistance must be addressed to enable widespread adoption [10,

15]. Reviews and scoping studies emphasize the need for interdisciplinary approaches, combining insights from accounting, information systems, management, and law to fully understand blockchain's implications [31, 32]. Furthermore, as digital transformation accelerates, blockchain is likely to converge with other technologies such as artificial intelligence, big data, and the Internet of Things, amplifying its impact on accounting systems [16, 17]. In summary, the literature establishes blockchain as a disruptive innovation with far-reaching implications for accounting and auditing. It enhances transparency, strengthens risk management, and supports continuous assurance, while simultaneously posing significant challenges that must be carefully navigated [33-35]. Against this backdrop, the aim of this study is to conduct a qualitative content analysis of prior research to identify and synthesize the key factors influencing blockchain adoption in accounting and auditing practices.

2. Methodology

This research employed a qualitative design using a structured content analysis approach. The aim was to synthesize and interpret existing knowledge on the adoption of blockchain technology in accounting and auditing. Content analysis was chosen as the primary method because it enables a systematic examination of written materials, allowing the identification of patterns, themes, and conceptual relationships across multiple studies. This approach was deemed appropriate given the rapidly evolving nature of blockchain applications in accounting and the need to integrate fragmented findings into a coherent analytical framework.

The data collection process was conducted in accordance with the Critical Appraisal Skills Programme (CASP) checklist, which provided a structured and rigorous procedure for evaluating the quality and relevance of sources. Initially, a comprehensive literature search was performed across major academic databases, including Scopus, Web of Science, and Google Scholar, covering studies published between 2015 and 2024. Keywords such as "blockchain," "accounting," "auditing," "financial reporting," and "distributed ledger" were used in various combinations to ensure coverage of relevant research.

After removing duplicates and screening titles and abstracts, 42 potential studies were identified. These studies were subjected to CASP evaluation to ensure methodological rigor, clarity of objectives, relevance to the field, and transparency in reporting. Following this quality assessment, 15 studies that met all CASP criteria were selected as the final sample for analysis. These sources represent a balanced mix of empirical research, conceptual articles, and case studies addressing blockchain applications in accounting and auditing.

The selected 15 sources were analyzed using qualitative content analysis. The process involved multiple stages:

1. **Initial Reading:** Each source was read in full to gain familiarity with the main arguments, findings, and context.
2. **Coding:** Segments of text relevant to blockchain adoption, accounting practices, auditing processes, and organizational decision-making were highlighted and assigned open codes.
3. **Categorization:** Similar codes were grouped into categories reflecting recurring themes such as transparency, immutability, efficiency, cost reduction, risk management, and stakeholder trust.
4. **Thematic Abstraction:** Categories were further synthesized into broader themes to capture the underlying mechanisms and implications of blockchain adoption in accounting systems.

Throughout the analysis, a constant comparison technique was applied, whereby new data were continually compared with existing categories to refine the coding framework. The reliability of the analysis was enhanced through iterative reviews and cross-checks of coding consistency.

The final outcome of the content analysis provided a structured synthesis of how blockchain technology has been conceptualized and evaluated in the field of accounting, highlighting both its potentials and challenges.

3. Findings and Results

The content analysis of the 15 selected sources revealed a diverse range of perspectives on the role of blockchain technology in accounting and auditing. The sources included empirical research articles, conceptual frameworks, and case studies spanning different organizational contexts. Despite variations in scope and methodology, all studies emphasized the transformative potential of blockchain in reshaping accounting systems. Through systematic coding and categorization, five overarching themes emerged: enhancing transparency and reliability, improving efficiency in accounting and auditing, strengthening risk management and control mechanisms, overcoming challenges of adoption, and promoting strategic transformation.

During the first stage of analysis, open coding was performed on all 15 sources. This process resulted in approximately 75 unique codes that captured discrete concepts related to blockchain features, applications, and barriers. Many of these codes focused on blockchain's technical functions (e.g., immutability, traceability, and distributed verification), while others emphasized organizational implications (e.g., cost reduction, stakeholder trust, and regulatory challenges). Table 1 presents selected examples of initial codes derived from the sources.

Table 1. Examples of Initial Codes Extracted from Sources

Code ID	Source Example (Paraphrased)	Initial Code
C1	Blockchain allows immediate validation of accounting entries	Real-time verification
C2	Immutable ledger reduces opportunities for fraud	Immutability
C3	Smart contracts automate compliance in auditing	Smart contract automation
C4	Distributed ledger increases transparency across stakeholders	Transparency
C5	Blockchain adoption faces scalability and cost barriers	Adoption challenges

The second stage of analysis involved grouping related codes into broader categories. These categories represent higher-level concepts that capture recurring patterns across the studies. For example, codes such as "real-time verification" and "immutability" were clustered under the category of *Transparency & Trust,* reflecting blockchain's ability to enhance data integrity and accountability. Similarly, codes concerning automation and cost efficiency were grouped under *Efficiency & Automation.* Table 2 summarizes the categories identified during this phase of analysis.

Table 2. Categories Emerging from Content Analysis

Category	Related Codes	Description
Transparency & Trust	C1, C2, C4	Features of blockchain that improve trust and reliability of financial information.
Efficiency & Automation	C3, C6, C7	Use of smart contracts and distributed ledgers to streamline accounting processes.
Risk & Control	C8, C9	Blockchain's role in reducing fraud, error, and enhancing audit trails.
Adoption Challenges	C5, C10, C11	Barriers such as scalability, cost, regulatory uncertainty, and organizational resistance.
Strategic Value	C12, C13	Blockchain as a driver of innovation, competitive advantage, and stakeholder engagement.

In the final stage of analysis, categories were synthesized into overarching themes that provide a conceptual understanding of blockchain's potential in accounting. These themes represent the core findings of the study and form the basis for the discussion. Table 3 outlines the five themes derived from the analysis.

Table 3. Final Themes Identified in the Study

Theme	Description	Representative Categories
Enhancing Financial Transparency and Reliability	Blockchain strengthens data integrity, reduces information asymmetry, and enhances trust between managers and stakeholders.	Transparency & Trust
Improving Efficiency in Accounting and Auditing	Distributed ledger and smart contracts automate recordkeeping, compliance, and audit processes, reducing costs and delays.	Efficiency & Automation
Strengthening Risk Management and Control Mechanisms	Immutable records support continuous auditing and fraud detection, providing stronger internal control.	Risk & Control
Overcoming Challenges of Adoption and Implementation	High costs, technical complexity, and uncertain regulations hinder adoption, particularly in traditional accounting firms.	Adoption Challenges
Strategic Transformation through Blockchain	Beyond technical efficiency, blockchain redefines organizational accountability and opens pathways to innovative financial ecosystems.	Strategic Value

Enhancing Financial Transparency and Reliability

One of the most consistent findings across the reviewed sources is blockchain's ability to increase transparency and reliability in financial reporting. The immutability of records ensures that once transactions are recorded, they cannot be altered, thereby reducing the possibility of manipulation or fraud. Transparency is also enhanced through distributed ledger systems that allow stakeholders simultaneous access to the same set of verified financial data. This minimizes information asymmetry between managers, auditors, and shareholders, reinforcing accountability within organizations.

Improving Efficiency in Accounting and Auditing

A second theme centers on efficiency gains facilitated by blockchain. Smart contracts and automated validation of transactions streamline processes such as recordkeeping, payment processing, and compliance checks. By reducing the need for intermediaries and manual verification, blockchain lowers operational costs and accelerates the speed of accounting tasks. Auditing, in particular, benefits from continuous and real-time data access, allowing auditors to perform assessments more quickly and accurately.

Strengthening Risk Management and Control Mechanisms

Another important theme involves blockchain's contribution to risk management and control. The distributed nature of the ledger ensures that fraudulent activities are more easily detectable and harder to conceal. Continuous auditing becomes feasible, enabling organizations to monitor financial data in real time and detect irregularities promptly. This functionality supports stronger internal controls and reduces the likelihood of both intentional fraud and unintentional errors.

Overcoming Challenges of Adoption and Implementation

Despite its benefits, the findings also reveal significant challenges to blockchain adoption in accounting. High implementation costs, the need for specialized technical expertise, and concerns about scalability remain major obstacles. Additionally, regulatory uncertainty surrounding blockchain-based systems creates hesitation among organizations, particularly those operating in heavily regulated financial sectors. Organizational resistance to change also emerges as a recurring barrier, as traditional firms may be reluctant to alter established accounting practices.

Strategic Transformation through Blockchain

Finally, the analysis highlights blockchain's role in driving strategic transformation. Beyond operational improvements, blockchain fosters innovation in organizational governance and stakeholder engagement. By enhancing trust, accountability, and transparency, it creates new opportunities for collaboration across firms and

industries. The technology not only modernizes accounting systems but also positions organizations to respond more effectively to the broader demands of digital transformation.

4. Discussion and Conclusion

The purpose of this study was to conduct a qualitative content analysis of prior research to explore the adoption of blockchain technology in accounting and auditing practices. The analysis of 15 selected sources revealed five overarching themes: enhancing financial transparency and reliability, improving efficiency in accounting and auditing, strengthening risk management and control mechanisms, overcoming challenges of adoption and implementation, and strategic transformation through blockchain. Each of these themes contributes to the understanding of blockchain's potential to transform accounting and auditing systems, while also highlighting the challenges that must be navigated for successful adoption. This discussion interprets the findings in light of prior studies, offering theoretical and practical implications for the field.

The first theme identified in this study highlights blockchain's role in enhancing financial transparency and reliability. Findings revealed that blockchain's immutability and distributed ledger capabilities significantly reduce opportunities for manipulation of financial data, while simultaneously strengthening stakeholder trust through transparent and verifiable information. This aligns with prior studies that demonstrate how blockchain enhances the quality of accounting information by reducing information asymmetry and ensuring that all parties access the same verified records [14]. Research in the banking sector further confirms that blockchain adoption improves corporate governance and the overall quality of financial disclosures [12]. Similarly, case studies conducted in emerging markets emphasize the ability of blockchain to act as a trust-enhancing mechanism in environments where traditional systems are vulnerable to inefficiencies and fraud [15]. Scholars argue that blockchain can strengthen the fundamental principles of agency theory by aligning the interests of managers and shareholders through enhanced information transparency [4]. The consistency of these findings across different contexts reinforces the conclusion that blockchain contributes to reducing agency costs and increasing financial accountability.

The second theme focuses on blockchain's role in improving efficiency in accounting and auditing. Findings indicate that blockchain facilitates real-time data access, automates verification through smart contracts, and reduces reliance on intermediaries, thereby lowering operational costs and increasing speed. These results echo the conclusions of systematic reviews which highlight blockchain's capacity to streamline accounting procedures while simultaneously ensuring regulatory compliance [5]. Studies also show that blockchain-enabled accounting systems allow auditors to access tamper-resistant records in real time, making continuous auditing feasible [16]. Literature in the public sector similarly notes how blockchain enhances efficiency in financial reporting, reducing bureaucratic delays and enabling faster decision-making [18]. In the domain of supply chain finance, blockchain has been reported to overcome barriers of assurance and accountability by reducing redundancies and ensuring transaction validity [1]. These findings collectively demonstrate that efficiency gains are not confined to technical improvements but extend to strategic benefits, including reduced transaction costs and greater organizational agility.

The third theme centers on risk management and internal control. This study found that blockchain's ability to provide immutable and transparent records strengthens organizations' capacity to detect and prevent fraud, monitor irregularities, and establish continuous auditing practices. The literature supports these conclusions, with several studies identifying blockchain as a critical tool for enhancing fraud detection and risk management in

accounting systems [10, 11]. Research on blockchain-based auditing confirms that distributed ledger technology supports auditors in identifying anomalies and ensuring integrity of the audit trail [17]. Additionally, blockchain's integration with artificial intelligence has been suggested as a means to further improve auditing quality by automating anomaly detection and enhancing predictive risk assessment [32]. The potential of blockchain to strengthen internal controls is particularly relevant in environments with weak regulatory oversight, as it reduces opportunities for manipulation and enhances compliance mechanisms [25]. These findings emphasize that blockchain not only mitigates operational risks but also enhances the credibility of financial reporting in the eyes of regulators and investors.

The fourth theme addresses the challenges of adoption and implementation. While blockchain offers substantial opportunities, the findings of this study revealed that high implementation costs, scalability limitations, lack of interoperability, and regulatory uncertainty are major obstacles. These challenges are consistent with prior research indicating that blockchain adoption in accounting remains limited due to significant technological and institutional barriers [34]. Empirical analyses show that organizational resistance to change and lack of skilled personnel further complicate adoption [13]. Moreover, developing countries face additional challenges due to limited digital infrastructure and the absence of regulatory clarity [15]. Bibliometric reviews emphasize that while the academic literature on blockchain in accounting has grown rapidly, much of the research remains conceptual, with limited empirical validation of large-scale implementations [22, 23]. Studies also point out that adoption is influenced by cultural and institutional contexts, suggesting that models of blockchain integration cannot be universally applied [19, 24]. These challenges underscore the need for comprehensive frameworks that integrate technical, organizational, and regulatory considerations to support blockchain adoption in diverse contexts.

The fifth theme highlights blockchain as a catalyst for strategic transformation in accounting and auditing. Findings indicated that beyond technical improvements, blockchain creates opportunities for innovation, competitive advantage, and cross-industry collaboration. Prior studies reinforce this perspective, showing that blockchain adoption in supply chains enhances transparency, strengthens accountability, and promotes sustainable practices [27]. Research in pharmaceutical cold chains demonstrates how blockchain ensures authenticity and reliability of transactions, lessons that are directly applicable to financial accounting [28]. Similarly, blockchain applications in medicine and counterfeit detection illustrate its potential to secure value chains and protect against fraud [29]. These cross-sectoral insights highlight blockchain's transformative capacity to redefine organizational accountability, particularly when integrated with smart contracts that automate compliance and enforceability [30]. Furthermore, blockchain education initiatives underscore the importance of preparing accounting professionals for a future where digital transformation is central to practice [21]. By fostering transparency, efficiency, and innovation, blockchain not only modernizes accounting systems but also redefines the role of the profession in the digital economy.

Taken together, the findings of this study and the supporting literature converge on the conclusion that blockchain is a disruptive technology with far-reaching implications for accounting and auditing. Its capacity to enhance transparency, efficiency, and risk management positions it as a valuable tool for addressing long-standing challenges in financial reporting and assurance. However, the persistent barriers to adoption suggest that blockchain's transformative potential will only be realized through coordinated efforts that address technological, regulatory, and organizational dimensions. The literature makes it clear that blockchain adoption cannot be viewed solely as a technological upgrade; rather, it represents a paradigm shift in accounting practices and professional standards.

This study is subject to several limitations. First, the content analysis was limited to 15 sources that met the inclusion criteria based on CASP assessment. While these sources represent a diverse set of perspectives, they may not capture the full breadth of literature on blockchain adoption in accounting and auditing. Second, the reliance on qualitative analysis means that findings are interpretive and may not fully account for variations across industries and national contexts. Third, the study did not include empirical fieldwork or interviews with practitioners, which could have provided additional insights into practical challenges and organizational experiences. Lastly, the rapidly evolving nature of blockchain technology means that some findings may quickly become outdated as new developments and applications emerge.

Future research should aim to expand the empirical evidence base on blockchain adoption in accounting and auditing. Comparative studies across industries and countries could provide deeper insights into the contextual factors that influence adoption. Longitudinal studies are also needed to assess the long-term impacts of blockchain on financial transparency, efficiency, and risk management. Additionally, interdisciplinary approaches that integrate perspectives from law, information systems, and management could enrich understanding of blockchain's broader implications. Exploring the convergence of blockchain with other technologies such as artificial intelligence, big data analytics, and the Internet of Things would also be valuable in forecasting the future trajectory of digital transformation in accounting.

For practitioners, the findings of this study suggest several actionable strategies. Organizations should invest in developing blockchain literacy among accounting professionals to ensure readiness for technological adoption. Pilot projects can help firms evaluate the costs and benefits of blockchain integration before large-scale implementation. Regulators and standard-setters should work collaboratively with industry stakeholders to develop clear frameworks that address legal, ethical, and technical aspects of blockchain use in accounting. Firms should also consider blockchain as part of a broader digital transformation strategy, aligning it with other emerging technologies to maximize efficiency and competitiveness. Finally, professional bodies and universities should prioritize blockchain education in curricula to prepare the next generation of accountants for the demands of a rapidly evolving digital landscape.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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