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Blockchain and Accounting: Contemporary Benefits and Challenges

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ABSTRACT

The rapid digital transformation has led to substantial changes in the way accounting information is generated, validated, and disclosed, creating the need for new alignments between accounting practices and emerging technologies. This study aims to investigate, through a Systematic Literature Review (SLR), how technologies such as blockchain, artificial intelligence, and automation have been addressed in the accounting domain, especially concerning the quality of information, auditing practices, and regulatory frameworks. A total of 81 review articles were initially identified in the Web of Science database, and after applying inclusion and exclusion criteria, 55 articles composed the final analytical corpus. The results were categorized into three thematic axes: (i) benefits and potentialities of technological adoption in improving informational quality and financial performance; (ii) disruptive innovations in accounting and auditing practices based on decentralized technologies; and (iii) institutional, technical, and regulatory challenges in integrating new technologies into accounting systems. The findings demonstrate that although blockchain and related tools offer enhanced transparency, traceability, and data security, there are still significant obstacles involving interoperability, standardization, and legal compliance. Additionally, the literature suggests that accounting professionals must expand their competencies to adapt to a scenario that demands both technical expertise and ethical judgment. It is concluded that the incorporation of emerging technologies into accounting represents not merely an operational enhancement, but a paradigm shift requiring strategic vision, institutional commitment, and an openness to ongoing innovation. Accounting, as an applied social science, plays a pivotal role in balancing technological progress with trust, accountability, transparency, and regulatory compliance.

INTRODUCTION

The rapid digital transformation in recent decades has been promoting substantial changes in the way organizations produce, record, control and validate accounting information. These transformations are not restricted to the technical-operational field, but reverberate transversally on the institutional pillars, governance arrangements, regulatory frameworks, and the very epistemology of accounting as an applied science. In this scenario, emerging technologies such as blockchain, artificial intelligence, big data, machine learning, and audit automation are now occupying a strategic position in discussions about the future of accounting practice, driving debates involving innovation, standardization, information security, and user trust.

Historically, accounting has evolved in parallel with the needs of economic systems and the complexity of organizational structures. From manual record books to ERP-integrated digital platforms, each technological shift has imposed new responsibilities on accounting professionals and demanded adaptations in terms of technical training and ethical conduct. The current technological wave, however, is distinguished by the speed and depth of the changes it introduces, creating unprecedented challenges in reconciling automation with control, decentralization with accountability, and algorithmic decision-making with normative frameworks. These dynamics reinforce the urgency of a renewed approach to accounting education, institutional governance, and professional regulation in light of this ongoing digital revolution.

According to Iudícibus *et al.* (2018), accounting has, as its central mission, the generation of useful information for the economic decision-making process, and it is essential that this information is relevant, reliable, understandable and timely. This qualitative triad, however, is put to the test in the face of the incorporation of disruptive technologies, which profoundly alter the information flows, the recognition and measurement criteria, and the mechanisms of technical and institutional validation. The decentralization promoted by distributed ledgers such as blockchain, for example, challenges traditional control and auditing logics, while expanding the traceability, immutability, and transparency of financial ledgers. In

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turn, artificial intelligence applied to auditing allows the automation of processes, the anticipation of risks and the large-scale analysis of data, enhancing the supervisory and predictive function of accounting.

Despite the growing academic and professional interest in the subject, there is still a relevant gap in the literature regarding the critical and integrated systematization of these technologies from the accounting perspective. There is a lack of research that addresses the effects of technological adoption on the quality of accounting information, its impacts on governance, and the practical and regulatory challenges involved. Most studies still focus on fragmented analyses, sometimes extolling the benefits and potentialities, sometimes pointing out risks and limitations, without, however, consolidating a comprehensive view that articulates technical, institutional, and regulatory aspects in a coherent manner. The absence of this integrated approach compromises the formation of a robust theoretical body, capable of guiding responsible and sustainable practices in the use of these innovations in the context of accounting.

In this context, the guiding question that guides this investigation emerges: how do the benefits and limitations associated with the adoption of emerging technologies impact the quality of accounting information and the governance standards related to it? This question seeks not only to map trends and empirical evidence, but also to identify contradictions, barriers, and points of tension that cross the interface between technological innovation and accounting standardization. It is assumed that technology, by itself, is not neutral, nor does it automatically guarantee best practices. Institutional, ethical and professional mediation is necessary for its effects to be positive and aligned with the fundamental principles of the accounting profession.

In view of this scenario, this article aims to systematically analyze how emerging technologies have been discussed in the field of accounting, with special attention to the impacts on the quality of accounting information, audit processes, transparency mechanisms, adherence to international financial reporting standards, and the challenges associated with governance and regulation. To this end, a Systematic Literature Review (RSL) was adopted as a methodological approach, selecting 81 articles from the Web of Science database, published between 2021 and 2025, with open access and review typology. After rigorous screening, 55 articles composed the definitive corpus of analysis.

The structure of the article is organized into four main sections: in addition to this introduction, the theoretical foundation that discusses the accounting principles and the fundamentals of emerging technologies is presented; the methodology section describes the process of selecting and categorizing studies; The results and the discussion are divided into three analytical axes – benefits, risks and institutional challenges; and, finally, the conclusions rescue the main findings and suggest paths for future research and practical applications in the accounting field.

LITERATURE REVIEW

Accounting Principles and Fundamentals

According to Iudícibus *et al.* (2018), accounting is an applied social science whose main objective is to provide useful information for economic decision-making. It is based on principles such as the relevance, reliability, comparability and comprehensibility of financial information. These qualitative characteristics are essential to ensure that users of financial statements can trust the data presented and make informed decisions.

Within this aspect, one way to improve this quality is through financial reports that show the adoption of International Financial Reporting Standards (IFRS) to improve the quality of accounting information, promoting greater transparency and uniformity in financial reporting, which corroborates, to a certain extent, the sustainable development of companies (Ait Bahabbaz & Karim, 2023a). Bellucci *et al.* (2022) also highlight that the adoption of these standards and convergence with emerging technologies, such as blockchain, can significantly improve informational quality, strengthening trust and comparability in financial reporting.

In addition, the quality of accounting information, as declared under IFRS standards, plays a crucial role in improving the financial performance of companies. The qualitative characteristics of accounting information, such as relevance and faithful representation, are positively correlated with financial performance in the medium and long term, encouraging companies to adopt international accounting standards (Ait Bahabbaz & Karim, 2023b). Moxotó *et al.* (2025) corroborate this understanding by showing that the consistent application of high-quality accounting practices generates positive impacts in terms of regional economic development and corporate governance.

Han et al. (2023) also point out that aligning traditional auditing and accounting practices with emerging digital technologies can amplify the benefits obtained by adopting IFRS, especially in terms of efficiency and accuracy of information. These authors highlight that this technological integration directly contributes to the confidence of the various stakeholders involved in the use of this financial information.

The importance of accounting information goes beyond the normative and theoretical aspect, demonstrating direct impacts on organizational performance. Chowdhury *et al.* (2021) analyzed companies in the industrial sector and confirmed that the quality of accounting information is positively associated with financial performance, showing that the standardization and consistency of records strengthen decision-making mechanisms. This result is even more sensitive in the context of small and medium-sized enterprises (SMEs), which often lack formal accounting structures.

Amosah et al. (2023) reinforce this argument by showing that efficient accounting practices in SMEs are decisive for their growth, sustainability, and access to credit, especially in developing economies. The absence of these practices



can compromise the continuity of these organizations, evidencing the need for applied accounting, which goes beyond legal compliance and is inserted as a strategic management instrument (Iudícibus *et al.*, 2018).

In view of these transformations in the conceptual and normative bases of accounting, it becomes evident the need to rethink organizational arrangements, information production models and corporate governance from a perspective of institutional adaptation. It is in this scenario of structural change that emerging technologies begin to occupy strategic space, not only as operational tools, but as catalyzing agents of new ways of working, reporting and accountability. Agrifoglio and de Gennaro (2023) highlight that the integration of these technologies into accounting processes – including artificial intelligence, big data, and blockchain - represents not only a technological innovation, but a disruption in the traditional paradigms of the accounting profession, requiring reconfigurations in terms of competencies, values, and organizational structures.

Emerging Technologies Not Organizational Context

The advancement of emerging technologies has reshaped several economic sectors, offering solutions that combine security, transparency, decentralization, and automation. These innovations profoundly impact the way organizations operate, make decisions, and build reliable information systems.

Aditya et al. (2023) illustrate this scenario when discussing the use of blockchain in robotics, highlighting benefits such as traceability and reliability in autonomous systems, as well as proposing hybrid approaches that integrate sensors and distributed control. Chaganti et al. (2023) address vulnerabilities in blockchain systems, pointing out how denial-of-service (DoS) attacks still pose challenges even in decentralized environments, suggesting early detection strategies based on artificial intelligence.

Complementing this approach, Rico-Peña et al. (2023) explore the models that characterize blockchain properties, such as immutability and transparency, applicable to supply chains, financial systems, and other organizational areas. Taherdoost (2023) broadens this scope by critically analyzing the convergence between blockchain and machine learning, emphasizing the ethical and methodological challenges in smart data governance.

Cybersecurity and digital governance emerge as central dimensions in this panorama of technological transformation. Technologies such as blockchain have been employed to mitigate critical vulnerabilities in IoT devices, enable decentralized control structures in federated machine learning environments, and raise important debates about the compatibility between innovation and regulatory frameworks such as GDPR. These advances indicate a move towards more autonomous, auditable, and resilient systems, albeit permeated by technical, legal, and operational challenges (Bakhshi *et al.*, 2023; Asif *et al.*, 2023; Han & Park, 2023).

MATERIALS AND METHODS

This study used the Systematic Literature Review (RSL) method with the objective of identifying, classifying, and critically analyzing recent academic production related to the application of emerging technologies — with an emphasis on blockchain technology — in the fields of accounting, auditing, and accounting information systems. The choice of the RSL is justified by its ability to provide a robust, transparent and reproducible synthesis of the available knowledge, ensuring the traceability of the methodological steps and consistency in the interpretation of the findings.

The search was carried out in the Web of Science (WoS) database, internationally recognized for its indexing rigor and interdisciplinary scope, especially in the areas of applied social sciences and emerging technologies. The search strategy adopted combined specific descriptors connected by Boolean operators, namely:

(blockchain OR "distributed ledger" OR DLT) AND (accounting OR auditing OR "financial reporting" OR bookkeeping OR "accounting information systems" OR AIS OR "management accounting").

The following filters were applied:

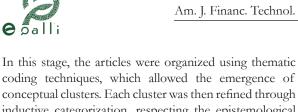
- (i) Type of document: review articles;
- (ii) Publication period: from 2021 to 2025;
- (iii) Open access, in order to ensure the transparency, timeliness and accessibility of the data analyzed. As an initial result, 82 articles were identified.

To ensure methodological rigor, a structured protocol was developed and applied during the selection and analysis process. This protocol followed four main steps:

- (1) Database selection and search string validation;
- (2) Application of filters and preliminary screening;
- (3) Critical reading of metadata (title, abstract, keywords); and
- (4) Semantic classification and refinement of the final corpus. The process was documented in an Excel spreadsheet to ensure traceability and replicability of the procedure.

The subsequent screening was performed in an Excel spreadsheet and followed a structured protocol for reading the titles, abstracts and keywords. The exclusion criteria included: duplication of records, lack of thematic adherence to the accounting field, exclusively technical focus on blockchain technology without dialogue with accounting or auditing systems, and reviews that were limited to the legal or computational scope without interface with the governance of accounting information. On the other hand, the inclusion criteria prioritized studies with discussion applied to accounting practice, the normative-financial environment and auditing functions, as well as approaches to information governance, regulatory standardization and organizational impacts.

After this careful filtering, 55 articles composed the final corpus of the review. For the analysis, a qualitative approach was adopted based on the detailed reading of the abstracts, introductions and conclusions, allowing the identification of semantic convergences and the construction of analytical categories.



oding techniques, which allowed the emergence of conceptual clusters. Each cluster was then refined through inductive categorization, respecting the epistemological alignment of the articles with the central objective of the study. The triangulation of results involved a confrontation between theoretical propositions and empirical findings, ensuring a critical reading anchored in academic rigor.

The content was then organized into three thematic blocks based on conceptual affinities and recurrence of topics:

Benefits and potential of technological adoption; Risks, barriers and constraints of implementation; Institutional and regulatory implications.

In addition, 09 key authors were selected, based on three cross-criteria: (a) depth in the discussion on accounting impacts; (b) representativeness within the RSL sample; and (c) critical contribution to the construction of points and counterpoints in interpretative analysis. These authors composed the empirical core of the Results and Discussion section, and were organized based on a funnel argumentative logic, starting from broad analyses of technological innovation and arriving at specific applications in the field of accounting. This triangulation allowed an integrated reading between theory and recent evidence, respecting the rigor and replicability required in systematic reviews.

RESULTS AND DISCUSSION

The analysis of the 09 selected studies was organized into three main categories, each representing a distinct axis of reflection on the incorporation of emerging technologies in accounting: (1) benefits and challenges of technological integration, (2) institutional and regulatory impacts, and (3) innovations in accounting practices with an emphasis on blockchain adoption. The argumentative construction of this section follows the logic of the funnel, starting from broad and conceptual perspectives until reaching specific applications related to accounting.

Quality of Accounting Information and Business Performance

The relationship between the quality of accounting information and organizational performance emerges as one of the main convergent axes between the empirical studies analyzed and the theoretical framework presented. Iudícibus *et al.* (2018) already defended accounting as a social instrument aimed at generating useful information, based on the relevance and reliability of data. This perspective is reinforced by Ait Bahabbaz and Karim (2023a), who argue that the adoption of IFRS standards raises the informational standard, promoting greater transparency and predictability in accounting reports.

In this sense, the findings of Chowdhury et al. (2021) empirically demonstrate that the quality of accounting information, measured by disclosure metrics and regulatory adequacy, is positively correlated with the

financial performance of firms, especially in the context of emerging economies. These results dialogue with the analysis of Amosah *et al.* (2023), which focus on micro and small firms, showing that good bookkeeping and accounting records practices directly impact their survival and expansion — which expands the applicability of accounting theory beyond large corporations.

The strategic relevance of accounting is also connected to the study by Ait Bahabbaz and Karim (2023b), when they point out that quality accounting information, shaped by international principles, positively influences financing, investment, and sustainable growth decisions. Moxotó et al. (2025) reinforce this premise by analyzing the success of initial coin offerings (ICOs) in Latin American markets, demonstrating that accounting standardization and transparency are decisive vectors for the success of these operations.

Complementing this analysis, Han et al. (2023) highlight that trust in accounting information is increased when combined with the use of emerging technologies, such as blockchain, which enhances traceability and reduces manipulation risks. This bridge between informational quality, performance, and technological accounting innovation is also evidenced by Bellucci et al. (2022), who review empirical practices and reveal that the use of blockchain and digital accounting systems strengthens comparability and stakeholder trust.

Therefore, the triangulation reveals that there is a solid coherence between the theoretical bases and the most recent empirical findings: both the classical literature and contemporary studies converge on the premise that the quality of accounting information is a strategic asset for organizational performance, being amplified by the adoption of international standards and new technologies.

Emerging Technologies and Transformations in Accounting Practice

The emergence of disruptive technologies has caused significant transformations in accounting practices and in traditional models of auditing and informational governance. In the theoretical sphere, Bellucci et al. (2022) have already argued that the convergence between blockchain, digital systems, and accounting represents an advance in the automation of records, the traceability of transactions, and the reliability of financial data. This premise is supported by what Agrifoglio and de Gennaro (2022) classify as a new paradigm of accounting work, in which technological adoption redefines not only processes, but also the role of professionals in the area. Sarwar et al. (2023) empirically illustrate this disruption by examining the use of triple-entry accounting in B2B transactions through blockchain. According to the authors, this innovation reduces the need for reconciliation between parties, generates simultaneous and auditable records, and increases the degree of security in bookkeeping. This model, in turn, represents a natural evolution in the face of the limitations of double-entry systems — a founding concept of accounting practice



since Luca Pacioli.

In the same vein, Johri and Singh (2023) explore how decentralized platforms have been shaping auditing practices, highlighting the possibility of continuous audits and automatic tracking. This advance, although promising, still faces obstacles in terms of standardization and interoperability between systems, which refers to the warning of Iudícibus *et al.* (2018) about the need for clear and understandable norms that ensure interpretative uniformity.

Broadening the discussion, Asif et al. (2023) propose a blockchain-based decentralized governance framework for federated machine learning environments. While not directly about accounting, the study illustrates the potential of decentralized models in managing sensitive and auditable data — a perspective that is highly applicable to digital accounting systems, given the growing demand for simultaneous privacy and transparency. This point dialogues with Han and Park (2023), who address the tensions between the immutability of blockchain and GDPR principles, such as the right to be forgotten. Such a legal and ethical clash reinforces the importance of an accounting architecture that is at the same time robust, flexible and legally compatible.

Finally, Bakhshi et al. (2023) address cybersecurity in IoT devices, pointing out that blockchain can reinforce the integrity of records and protect integrated accounting infrastructures in industrial or remote environments. This finding, although transversal, reinforces the idea that the accounting of the future will necessarily be anchored in technological layers that go beyond traditional accounting software.

Triangulation reveals, therefore, that the challenges and opportunities brought by emerging technologies not only impact the efficiency of accounting systems, but also impose new normative, ethical, and operational requirements. The role of the accountant, in this scenario, is now resized: from a recorder to an architect of reliable information.

Limitations, Risks, and Barriers to Technological Adoption in Accounting

Despite the promises of efficiency, traceability, and innovation, the adoption of emerging technologies in accounting encounters structural, regulatory, and operational barriers that compromise its universalization. Bellucci *et al.* (2022) had already warned that the implementation of blockchain and associated technologies requires, in addition to technical training, a review of organizational infrastructures and reporting standards. This point is reinforced by Han *et al.* (2023), who, when dealing with the application of blockchain in auditing, highlight the resistance of stakeholders in the face of technical complexity, lack of regulatory clarity, and shortage of skilled labor.

Johri and Singh (2023), when systematizing auditing practices in decentralized environments, observe that, although there are gains with continuous auditing and automation, the absence of data standardization and the difficulty of integration between platforms limit its effectiveness. This finding converges with the warning of Agrifoglio and Gennaro (2022), who highlight that technological advancement must be accompanied by a cultural and institutional transformation in accounting firms, so that systems do not become isolated technological enclaves.

The legal aspect gains centrality with Han and Park (2023), when they explore the conflict between the principles of blockchain's immutability and the guidelines of the General Data Protection Regulation (GDPR). The impossibility of erasing records collides head-on with the right to be forgotten and rectified, requiring sophisticated technical solutions such as permissioned blockchains, data anonymization, and the use of cryptographic layers. This tension refers to the reflection of Iudícibus *et al.* (2018) on the role of accounting as an open system, which must adapt to legal and social demands.

Furthermore, Asif et al. (2023) warn that blockchain-based decentralized frameworks face challenges in latency, computational cost, and regulatory inconsistencies. Such obstacles limit the scalability and practical applicability of these models, especially in companies with less robust structures or located in strict regulatory contexts. In a complementary sense, Bakhshi et al. (2023) address firmware vulnerabilities in IoT devices, showing that, even with the use of blockchain, security flaws persist, requiring integrated solutions and continuous technological updating.

CONCLUSION

This study investigated, through a Systematic Literature Review, how emerging technologies — especially blockchain — have been addressed in the field of accounting. A total of 55 articles from the Web of Science database were analyzed and categorized into three thematic axes: (i) quality of accounting information and organizational performance, (ii) transformation of accounting and auditing practices, and(iii) risks and barriers to technological adoption. The first category highlighted that blockchain enhances the quality of accounting information by ensuring traceability, immutability, and transparency, thereby increasing stakeholder confidence and supporting decision-making in complex economic contexts.

The second category showed that disruptive technologies are reshaping traditional accounting practices, promoting models like triple-entry accounting, continuous auditing, and decentralized governance mechanisms.

These changes reposition the accountant's role toward system design and strategic governance, demanding new digital competencies, interdisciplinary knowledge, and curricular adjustments in accounting education. The third category revealed persistent challenges, such as high implementation costs, regulatory gaps, and organizational resistance to change.

Despite these barriers, the literature points to blockchain's



growing relevance as a key enabler of trust, transparency, and innovation in contemporary accounting. Its integration represents a significant paradigm shift in how accounting information is produced, validated, disseminated, and ultimately used for corporate governance and regulatory compliance.

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