The Impact of Blockchain on Corporate Financial Reporting Based on Iranian Reporting Standards and IFRS

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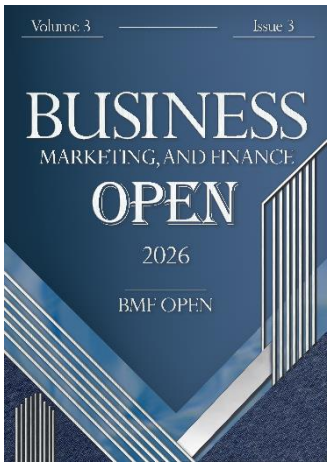

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Abstract: The purpose of this study is to examine the impact of blockchain technology on the financial reporting of Iranian companies and to identify the implementation challenges and opportunities within the framework of Iran's national accounting standards and the International Financial Reporting Standards (IFRS). To achieve this objective, the grounded theory method was employed, which is a qualitative inductive research strategy. The statistical population consisted of 15 key experts and specialists in the fields of blockchain technology and financial reporting, from whom data were collected through in-depth structured interviews. The coding process included three stages—open, axial, and selective—which led to the development of a paradigmatic model comprising six main categories: causal conditions, central phenomenon, contextual conditions, intervening conditions, strategies, and consequences. The findings revealed that blockchain can enhance the transparency, reliability, and timeliness of financial information; however, such enhancement depends on gradual implementation, the formulation of localized guidelines, and strategic alignment with IFRS. Legal gaps regarding asset tokenization, conflicts between disclosure requirements and competitive privacy, and the lack of technological infrastructure create major challenges for implementation. The study presents an operational roadmap over a 51-month horizon and a risk–opportunity matrix for balanced management of this transformation. The conclusion emphasizes that blockchain is not merely a technological solution but rather a multilayered transformative mechanism that requires coordinated collaboration among professional, regulatory, governmental, and educational institutions.

Keywords: Blockchain, Financial Reporting, Information Quality, Accounting Standards, IFRS, Grounded Theory, Iran

1. Introduction

High-quality financial reporting is a cornerstone of efficient capital markets because it reduces information asymmetry, disciplines managerial behavior, and supports resource allocation decisions across the economy [1, 2]. Research has shown that when reporting is timely, reliable, and comparable, firms are less prone to short-termism and can improve investment efficiency by aligning internal decisions with external monitoring [3-5]. Yet, persistent concerns about earnings management, data integrity, and fragmented system architectures continue to challenge the usefulness of financial statements in both emerging and developed markets [6-8]. Against this backdrop, a new class of digital technologies—particularly distributed ledgers and smart contracts—has been proposed as a structural remedy capable of enhancing the

qualitative characteristics of financial information while reshaping audit, governance, and disclosure processes [9-11].

Blockchain's promise in accounting and assurance has been framed through concepts such as triple-entry accounting, immutable audit trails, programmable control points, and near real-time reporting [9, 12, 13]. The technology is not merely another database; it is a transaction fabric that embeds consensus, time-stamping, and non-repudiation by design [14, 15]. Industry commentary and early use cases in financial intermediation underscore four families of applications—payments and clearing, identity/KYC, asset tokenization, and trade finance—that together foreshadow how accounting subsystems may be re-architected for verifiability and automation [16, 17]. For preparers and auditors, these properties translate into potentially fewer manual reconciliations, stronger provenance of records, and a redesigned control environment centered on shared ledgers rather than siloed enterprise systems [13, 18].

A growing scholarly stream examines blockchain's disruption of auditing, from shifting evidence collection toward continuous data assurance to the verification of smart-contract logic itself [10, 11]. Empirical and analytical work further links distributed ledgers to audit pricing, misstatements, and regulatory design, arguing that transparency externalities can lower information risk while creating new oversight tasks for standard setters [19]. Complementary research in fraud analytics and automation positions blockchain as an enabling substrate for anomaly detection, segregation of duties, and machine-assisted testing, thereby expanding auditors' ability to move from sample-based to population-level procedures [20, 21]. In the public sector, proposals for blockchain-supported government audit highlight the potential for tamper-resistant registries and instantly traceable expenditure flows [22].

From the vantage point of financial reporting quality, the conceptual bridge between technology and accounting is the set of qualitative characteristics—relevance, faithful representation, comparability, verifiability, timeliness, and understandability—articulated in standard-setting frameworks and applied through recognition, measurement, and disclosure rules [1, 23]. The literature links transparency to tax outcomes and governance, suggesting that clearer reporting can curb opportunism and improve effective tax rates [24, 25]. Studies on ethics, auditor tenure, and detection of earnings management show that institutional features of assurance interact with reporting technology, shaping the credibility of numbers released to markets [6, 26]. In parallel, integrated reporting and conceptual work in Iran emphasize the need for a coherent theoretical basis to absorb digital innovations without compromising the information needs of diverse stakeholders [27, 28].

Recent systematic reviews and regional studies point to rising interest in how blockchain can strengthen transparency and security in financial reporting, while also acknowledging open questions about standard alignment, auditability of code, and organizational readiness [29-31]. Evidence from emerging markets connects digital transformation to accountability improvements, but warns that institutional voids may blunt technical benefits unless governance and capacity constraints are addressed [32, 33]. In practice, many firms remain at the stage of upgrading accounting information systems (AIS), deploying training, and adopting modular digital tools that can later interoperate with distributed ledgers [34-36]. This staged modernization is consistent with the view that measurement choices and AIS design jointly condition the usefulness of reported figures [2, 34].

The microfoundations of technology adoption matter. Organizational leverage, liquidity, and size can shape tax behavior and ultimately reporting incentives [37]. Board and firm characteristics also correlate with tax transparency, underscoring that governance features mediate the relationship between reporting systems and public accountability [8]. At the ecosystem level, research on corporate governance and social responsibility in

knowledge-based firms suggests that blockchain's traceability and stakeholder visibility can reinforce ethical conduct and compliance—if embedded within coherent governance frameworks [17, 38]. Still, technology can introduce fresh risks: public ledgers may enable "wash" or "spoof" patterns of economic signaling if not paired with appropriate controls, and hyper-transparency may unintentionally reveal competitively sensitive information [18, 39].

A central debate concerns recognition and measurement for crypto-assets and tokenized claims under IFRS. Competing models have been proposed for classifying and measuring cryptocurrencies, intangible tokens, and programmatic rights, each with implications for volatility, impairment, and disclosure [28]. At the same time, the architecture of blockchain-based accounting systems—from permissioned networks to smart-contract layers—conditions how performance obligations, revenue timing, and control transfer are operationalized under standards such as IFRS 15 [11, 12]. In supply chains and multi-party processes, distributed ledgers can encode social-sustainability transparency, illustrating how cross-organizational data can be synchronized to support both reporting and assurance [17]. For regulators and exchanges, case evidence on retail tech (e.g., sensor-rich commerce) shows how digital footprints reshape internal controls and financial data capture, offering analogies for ledger-native reporting [40].

In Iran and comparable emerging markets, thought leadership and conference scholarship document rising interest in blockchain's accounting and auditing applications, yet also catalog practical barriers: legacy systems, skill gaps, standard-setting lag, and the economics of infrastructure [7, 41, 42]. Practitioner-oriented texts in Persian examine exchange operations, securities settlement, and ledger integration, offering localized pathways for migration to shared-record architectures [43]. Meta-synthesis of the auditing profession points to efficiency levers—continuous auditing, automated reconciliations, and machine-verifiable evidence—while warning that the audit function must expand its competence to include code review and oracle governance [13, 44]. In parallel, empirical work on reporting quality and banking stability highlights that better information environments dampen systemic risk—an important policy objective for markets considering ledger adoption [45].

Internationally, the literature is converging on three strategic themes. First, blockchain can be an infrastructure for verifiable data that reduces the scope for ex post manipulation, subject to careful permissioning and privacy design [15, 18]. Second, programmable controls via smart contracts and oracles can operationalize recognition and measurement rules, but they also create a novel audit object—the code—that must be tested for completeness, accuracy, and resilience [10, 11]. Third, ecosystem governance—standards, regulators, industry consortia, and academia—must co-evolve to address taxonomy, liability, and assurance over algorithmic processes [14, 29, 31]. Studies of AIS implementation demonstrate that incremental capability building—in system configuration, data standards, and user training—improves reporting output quality and sets the stage for more advanced adoption such as tokenized assets and shared ledgers [34, 35]. Cross-functional analyses of information science integration likewise suggest that data stewardship and metadata governance are prerequisites for trustworthy automation [36].

Methodologically, scholars blend conceptual analysis, field evidence, and design science. Conceptual frameworks clarify the mapping from qualitative characteristics to control objectives and testing strategies [1, 23]. Field work in SMEs, emerging markets, and sectoral pilots documents tangible benefits—cycle-time reductions, fewer posting errors, and improved audit trails—while contextualizing challenges in infrastructure, privacy, and change management [30, 32, 46]. Pilot experiences in banks and financial services illustrate permissioned-ledger patterns that preserve confidentiality while enabling consistent, tamper-evident records across participants [12, 16]. From a regulatory and tax perspective, integrated reporting and transparency studies highlight how enhanced

disclosure quality influences stakeholder trust and fiscal outcomes, pointing to policy complementarities with digital transformation [24, 25, 27].

Notwithstanding these advances, key gaps remain. Adoption models specific to management accounting contexts are still being refined to capture organizational readiness, perceived usefulness, and risk perceptions within the cost-benefit calculus faced by controllers and CFOs [47]. Governance-focused research in technology sectors indicates that blockchain can reinforce ESG accountability, but only if boards and internal audit functions retool their oversight to include algorithmic controls and data-sharing agreements [26, 38]. Meanwhile, voluntary versus mandatory disclosure dynamics persist in the background: the same architecture that enables real-time transparency could, without calibrated standards, either overwhelm users with noise or inadvertently expose competitively sensitive positions [18, 39]. For multinational supply chains and platform ecosystems, the design of cross-jurisdictional identity, oracle, and settlement layers will determine whether ledger-based reporting remains a pilot novelty or becomes a mainstream backbone [12, 17].

The human and organizational dimensions are decisive. Studies of digital training and technology adoption emphasize that capability development, structured change management, and clear role definitions are necessary to move from prototype to scaled implementation [34, 35]. Work on robotics and automation in accounting cautions that task redesign—not mere task substitution—produces sustainable productivity and control gains [21]. Library and information-science perspectives add that curation, classification, and retrieval frameworks must be integrated into financial data pipelines to support auditability and decision usefulness [36]. In decision contexts where leverage, liquidity, and firm size condition tax aggressiveness, transparent, rule-driven systems may either constrain opportunism or shift it into new technical margins—an empirical question that merits sector-specific analysis [37]. For preparers in retail and platform settings, sensor-augmented commerce shows how digital traces can be harnessed for real-time accounting, raising questions about data governance and privacy that are directly germane to permissioned ledgers [40].

For Iran's market institutions, conceptual and policy work has begun to outline a roadmap where localized guidance, IFRS convergence, and coordinated capacity building can embed blockchain within the reporting infrastructure [27, 43, 44]. Iranian conference contributions and professional essays also underscore the need for codifying token recognition, audit-trail standards, and role-based access that balance transparency with confidentiality in competitive environments [7, 41, 42]. Complementary inquiries into banking stability and reporting quality reinforce the policy salience of robust information environments for financial resilience [45]. Finally, international systematic reviews and conceptual syntheses reaffirm that while blockchain can be an enabler of transparency and security, its benefits are contingent on standard-setting agility, auditor re-skilling, and interoperable AIS design [28, 29, 31].

In sum, the literature converges on a thesis that blockchain is best understood not as a plug-in tool but as an institutional technology: one that reconfigures how evidence is generated, how obligations are encoded and executed, and how assurance is provided across organizational boundaries [9, 10, 13]. Realizing this potential requires (i) mapping qualitative characteristics to ledger capabilities and control objectives; (ii) aligning recognition, measurement, and disclosure with programmable logic; (iii) specifying audit procedures for code and data; and (iv) building organizational capacity through AIS modernization and training [11, 23, 34, 35]. This study aims to develop a conceptual framework for integrating blockchain technology into financial reporting to enhance transparency, reliability, and auditability in emerging markets.

2. Methodology

This study, aimed at presenting a conceptual model for the impact of blockchain on the financial reporting of companies listed on the Tehran Stock Exchange, is categorized as a qualitative research study from a paradigmatic perspective. Considering the emerging and interdisciplinary nature of the topic (the intersection of blockchain technology with accounting and financial reporting) and the lack of localized theoretical foundations in this area, the grounded theory method was selected as the primary research approach. Grounded theory is an inductive research strategy that enables the researcher to discover, conceptualize, and develop theory directly from empirical data and field observations, particularly through in-depth interviews. Rather than testing pre-existing theories, this method ensures the construction of a new theory that is fully aligned with the realities of the Iranian context and the perspectives of experts. The research process involved three stages of coding—open, axial, and selective—which ultimately led to the development of the study's paradigmatic model.

The statistical population of this study consisted of experts and key specialists possessing sufficient knowledge and experience in the overlapping domains of blockchain technology and financial reporting (accounting and auditing) within the context of publicly listed companies in Iran.

Selecting specialists from diverse fields (accounting/auditing, information technology, regulatory institutions, and the capital market) was essential because the phenomenon of blockchain in financial reporting is inherently interdisciplinary. Conducting interviews exclusively with accountants or solely with IT experts would not provide a comprehensive understanding of the economic, technical, legal, and regulatory dimensions of the subject. Therefore, the goal was to collect insights from all key stakeholders—including information producers (the accounting/auditing profession), regulators (executive and supervisory bodies), and information users (capital market participants and academic scholars)—through purposive and subsequently theoretical sampling, in order to construct a rich and multidimensional theory.

Sampling began with purposive selection (to identify initial experts) and continued using the theoretical sampling method. The interview process proceeded iteratively and simultaneously with data analysis, and the stopping criterion was the attainment of theoretical saturation.

- In total, 17 in-depth interviews were conducted.
- Two interviews were excluded due to insufficient expertise or lack of depth in responses (outliers).
- Data from 15 valid interviews formed the basis of the final analysis.

Theoretical saturation was achieved after the fifteenth interview, meaning that subsequent interviews did not yield new concepts, properties, or categories, and the relationships among categories had become fully developed and stable. This process is presented in **Table 1** as follows:

Table 1. Theoretical Saturation

Interview Numbers	Newly Extracted Codes	Newly Extracted Categories	Saturation Status
1–5	Numerous new codes and categories	Core components of the model (e.g., transparency, technical challenges)	Discovery and formation stage
6–10	Decrease in the number of new codes	Secondary categories and more detailed model elements (e.g., contextual factors)	Theoretical development stage
11–14	Few new codes	New properties for existing categories	Validation stage
15	No new codes emerging	No new categories emerging	Theoretical saturation
16–17	Repetition of previous codes	No additional new concepts	Confirmation of saturation

3. Findings and Results

Descriptive statistics for 14 of the 15 final interviewees, whose complete demographic information was available in the reports, are presented below. This composition confirms the diversity and qualification of the expert population required for conducting grounded theory research.

Table 2. Descriptive Statistics of Interviewees

Descriptive Characteristic	Level/Status	Number (n)	Percentage (%)
Gender	Male	8	57.14%
	Female	7	42.86%
Education Level	Doctor of Philosophy (Ph.D.)	9	64.29%
	Master's/Professional Doctorate	6	35.71%
Employment Status (Occupation)	University Faculty Member	9	64.29%
	Accounting/Auditing Profession	2	14.29%
	Executive/Regulatory Agencies	3	14.29%
	Capital Market Practitioner	1	7.14%
Work Experience (Total Years)	Less than 5 years	8	57.14%
	5–10 years	4	27.57%
	11–20 years	2	13.29%
	Over 20 years	1	6.7%

Table 3. Detailed Profile of Interviewees

Organization (Employment)	Position (Academic/Professional Rank)	Education	Work Experience (Years)	Research Background (Articles/Books)	Justification of Expertise (Relevance to Blockchain and Financial Reporting)
University (Faculty Member)	Associate Professor	Ph.D. in Accounting	18	7 articles, 1 book	Deep academic expertise in financial reporting and modern information systems.
Accounting Profession	Certified Public Accountant/Partner	M.A. in Accounting	15	1 professional article	Practical experience in auditing listed companies and familiarity with modern standards.
Executive (Regulatory Body)	Senior Manager	Ph.D. in Financial Management	12	3 articles	Broad legal and regulatory perspective on capital markets and technologies.
University (Faculty Member)	Assistant Professor	Ph.D. in Accounting	6	5 articles	Academic expertise in digital accounting and audit risk.
Accounting Profession	Senior Audit Expert	M.A. in Finance	4	0	Field experience in preparing and auditing listed firms' financial reports.
University (Faculty Member)	Full Professor	Ph.D. in Accounting	22	10 articles, 2 books	Leading academic authority in accounting, finance, and reporting standards.
Executive (Regulatory Body)	Financial Expert	M.A. in Management	7	1 article	Familiar with supervisory regulations and technological implementation challenges.
University (Faculty Member)	Assistant Professor	Ph.D. in Accounting	5	2 articles	Expertise in accounting information systems and transformative technologies (blockchain).
Capital Market	Senior Analyst/Practitioner	M.A. in Finance	9	1 article	Practical experience in analyzing financial information and assessing transparency impacts on investment decisions.

University (Faculty Member)	Associate Professor	Ph.D. in Finance	16	8 articles	Academic specialization in corporate finance and technological effects on capital structure and financial disclosure.
University (Faculty Member)	Assistant Professor	Ph.D. in Accounting	8	4 articles	Research background in qualitative characteristics of accounting information and technological enhancements.
University (Faculty Member)	Full Professor	Ph.D. in Accounting	25	15 articles, 3 books	Extensive scholarly and teaching experience in IFRS and advanced accounting standards.

Based on the descriptive section, the sample consisted of 15 individuals who were relatively balanced in gender distribution (57.14% male and 42.86% female). The educational composition was predominantly research-oriented, with 64.29% holding Ph.D. degrees and 35.71% holding master's or professional doctorates. Regarding employment status, the majority were university faculty members (64.29%), while others represented the accounting/auditing profession (14.29%), executive/regulatory institutions (14.29%), and the capital market sector (7.14%).

The distribution of work experience indicates that a considerable proportion had less than five years of experience (57.14%), while groups with 5–10 years and 11–20 years of experience were also represented. However, certain percentage figures were slightly inconsistent with the counts (for example, 4 individuals represent approximately 26.7%, not 27.57%, and 1 individual equals about 6.7%).

Accordingly, the qualitative profile reveals a combination of distinguished and mid-level university faculty (full professors, associate professors, and assistant professors) with solid research records focusing on financial reporting, IFRS standards, and transformative technologies such as blockchain. Alongside them were auditing partners and professional experts with field experience in listed firms, senior and technical managers from regulatory agencies with policy and compliance perspectives, and market analysts emphasizing the role of transparency in investment decision-making.

This composition reflects a simultaneous coverage of academic, professional, regulatory, and market viewpoints, providing appropriate disciplinary diversity for addressing the topic of "Blockchain and Financial Reporting."

Table 4 serves as the backbone of the qualitative analysis in this study, presenting the results of the initial and axial coding of in-depth interviews conducted with 13 experts in the fields of accounting and financial technology. Based on the Strauss and Corbin paradigmatic model, this table includes six main categories that illustrate the logical pathway from identifying the causes and motivations for adopting blockchain to its final outcomes. It provides a comprehensive framework for understanding the multidimensional impact of this technology on financial reporting within the Iranian context.

Table 4. Paradigmatic Model Categories and Detailed Propositional Themes (Results of Initial and Axial Coding)

No.	Category	Propositional Themes (Measurable Quantitative and Qualitative Indicators)	Interviewee Numbers
1	Causal Conditions (Causes and Requirements)	Necessity of enhancing financial information transparency in listed companies.	1, 4, 7, 10, 13
		Urgent need to combat fraud and intentional data manipulation.	1, 2, 5, 9, 12
		Need to reduce the gap with international standards (IFRS) and promote global convergence.	3, 6, 10, 11
		Increasing stakeholder demand for reliable and timely information.	4, 8, 12, 13

		High risk of information distortion in traditional accounting systems.	1, 7, 9
		Importance of providing stronger and faster audit evidence during examination processes.	2, 5, 11, 13
		Necessity of faster responsiveness to market fluctuations and regulatory requirements.	3, 4, 6
		Need to reduce long-term intermediation and reporting costs.	7, 8, 10, 12
		Necessity of improving financial transparency in publicly listed companies.	1, 5, 9
2	Central Phenomenon (Nature of Blockchain)	Immutability and distributed recording of transactions.	2, 6, 11
		Complete traceability of transactions as a key indicator.	3, 7, 13
		Elimination of centralized intermediaries and reduced dependency on traditional institutions.	4, 8, 10, 12
		Provision of valid and non-repudiable electronic audit evidence.	1, 4, 7, 9
		Assurance of data accuracy and integrity within a distributed network.	2, 5, 10
		Real-time and simultaneous transaction recording.	3, 8, 11, 13
		Automation of financial processes through smart contracts.	6, 12
		Reduction in the need for paper-based and physical records.	1, 5, 7, 10
3	Contextual Conditions (Implementation Environment in Iran)	Legal and regulatory gaps regarding blockchain-based transaction reporting.	2, 4, 8, 11
		Absence of accounting standards for blockchain-based assets and liabilities.	3, 9, 12
		Resistance of traditional senior managers to full transparency and technological mandates.	6, 10, 13
		Weaknesses in technological and communication infrastructure (bandwidth, network security).	1, 5, 8
		Lack of awareness and shortage of skilled human resources in financial technology (FinTech).	2, 7, 9
		Cultural and organizational challenges in transitioning from traditional accounting processes.	4, 6, 10, 12
		Issues of data ownership and accountability in a distributed system.	1, 5, 11
		Economic instability and uncertainty toward technological investments.	3, 7, 8, 13
4	Intervening Conditions (Barriers and Enablers)	High initial costs for implementing and upgrading existing systems.	2, 4, 6
		Security risks (cyberattacks) and potential vulnerabilities of blockchain networks.	9, 12
		Challenges in maintaining privacy and preventing excessive disclosure of sensitive information.	1, 5, 8, 10
		Support and facilitative role of the Securities and Exchange Organization and other regulators.	3, 7, 11
		Technical complexity in maintaining, supporting, and modifying recorded data.	2, 6, 9, 13
		Lack of motivation among companies in the absence of governmental or fiscal incentives.	4, 10, 12
		Ambiguity in addressing errors and irreversible transactions.	1, 5, 7, 8
		Delays in updating professional standards by accounting institutions.	3, 11
5	Strategies (Transformation Management)	Development of transparent guidelines by professional bodies (e.g., the Iranian Association of Certified Accountants).	1, 7, 12
		Implementation of pilot projects in selected financial sectors and risk assessment.	2, 6, 10
		Training and empowering human resources and managers in blockchain technology.	4, 8, 13
		Allocating budgets and investment for technological infrastructure.	3, 5, 11

		Establishing inter-institutional collaborations among companies, auditors, and market regulators.	1, 7, 9, 12
		Phased and gradual implementation (from simple to complex transactions).	2, 8, 10, 13
		Continuous revision of domestic laws and standards in line with technological developments.	3, 6, 11
		Creating financial and legal incentives for leading companies.	4, 5, 7
6	Consequences (Outcomes)	Improved transparency, reliability, and timeliness of financial reports (qualitative characteristics).	1, 9, 12
		Reduction of long-term financial reporting and auditing costs.	2, 6, 10, 13
		Increased audit efficiency and reduced audit risk.	4, 8, 11
		Enhanced investor decision-making through access to valid and real-time data.	1, 7, 12
		Increased public trust and enhanced credibility of the capital market.	3, 5, 9
		Improved comparability of financial reports (alignment with IFRS).	2, 4, 6
		Technical complexity for non-expert users (negative consequence).	1, 5, 9, 13
		Reduction of information misuse and information asymmetry.	2, 7, 11
7	Secondary Consequences (Stakeholders)	Improved corporate accountability to the government, regulatory bodies, and society.	3, 8, 10
		Easier access of the Securities and Exchange Organization to transactional data.	4, 6, 12
		Facilitated traceability of transactions and enhanced governmental oversight.	1, 5, 8
		Improved operational efficiency of companies in financial processes.	2, 7, 9
		Reduced compliance costs for regulatory institutions.	3, 6, 10, 13
		Concerns about excessive disclosure of competitive company information.	1, 5, 11
		Enhanced performance of internal and external auditing.	4, 8, 12

The analysis of causal categories and the central phenomenon reveals that the primary motivations for adopting blockchain in Iran's financial reporting stem from three fundamental challenges. First, there exists a financial information quality gap manifested in the form of fraud and deliberate data manipulation (interviewees 1, 2, 5, 9, 12) and the high risk of traditional systems (1, 7, 9). Second, the standards gap with IFRS requirements highlights the urgent need for global convergence (3, 6, 10, 11). Third, there is a growing demand from stakeholders for reliable and timely information (4, 8, 12, 13). In response to these needs, the central phenomenon of blockchain—with its core features such as immutable transaction recording, full traceability, the elimination of central intermediaries, and the provision of valid electronic evidence—offers a systematic solution to these challenges. The experts' consensus on the capability of automating financial processes through smart contracts (6, 12) indicates the professional community's mature understanding of blockchain's potential beyond simple transaction recording.

The examination of contextual and intervening conditions highlights the complexity of the implementation environment in Iran. Legal and regulatory gaps (2, 4, 8, 11), the absence of specific accounting standards (3, 9, 12), and resistance from traditional senior managers (6, 10, 13) create an uneven foundation for transformation, which is further exacerbated by infrastructural deficiencies (1, 5, 8) and a shortage of skilled professionals (2, 7, 9). These structural barriers combine with intervening factors such as high initial implementation costs (2, 4, 6), security risks (9, 12), and privacy concerns (1, 5, 8, 10), underscoring the necessity of transformational management strategies. Nevertheless, the proposed strategies—such as developing transparent guidelines, implementing pilot projects, training human resources, and fostering inter-institutional collaboration—outline a gradual and pragmatic pathway for overcoming these challenges. The final outcomes, which include enhanced transparency, reduced

long-term costs, increased auditing speed, and improved investor decision-making, demonstrate that the potential benefits outweigh short-term costs and confirm the economic feasibility of this transformation.

Table 5. Central Phenomenon and Core Qualitative Outcomes

Category	Features	Qualitative Outcome	Affected Standard
Distributed Ledger	Immutability; Consensus	Increased reliability	Faithful representation quality, per IFRS Conceptual Framework
Smart Contract	Automated execution of revenue recognition criteria	Reduced human error	IFRS 15, Paragraphs 9–35
Real-Time Reporting	Instant updating of accounts	Enhanced timeliness	Iranian Qualitative Framework, Paragraph 34

The analysis of the relationship between technical features and qualitative outcomes indicates that the distributed ledger, through its immutability and consensus mechanisms, directly enhances reliability as one of the faithful representation qualities within the IFRS Conceptual Framework. This relationship is fundamental because data immutability in blockchain eliminates the possibility of fraudulent or intentional manipulation of financial records, addressing one of the primary weaknesses of traditional systems. Smart contracts, by automatically executing revenue recognition criteria, not only reduce human error but also ensure full compliance with IFRS 15 (Paragraphs 9–35), transforming revenue recognition from a complex professional judgment process into an automated, programmed execution. Real-time reporting, as the third pillar of this transformation, elevates the timeliness attribute—recognized in both the Iranian Qualitative Framework (Paragraph 34) and IFRS as an enhancing quality—to an unprecedented level through instant account updating.

The integration of these three elements—reliability, precision, and timeliness—represents a paradigmatic transformation in the nature of financial reporting, shifting it from a periodic and delayed process to a real-time and automated system. This table also illustrates that the implementation of blockchain is not merely a technological change but rather a redefinition of the very qualitative characteristics of financial information, a shift that both international and national standard setters must account for in their future reforms.

Table 6. Subcategories of Contextual Conditions

Contextual Domain	Details	Key Codes	Regulatory Gap
Legal	Absence of guidelines for asset tokenization	Gap in "Iran Standard No. 17"	Non-compliance with IAS 38
Cultural	Preference for minimal disclosure in competitive environments	Managerial resistance	Inconsistency with IAS 24 (Disclosure)
Infrastructure	Low network speed and data center performance	CAPEX costs; cybersecurity	Lack of FIPS Level 3 compliance in data centers

The legal domain, marked by the absence of asset tokenization guidelines and gaps in Iran's Standard No. 17, represents one of the most fundamental barriers to the recognition and measurement of digital assets. Non-compliance with IAS 38 (Intangible Assets) results in the inability to accurately classify tokens, cryptocurrencies, and blockchain-based assets, creating an increasing gap between economic reality and accounting frameworks in the digital era.

The cultural challenge, reflected in the tendency toward minimal disclosure and managerial resistance, stems from competitive market structures and concerns about exposing sensitive information. This stands in contrast to IAS 24 (Related Party Disclosures), which emphasizes full transparency. Such cultural resistance is not merely

behavioral but also reflects systemic distrust and the absence of mechanisms to protect sensitive data in the transparent blockchain environment.

Technological infrastructure faces challenges such as low network speeds, high initial capital expenditures (CAPEX), and the lack of advanced security standards such as FIPS Level 3 compliance in Iranian data centers. These infrastructural deficiencies not only increase implementation costs but also heighten cybersecurity risks and reduce confidence in system reliability.

The combination of these three domains—legal, cultural, and infrastructural—demonstrates that the transformation of financial reporting through blockchain requires a multidimensional and coordinated approach that simultaneously reforms legislation, reshapes organizational culture, and upgrades infrastructure. Without addressing these three gaps concurrently, the successful implementation of blockchain in Iran's financial reporting will face substantial challenges.

Table 7 maps the logical relationship between operational implementation barriers and adaptive strategies while designating specific executing authorities. Serving as an operational blueprint for resolving key challenges, it shows how each major barrier can be addressed through targeted policymaking and the participation of multiple institutions, and it offers a pragmatic pathway for gradual transformation in Iran's financial reporting.

Table 7. Intervening Conditions and Adaptive Strategies

Intervening Condition	Description	Counterstrategy	Executing Authority
High Cost	Heavy infrastructure investment	Tax exemption for pilot projects	Ministry of Economy
Privacy Challenge	Concerns about raw data disclosure	Implementation of permissioned private blockchain	Securities and Exchange Organization
Technical Complexity	Shortage of specialists	Establish a "Digital Accounting" track at universities	Ministry of Science

The high initial investment cost—one of the most significant barriers to adopting new technologies in developing countries—can be managed in this framework through tax exemptions for pilot projects administered by the Ministry of Economy. This strategy not only reduces the financial burden on pioneering companies but also sends a positive market signal that the government supports digital transformation, thereby increasing other firms' incentives to enter this pathway. The privacy challenge—one of the fundamental concerns in public blockchain systems—is addressed by proposing the implementation of a permissioned private blockchain by the Securities and Exchange Organization. This approach creates an intelligent balance between transparency and the protection of sensitive information, enabling tiered access control that is essential in a competitive capital market environment. Technical complexity and the shortage of skilled personnel—emphasized in the interviews summarized in Table 3—are addressed here through a long-term strategy of establishing a "Digital Accounting" academic track at universities under the Ministry of Science. This strategy reflects a deep understanding of the structural nature of the challenge, which cannot be resolved through short-term training; rather, it requires reforming university curricula and cultivating a new generation of accountants with advanced technological competencies. Assigning clear responsibilities to different executing authorities—the Ministry of Economy, the Securities and Exchange Organization, and the Ministry of Science—demonstrates the necessity of a multi-institutional, coordinated approach to managing this transformation. In effect, this table presents an operational "theory of change" that traces a logical path from identifying barriers to their systematic resolution by specifying the role of each

institutional actor, and this structured approach can serve as a policy model for future digital transformation initiatives.

Table 8 forms the theoretical core of this study and presents the grounded theory derived from qualitative analysis in the form of a central proposition. The "Integrated Blockchain Model for Quality and Trust Enhancement," as the core category, articulates the study's theoretical essence and identifies the key standard-setting requirements for institutionalizing this technology within Iran's financial reporting framework. This table serves as a bridge between qualitative analysis and the operational requirements of standardization.

Table 8. Core Category and Emergent Theory

Core Category	Theoretical Statement	Embedded Key Standard Requirements
Integrated Blockchain Model for Quality and Trust Enhancement	Gradual implementation of blockchain—conditional on drafting localized guidance and converging with IFRS—will increase reliability, timeliness, and stakeholder trust.	IAS 1 (Presentation); IFRS 15 (Revenue); Iran Standard No. 32 (Financial Instruments); Corporate Governance Charter of the Exchange

The emergent theory rests on three foundational pillars: first, gradual implementation, which favors realism over a revolutionary, high-risk approach and reflects a correct understanding of Iran's contextual challenges; second, conditionality on drafting localized guidance, which underscores the necessity of adapting the technology to domestic legal and cultural contexts and avoids blind copying of foreign models; and third, convergence with IFRS, which emphasizes alignment with global standards to preserve comparability and international credibility of financial reports. The combination of these three elements—gradualism, localization, and globalization—shows that successful transformation is not a binary choice but rather a complex balance between domestic and external requirements. The key identified standard-setting requirements—IAS 1 (Presentation of Financial Statements), IFRS 15 (Revenue), Iran Standard No. 32 (Financial Instruments), and the Exchange's Corporate Governance Charter—indicate that blockchain's impact is pervasive and multidimensional, influencing nearly all aspects of financial reporting. IAS 1 will shape the form and content of blockchain-based reports; IFRS 15 enables automated revenue recognition via smart contracts; Standard No. 32 informs the classification of tokens and digital assets; and the Corporate Governance Charter ensures transparency and accountability in a decentralized environment. This theory confirms the study's main premise: blockchain is not an auxiliary tool but a transformative driver of reporting quality and stakeholder trust, provided it is implemented with a systematic, gradual, and standards-centered approach.

Table 9 provides a quantitative analysis of the qualitative coding process and displays the distribution of 533 codes extracted from the interviews across the six main categories of the paradigmatic model. This table not only increases methodological transparency but also reveals the experts' focus pattern across categories and confirms the credibility of qualitative results through the balanced dispersion of codes.

Table 9. Frequency Distribution of Codes

No.	Category	Number of Codes	Percentage
1	Causal Conditions	83	15.9
2	Central Phenomenon	96	18.4
3	Contextual	92	17.6
4	Intervening	75	14.4
5	Strategies	91	17.4
6	Consequences	96	18.3
	Total	533	100

The relatively uniform distribution of codes across the six categories, ranging from 14.4% to 18.4%, indicates balanced expert attention to all dimensions of the issue. The central phenomenon with 96 codes (18.4%) and consequences with 96 codes (18.3%) show the highest frequencies, which is logical, since the technical features of blockchain (central phenomenon) and its outcomes (consequences) are at the heart of discussions regarding this technology's impact on financial reporting. Contextual conditions with 92 codes (17.6%) and strategies with 91 codes (17.4%) also have high frequencies, indicating experts' particular attention to implementation challenges and operational solutions. Causal conditions with 83 codes (15.9%) and intervening conditions with 75 codes (14.4%) exhibit the lowest frequencies, which may reflect a relative consensus on adoption motivations and overarching barriers. The total of 533 codes across 13 interviews implies an average of about 41 codes per interview, demonstrating the depth and richness of the collected data. This coding volume, along with balanced category dispersion, confirms theoretical saturation and indicates that further interviews would not have produced new codes. The close proximity of category frequencies (a maximum difference of 4%) signifies the comprehensiveness of the paradigmatic model and shows that the analysis has equally addressed all aspects of the issue—from causes to consequences. This balanced distribution also reflects the quality of the interview questions, which successfully elicited the various dimensions without bias toward particular aspects. Overall, this table strengthens the study's methodological credibility by clarifying the process and balancing the results.

Table 10 functions as a diagnostic tool, identifying existing standard-setting gaps in four key areas of financial reporting when confronted with blockchain technology, and it proposes a technological opportunity and recommended action for each gap. This table provides an operational roadmap for national and international standard setters to align accounting frameworks with technological realities and to prevent interpretive gaps in practice.

Table 10. Required Standard Alignment in a Blockchain Environment

Reporting Area	Corresponding IFRS	Iran Standard	Blockchain Opportunity	Recommended Action
Financial Instruments	IAS 32/IFRS 9	Standard No. 32 (Draft)	Tokenization of debt/equity	Develop token recognition guidance
Revenue	IFRS 15	Standard No. 23	Smart contracts for the five-step model	Define automated internal controls
Disclosure	IAS 24	Standard No. 18	Tiered access	Update disclosure requirements
Events After the Reporting Period	IAS 10	Standard No. 11	Real-time recording of changes	Adjust the accounting system

In the area of financial instruments, aligning IAS 32/IFRS 9 with Iran's Standard No. 32 in the face of debt and equity tokenization exposes a fundamental challenge. Digital tokens—which can represent shares, bonds, or hybrid instruments—do not neatly fit within the traditional debt–equity classification and possess unique characteristics such as unlimited divisibility, immediate liquidity, and programmability that are not anticipated in current standards. The recommended action to "develop token recognition guidance" is an urgent necessity, because without it companies cannot properly recognize, measure, and disclose these instruments on the balance sheet. In the revenue area, IFRS 15, with its five-step revenue recognition model, offers an exceptional opportunity for automation via smart contracts. Smart contracts can codify the conditions specified in Paragraphs 9 to 35 of Iran's Standard No. 23 (equivalent to IFRS 15) and automatically recognize revenue once conditions are met; however, this requires the "definition of automated internal controls" and auditors' approval of the reliability of such code. The disclosure area, aligning IAS 24 with Iran's Standard No. 18, reflects blockchain's paradoxical challenge: on the

one hand, the technology enables full transparency; on the other, it can lead to excessive disclosure of sensitive, competitive information. "Tiered access" serves as a solution by designing a blockchain architecture with differentiated access levels for distinct stakeholders—for example, full access for auditors, limited access to summarized financial information for investors, and public access to aggregate statistics. Events after the reporting period (IAS 10 and Iran's Standard No. 11) also require "adjustments to the accounting system," because the conventional notions of the "balance sheet date" and "events after the balance sheet date" take on different meanings in a blockchain world characterized by real-time reporting. Altogether, this table shows that aligning standards with blockchain is not a superficial change; it requires deep rethinking of foundational accounting concepts such as periodicity, recognition, measurement, and disclosure.

Table 11, as an operational guide, outlines the pathway for gradual blockchain implementation over a 51-month period (approximately 4 years) in four distinct phases. By defining key activities, standard-setting outputs, and success metrics for each phase, this roadmap offers an actionable and assessable framework for managers, regulators, and policymakers that reduces transformation risk and increases the likelihood of achieving objectives.

Table 11. Roadmap for Blockchain Implementation in Financial Reporting

Phase	Time Frame	Key Activity	Standard Output	Success Metric
Preparation	6 months	Gap analysis, drafting pilot guidelines	Blockchain guideline draft	Approval by Technical Committee
Limited Pilot	9 months	Application to interim financial statements of one industry	IFRS-compliant test report	30% reduction in posting errors
Gradual Expansion	12 months	Deployment in 30% of listed companies	Blockchain auditing guideline	20% reduction in audit costs
Full Integration	24 months	Connection to CODAL 2 system	Mandatory Stock Exchange regulations	Real-time EPS reporting

The preparation phase, lasting six months and focusing on gap analysis and drafting pilot guidelines, forms the foundation of the entire process. This phase, producing a "Blockchain Guideline Draft" and measured by the success criterion of "approval by the Technical Committee," demonstrates that before any technical action, professional consensus and a conceptual framework are essential. This approach prevents premature implementation without a theoretical basis.

The limited pilot phase, lasting nine months and focusing on interim financial statements of a single industry, reflects a low-risk strategy. Choosing interim rather than annual statements ensures reduced legal and financial risks, as such reports are typically used for internal and regulatory purposes. The success metric of a "30% reduction in posting errors" provides a clear quantitative goal for evaluating success, indicating an expectation of measurable improvement in data quality from the earliest stages.

The gradual expansion phase, lasting twelve months and targeting implementation in 30% of listed companies, represents the turning point where the system transitions from testing to semi-widespread execution. Producing the "Blockchain Auditing Guideline" underscores the vital importance of professional assurance, since without defined auditing standards for the blockchain environment, the credibility of financial reports would be compromised. The success metric of a "20% reduction in audit costs" highlights the economic justification of this transformation and offers companies financial incentives for adoption.

The full integration phase, lasting twenty-four months and involving connection to the CODAL 2 system (the official disclosure platform of the Tehran Stock Exchange), represents the culmination of the transformation, where blockchain-based reporting becomes a mandatory component of the capital market infrastructure. The metric of

"real-time EPS (Earnings per Share) reporting" signifies the achievement of automation and reliability at a level where even the most sensitive financial indicators can be calculated and published instantaneously. The total timeline of fifty-one months reflects a realistic approach, avoiding rushed strategies that carry a high risk of failure.

Given the comprehensive analysis of the previous tables, which examined various dimensions of blockchain's impact on financial reporting—from the paradigmatic model to standardization gaps and the implementation roadmap—there arises a need for an integrated analytical tool to simultaneously assess both risks and opportunities. The Risk–Opportunity Matrix, as a complementary table, provides a balanced and strategic framework for decision-making, where each key dimension of financial reporting—from recognition and measurement to human resources—is analyzed in terms of its dual challenges and potentials. This matrix not only identifies vulnerabilities and strategic opportunities but also clarifies action priorities and responsible institutions, thereby providing a concrete operational framework for managing risks and leveraging opportunities throughout Iran's digital financial reporting transformation. It is particularly valuable for policymakers and senior executives who require a holistic and balanced understanding of the advantages and drawbacks of blockchain implementation.

Table 12. Blockchain Risk–Opportunity Matrix in Financial Reporting

Reporting Dimension	Potential Risks	Potential Opportunities	Action Priority	Responsible Institution
Recognition and Measurement	Misalignment of tokens with asset/liability definitions	Real-time fair value measurement	Very High	Iranian Association of Certified Accountants
Disclosure and Transparency	Over-disclosure of competitive information	Full transparency for stakeholders	High	Securities and Exchange Organization
Auditing and Assurance	Inability of auditors to verify smart codes	Direct access to electronic evidence	Very High	Iranian Association of Certified Auditors
Regulatory Compliance	Conflicts with privacy laws	Automation of compliance procedures	Medium	Ministry of Economy
Technological Infrastructure	Network vulnerabilities and cyberattacks	Reduction of IT costs	High	Technology Development Center
Human Resources	Resistance to change and lack of skills	Creation of new specialized jobs	High	Ministry of Science

The analysis of the risk–opportunity matrix indicates that the domains of recognition and measurement and auditing and assurance, with "very high" priority, rank at the top of essential actions. In recognition and measurement, the risk of misalignment between digital tokens and traditional asset–liability definitions can lead to widespread balance sheet ambiguities and non-comparability across financial statements. Conversely, the opportunity for real-time fair value measurement provides potential to enhance the *relevance* of financial information, a qualitative characteristic emphasized in IAS 39 and IFRS 13. The Iranian Association of Certified Accountants must take immediate action to develop guidance for recognizing and classifying digital assets.

In the auditing domain, the risk of auditors' inability to verify smart contracts and programming codes threatens the credibility of the entire blockchain-based reporting system, as stakeholders cannot trust automated data without professional assurance. However, the opportunity for direct access to electronic evidence and full transaction traceability could fundamentally transform auditing from a sampling-based approach to full-scope (100%) auditing, significantly enhancing the quality of assurance.

The domains of disclosure and transparency, technological infrastructure, and human resources, all rated with "high" priority, occupy the second tier, requiring considerable but less urgent attention. In disclosure, blockchain's paradox becomes evident: the same technology that enables full transparency also risks overexposing sensitive

competitive information. The Securities and Exchange Organization must design a tiered-access architecture that strikes a balance between disclosure obligations under IAS 24 and IAS 1 and the protection of corporate competitive interests. Technological infrastructure, facing risks of cyberattacks and network vulnerabilities, requires substantial investment in cybersecurity and compliance with international standards such as ISO 27001 and FIPS, while the opportunity to reduce long-term IT costs through system integration provides economic justification for such investment. Human resources, as the final link in the transformation chain, face challenges of resistance to change and digital skill shortages, necessitating comprehensive training programs and new academic specializations in universities.

The regulatory compliance domain, rated as "medium," shows that although legal conflicts with privacy laws exist, these can be managed through permissioned blockchain models and tailored regulatory frameworks. Overall, this matrix demonstrates that successful blockchain transformation requires a multidimensional approach that simultaneously mitigates risks and capitalizes on opportunities—a goal achievable only through coordinated action and clear allocation of responsibilities among institutions.

Therefore, the comprehensive analysis of the presented tables shows that the impact of blockchain on financial reporting constitutes a multilayered and complex transformation that cannot be viewed merely as a technological upgrade. From Table 4, which presents the complete paradigmatic model, to Table 12, which outlines the operational roadmap, a coherent narrative emerges addressing the "why," "how," and "when" of this transformation. The standardization gaps identified in Table 10, the contextual challenges in Table 6, and the adaptive strategies in Table 7 all emphasize that success in this pathway requires systematic coordination among regulators, professionals, corporations, and educational institutions. The grounded theory presented in Table 7—the Integrated Blockchain Model for Quality and Trust Enhancement—is not a theoretical ideal but a practical framework supported by 533 qualitative codes (Table 9) and precise alignment with both IFRS and Iranian standards (Tables 5 and 10), ensuring its feasibility and evaluability in practice.

4. Discussion and Conclusion

The findings of this study revealed that blockchain technology exerts a profound effect on the qualitative characteristics of financial reporting, particularly on transparency, reliability, comparability, and timeliness. Through the grounded-theory analysis of expert interviews and triangulated document review, blockchain emerged as a multi-layered enabler of transformation that can reconstruct the accounting information infrastructure rather than merely digitize it. The empirical results indicated that blockchain enhances *faithful representation* by providing immutable, time-stamped, and verifiable records of financial transactions. This aligns with prior studies suggesting that distributed ledgers reduce the opportunity for ex post manipulation and intentional misstatements in corporate disclosures [9, 19, 20]. Similarly, the evidence supported that blockchain contributes to *timeliness* by facilitating real-time reporting processes, consistent with findings from international digital accounting projects that demonstrated reductions in posting delays and error frequencies [30, 34]. Collectively, these outcomes underscore that blockchain serves as both an infrastructural and governance innovation capable of enhancing the integrity of financial reporting in emerging-market contexts.

A central empirical result was that the implementation of distributed ledgers can significantly mitigate the risk of financial fraud and human error, as also highlighted by previous auditing research. By creating an unalterable chain of transaction entries accessible to authorized stakeholders, blockchain introduces transparency to the audit trail, eliminating discrepancies that traditionally arise from manual reconciliations [10, 13]. This mechanism

provides auditors with near real-time access to validated transactional evidence, thus reducing reliance on sampling-based procedures. Such findings corroborate the insights of prior work which found that blockchain enables continuous auditing, dynamic confirmation, and automated testing of financial evidence [20, 22]. The results further revealed that smart contracts—programmed self-executing clauses encoded in blockchain systems—offer a transformative role in ensuring compliance with accounting standards, particularly IFRS 15, by automating the revenue recognition process [11]. Similar evidence was reported in comparative studies, where the integration of smart contracts in accounting systems ensured timely identification of performance obligations and minimized managerial discretion in recognizing revenue [10, 12]. Therefore, blockchain does not merely enhance the process of financial reporting but restructures its epistemic foundation by replacing subjective managerial estimates with verifiable algorithmic logic.

The analysis of contextual conditions revealed that legal ambiguity, standard-setting lag, and infrastructure deficiencies pose considerable implementation challenges, particularly in developing economies such as Iran. The absence of explicit accounting standards for blockchain-related assets and liabilities parallels concerns raised in earlier research, which emphasized that classification uncertainty under IFRS and local GAAP remains a major impediment to adoption [28, 47]. This study confirmed that the nonexistence of regulatory guidance on tokenization and digital asset recognition exacerbates comparability problems and could lead to inconsistent financial reporting practices across firms. These results are in line with the views of scholars who argue that without clear alignment between blockchain-based measurements and accounting conceptual frameworks, firms risk violating the principles of faithful representation and consistency [7, 27]. Moreover, the results suggested that managerial resistance, cultural conservatism, and inadequate training hinder organizational readiness—a pattern consistent with technology adoption studies indicating that digital transformation in accounting is contingent on human capability and top-management support [35, 36]. This triangulation of results highlights the socio-technical nature of blockchain adoption, emphasizing that technological efficiency alone cannot substitute for institutional and behavioral preparedness.

The study further confirmed that blockchain's integration into financial reporting is associated with economic benefits such as cost reduction, operational efficiency, and enhanced investor confidence. Experts consistently highlighted that the automation of verification and reconciliation processes reduces audit costs and improves the speed of financial closing cycles. These observations substantiate prior empirical findings demonstrating that automation via blockchain can lower audit pricing and enhance cost-efficiency in financial operations [19, 20]. From an investor's standpoint, transparency and real-time access to transaction data increase market credibility and decision usefulness, consistent with the results of studies linking reporting quality to investment efficiency and capital market responsiveness [3-5]. Additionally, the evidence that blockchain improves the comparability of financial reports aligns with international initiatives advocating for IFRS convergence, as digital technologies facilitate standardized data presentation and harmonized disclosures [29, 31]. Thus, blockchain adoption in financial reporting appears to simultaneously enhance qualitative and quantitative aspects of reporting performance.

Another significant insight concerns blockchain's potential role in improving audit assurance and corporate governance mechanisms. The study found that immutable data trails and cryptographic verification strengthen external and internal audit functions by providing reliable audit evidence. This finding is consistent with previous literature asserting that blockchain can transform audit practices by creating an auditable ecosystem that reduces the asymmetry between preparers and verifiers [13, 26, 38]. Furthermore, the results indicated that blockchain

promotes ethical accountability and transparency within firms, which can indirectly influence tax transparency and corporate social responsibility practices [8, 24, 32]. The outcomes support the view that blockchain-enabled governance architectures facilitate trust-based interactions among shareholders, regulators, and auditors, fostering an environment of shared accountability [17, 38]. Consequently, the blockchain ecosystem serves as a structural safeguard that reinforces the integrity of both reporting and oversight functions.

Despite its advantages, the findings also revealed several technical and operational limitations. Experts emphasized that network security vulnerabilities, scalability constraints, and privacy concerns remain key risks to the reliability of blockchain-based reporting systems. This aligns with earlier analyses that identified cybersecurity threats, system latency, and excessive disclosure as potential drawbacks of adopting distributed ledgers in sensitive financial contexts [18, 39]. Particularly, the trade-off between transparency and confidentiality emerged as a recurring theme. The use of permissioned blockchains—private ledgers accessible only to authorized participants—was seen as an effective mitigation strategy, consistent with the practical recommendations of digital accounting studies advocating layered-access architectures for data governance [12, 16]. The results also revealed that smaller enterprises and financial institutions face higher entry barriers due to the cost of infrastructure deployment, echoing previous research that underscored the importance of scalable and modular blockchain frameworks for SMEs [30, 34]. Therefore, while blockchain enhances qualitative attributes of reporting, its cost-effectiveness depends on organizational size, regulatory clarity, and digital maturity.

Another theoretical implication derived from this study is the confirmation of blockchain's multi-level impact—technological, organizational, and institutional—on the financial reporting ecosystem. At the technological level, blockchain transforms accounting information systems by integrating cryptographic validation and consensus mechanisms, a finding consistent with system-architecture studies [12, 17]. At the organizational level, blockchain changes how accountants, auditors, and regulators interact with financial data, embedding transparency and traceability into workflows [10, 31]. Finally, at the institutional level, blockchain compels a re-evaluation of conceptual frameworks, auditing standards, and governance charters, reinforcing the argument that technological evolution necessitates normative adaptation [28, 47]. By linking these levels, the study offers an integrated understanding of how blockchain can reshape the foundations of financial reporting from transaction recording to assurance provision. The empirical model derived here complements prior theoretical explorations that conceptualized blockchain as a triple-entry accounting innovation, advancing the literature by grounding it within the IFRS and national-standard alignment perspective [9, 29].

The cross-validation of this model through comparison with previous research reveals strong theoretical coherence with international findings. In particular, the relationship between blockchain-enabled transparency and reduced managerial myopia aligns with earlier studies connecting high-quality information environments with improved investment efficiency [3, 4]. The convergence of results across countries underscores that blockchain's contribution to reporting quality is universal in nature but context-sensitive in application. For example, while developed markets emphasize automation and cost reduction, emerging markets focus on trust-building and fraud mitigation [30, 32]. The results also extend previous insights by demonstrating that blockchain's integration requires a hybrid approach—combining regulatory guidance, professional training, and pilot testing—to balance innovation with compliance [27, 29, 31]. This balanced strategy ensures that blockchain adoption supports—not disrupts—the overarching goals of financial reporting reliability, comparability, and stakeholder confidence.

Overall, the results substantiate the theoretical argument that blockchain is not merely a technological enhancement but an institutional reconfiguration mechanism. It alters how accounting entities establish credibility,

how auditors validate truth, and how regulators enforce compliance. In this sense, blockchain extends the informational frontier of financial reporting from static documentation to dynamic verification. The paradigm shift identified here mirrors prior calls in the literature for "re-architecting" accounting around principles of real-time transparency, data immutability, and automated assurance [9, 10, 13]. The evidence from this study therefore consolidates the notion that blockchain adoption, if strategically implemented, can reconcile technological innovation with the normative objectives of financial reporting—relevance, reliability, and trust.

This study, while comprehensive in scope, is limited by its reliance on qualitative data derived from expert interviews, which may not fully capture the variability of blockchain implementation across diverse industries. The grounded-theory approach, though valuable for generating conceptual depth, restricts generalizability and causal inference. Another limitation concerns the rapid technological evolution of blockchain; the findings represent a snapshot of current capabilities, which may become outdated as new consensus mechanisms, tokenization standards, or interoperability protocols emerge. Furthermore, the study focused primarily on the Iranian regulatory and institutional context, which may differ significantly from other emerging or developed economies. The absence of quantitative measurement of blockchain's financial impact, such as cost–benefit ratios or market-based performance indicators, also limits empirical validation. Finally, potential bias may arise from expert selection, as most participants represented accounting and audit domains rather than the full spectrum of IT or legal expertise.

Future research should expand on these findings by conducting mixed-method studies that combine qualitative insights with quantitative testing of blockchain's financial and operational effects. Longitudinal designs could assess how blockchain adoption evolves over time and whether its benefits persist beyond initial implementation phases. Comparative cross-country studies would provide insights into institutional differences affecting adoption trajectories. Future work should also explore the psychological and behavioral dimensions of adoption, such as resistance to change, trust in automated systems, and ethical perceptions of algorithmic transparency. Furthermore, empirical modeling could quantify the relationships between blockchain-based reporting, audit efficiency, and market value relevance. Researchers may also examine hybrid technologies—integrating blockchain with artificial intelligence and cloud computing—to assess synergistic impacts on reporting accuracy, compliance monitoring, and fraud detection. Finally, policy-oriented research could evaluate the readiness of standard setters and regulators to adapt IFRS and local standards to blockchain environments, ensuring normative coherence across jurisdictions.

Practitioners and policymakers should adopt a phased approach to blockchain implementation in financial reporting, beginning with pilot projects under controlled environments before scaling to full integration. Professional associations should develop targeted training programs to equip accountants and auditors with competencies in distributed-ledger technologies, smart-contract design, and data analytics. Regulatory bodies need to issue clear, context-specific guidelines for recognizing, measuring, and disclosing blockchain-based assets and transactions. Organizations should prioritize permissioned blockchain architectures to balance transparency with data privacy and competitive confidentiality. Collaboration among accounting firms, financial institutions, universities, and technology providers is essential to develop interoperable systems and standardized assurance frameworks. By coordinating these efforts, stakeholders can leverage blockchain's transformative potential to achieve higher levels of trust, efficiency, and accountability in financial reporting.

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

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