

Artificial Intelligence and Blockchain for Real-Time Financial Reporting:**Automating Accounting, Reducing Fraud, and Enhancing Reliability**Author: Charbel Sassine¹*Affiliation:*

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Abstract:

This study examines how the integration of Artificial Intelligence (AI), automation, and Blockchain Technology (BT) can improve traditional financial reporting processes. Conventional accounting systems often depend on periodic reporting, manual reconciliation, human verification, and retrospective auditing, which may result in delays, errors, increased costs, and difficulties in detecting fraudulent transactions. This research proposes a technology-based financial reporting model in which AI is used to process and analyze transactions while blockchain provides a secure and traceable digital ledger. A comparative research design is proposed to examine the differences between a traditional financial reporting system and an AI-blockchain-based system using five performance indicators: monthly closing time, transaction error rate, audit hours, fraud detection accuracy, and reporting cost. The illustrative results indicate that the technology-enabled system can substantially reduce reporting time and transaction errors while improving fraud-detection accuracy and reducing audit effort and operating costs. The study suggests that integrating AI and blockchain may improve financial reporting reliability, transparency, and efficiency. However, implementation costs, cybersecurity, employee training, data quality, and regulatory uncertainty remain important challenges. The study concludes that AI and blockchain can complement traditional financial systems and potentially support the development of more continuous and technology-driven financial reporting.

Keywords:

Artificial Intelligence, Blockchain Technology, Financial Reporting, Accounting Automation, Fraud Detection, Finance, SMEs

Introduction:

Financial reporting is an essential component of modern business because it provides managers, investors, creditors, auditors, and other stakeholders with information used to evaluate the financial condition and performance of organizations. Traditionally, financial reporting has relied on periodic closing procedures, manual reconciliations, accounting entries, internal controls, and retrospective audits. Although these systems remain widely used, the rapid growth of digital transactions has increased the amount and speed of financial information that organizations must process.

The development of Artificial Intelligence has created new possibilities for automating repetitive accounting activities and identifying unusual financial transactions. At the same time, Blockchain Technology provides a distributed digital ledger in which transactions can be recorded in a traceable and tamper-resistant manner. Blockchain has therefore attracted increasing attention in accounting, auditing, supply-chain management, and financial services.

The combination of these technologies may address several limitations of traditional financial reporting. AI can analyze large amounts of transaction data, classify information, identify anomalies, and automate repetitive accounting activities. Blockchain can provide a permanent transaction history and facilitate verification by authorized participants. When these technologies operate together, organizations may be able to move from a predominantly periodic reporting system toward a more continuous reporting environment.

The problem addressed by this research is that traditional financial reporting can require substantial manual effort and may delay the identification of errors or suspicious transactions. In addition, organizations may have to spend considerable time reconciling financial information and preparing evidence for auditors.

Therefore, the main research question is:

Does integrating Artificial Intelligence and Blockchain Technology improve the speed, accuracy, fraud detection, audit efficiency, and cost of financial reporting compared with a traditional reporting system?

The objectives of this study are to:

- Compare the speed of financial reporting under traditional and technology-enabled systems.
- Examine differences in transaction error rates.
- Evaluate the ability of AI to identify fraudulent or anomalous transactions.
- Assess whether blockchain-based records can reduce audit effort.
- Compare the operating costs of traditional and AI-blockchain financial reporting.
- Examine the implications of these technologies for the future of financial reporting and corporate governance.

The research is particularly relevant to finance because financial professionals increasingly operate in environments characterized by digital transactions, automated systems, data analytics, and technology-driven decision-making.

Literature Review:

2.1 Traditional Financial Reporting

Traditional financial reporting generally depends on accounting systems in which transactions are recorded, reconciled, reviewed, and eventually incorporated into periodic financial statements. This approach provides an established framework for financial control; however, the increasing volume of transactions can make manual procedures time-consuming.

Financial reporting quality depends not only on accounting standards but also on the quality, reliability, and timeliness of the underlying information. Agency theory explains why reliable financial information is important because managers and owners may possess different information and incentives. Jensen and Meckling (1976) argued that information asymmetry between principals and agents can generate agency costs. Reliable financial reporting can therefore contribute to reducing information asymmetry.

2.2 Artificial Intelligence in Accounting and Audit

Artificial Intelligence has increasingly been applied to accounting and financial activities. AI can process large amounts of information, recognize patterns, classify transactions, and identify unusual observations.

The use of automation in accounting can reduce the amount of repetitive manual work performed by employees. Instead of requiring accountants to manually inspect every transaction, automated systems can perform predefined procedures and direct unusual transactions toward human review. AI can also contribute to fraud detection because fraudulent transactions may contain patterns that differ from normal financial activity, thus increasing financial transparency (Saber & Sassine, 2022), scholars have found AI to revolutionize the audit industry (Sawaya et al., 2026) especially when combined with auditor independence (Sawaya et al., 2025). Jabbour Al Maalouf et al. (2026) explored the drivers of AI adoption in auditing and its benefits. However, AI systems depend on the quality of the data used to train or operate them. Consequently, poor-quality or incomplete financial data can reduce the reliability of AI-generated results.

2.3 Blockchain Technology and Financial Reporting

Blockchain is a distributed ledger technology that records transactions across a network. Cong and He (2019) discussed the potential effects of blockchain and smart contracts on economic and organizational activities, while Yermack (2017) examined blockchain in relation to corporate governance.

One potential accounting application of blockchain is the creation of a reliable transaction history. Once information is recorded and validated within a properly designed blockchain system, unauthorized modification becomes more difficult.

This characteristic may also influence auditing. Instead of spending substantial time collecting and reconciling transaction evidence, auditors could potentially access an organized and traceable transaction history and focus more heavily on analysis and professional judgment.

2.4 Artificial Intelligence and Blockchain Together

Although AI and blockchain can independently improve certain financial processes, their combination may create additional opportunities.

AI can perform the analytical function by reviewing transactions and identifying unusual activity. Blockchain can provide the recording and verification infrastructure for transactions that have passed the required controls.

For example, a transaction could be processed by an AI system, compared with established accounting rules, and then recorded on a permissioned blockchain. Smart contracts could subsequently enforce predetermined conditions relating to payment, authorization, or accounting procedures.

This creates a potential technological architecture in which:

Transaction → AI Analysis → Verification → Blockchain Recording → Continuous Audit Trail

This surge in technology has increased the performance of companies (Khalife et al., 2024) especially when utilized by experienced individuals (Chaanine et al., 2023), researchers found that these combined variables attributed to organizational success (Azoury et al., 2024) in today's data-driven culture. The positive effect is capped by technological adeptness but can attribute not only to financial performance (Subrahmanyam et al., 2024) and equity efficiency (Rizk & Sassine, 2023) but also to on non-financial metrics (Kaspard et al., 2025) such as sustainability (Kaspard et al., 2026).

2.5 Research Gap

Existing research has examined AI, automation, and blockchain individually. Other studies have considered their theoretical implications for accounting and auditing. However, fewer studies examine how these technologies can operate together within a single financial reporting environment.

The research gap addressed by this study is therefore the limited empirical examination of an integrated AI-blockchain financial reporting system using multiple performance indicators simultaneously.

This research addresses that gap by comparing a traditional reporting system with a technology-enabled system across reporting speed, transaction accuracy, audit effort, fraud detection, and cost.

Methodology:

3.1 Research Design

This study adopts a comparative quantitative case-study design. Two financial reporting environments are compared: (1) Traditional Financial Reporting System and (2) AI-Blockchain Financial Reporting System. The comparison focuses on the same categories of financial transactions in order to reduce differences caused by the underlying transaction population. The proposed observation period is three months, during which approximately 10,000 transactions are analyzed.

3.2 Traditional System

Under the traditional system, accounting personnel record transactions and perform reconciliation procedures manually or through conventional accounting software.

Monthly closing activities include:

- Recording journal entries
- Reconciling bank accounts
- Reviewing accounts payable
- Reviewing accounts receivable
- Identifying accounting errors
- Preparing financial reports
- Providing documentation for auditing

Fraud identification is primarily retrospective and may rely on internal controls and sampling procedures.

3.3 AI-Blockchain System

The technology-enabled system uses AI to analyze financial transactions and blockchain to maintain a secure transaction record.

The proposed process is:

Transaction → AI Classification → Anomaly Detection → Validation → Blockchain Recording

The AI component analyzes transactions and identifies unusual observations. Transactions that satisfy predefined conditions are recorded on a permissioned blockchain.

A permissioned blockchain is selected because corporate financial information generally requires controlled access rather than unrestricted public access.

Smart contracts may also be used to automatically apply predefined conditions relating to payment approval, transaction authorization, and accounting rules.

3.4 Variables

Variable Measurement

Monthly Closing Duration Number of days required to close monthly accounts

Transaction Error Rate Percentage of transactions containing errors

Audit Hours Number of hours required for quarterly audit procedures

Fraud Detection Accuracy Percentage of identified fraudulent/anomalous transactions correctly detected

Reporting Cost Monthly financial reporting operating cost

3.5 Analytical Approach

The performance of the two systems is compared using descriptive statistics and percentage changes.

Percentage Reduction = $(\text{Traditional Value} - \text{AI-Blockchain Value}) / \text{Traditional Value} \times 100$

Percentage Improvement = $(\text{AI-Blockchain Value} - \text{Traditional Value}) / \text{Traditional Value} \times 100$

The analysis focuses on whether the technology-enabled system produces measurable changes across the five indicators.

Results:

4.1 Comparative Performance

The following table presents the illustrative research-model results used to demonstrate the empirical structure of the proposed study.

Performance Indicator	Traditional System	AI-Blockchain System	Change
Monthly Closing Duration	7 days	1.5 days	78.6% reduction

Transaction Error Rate	3.8%	0.9%	76.3% reduction
Quarterly Audit Hours	120 hours	65 hours	45.8% reduction
Fraud Detection Accuracy	62%	91%	29 percentage-point increase
Monthly Reporting Cost	\$18,000	\$11,000	38.9% reduction

4.2 Transaction Error Rate

The transaction error rate decreases from 3.8% under the traditional system to 0.9% under the AI-blockchain system. This represents an approximate 76.3% reduction in the measured transaction error rate.

4.3 Audit Hours

Quarterly audit hours decrease from 120 hours to 65 hours. The difference represents approximately a 45.8% reduction in the measured audit effort.

4.4 Fraud Detection Accuracy

Fraud detection accuracy increases from 62% under the traditional system to 91% under the AI-blockchain system. The difference represents a 29 percentage-point increase. This result is associated with the ability of AI to continuously analyze transactions rather than relying exclusively on periodic or sample-based examination.

4.5 Reporting Cost

Monthly reporting costs decrease from \$18,000 to \$11,000. The difference represents approximately a 38.9% reduction in operating reporting costs.

Discussion and Conclusion:

This study examined the potential contribution of Artificial Intelligence and Blockchain Technology to financial reporting. The research compared a traditional reporting environment with an integrated AI-blockchain model using five performance indicators: monthly closing duration, transaction error rate, audit hours, fraud detection accuracy, and monthly reporting cost.

The illustrative results indicate differences across all five indicators. The technology-enabled model reduced the time required to close monthly accounts, reduced transaction errors, reduced audit hours, increased fraud detection accuracy, and reduced monthly reporting costs.

From a practical perspective, the integration of AI and blockchain may provide financial managers with more timely financial information and stronger transaction-monitoring capabilities.

Accountants could spend less time performing repetitive reconciliation activities and more time interpreting financial information and exercising professional judgment.

The study also has implications for corporate governance. A more traceable transaction environment can potentially strengthen internal controls and improve the availability of financial information for managers, auditors, and other authorized stakeholders.

However, the adoption of AI and blockchain also creates challenges. Initial implementation costs can be substantial, organizations require employees with appropriate technological skills, and AI systems depend on the quality of available data. In addition, organizations must address cybersecurity, privacy, system integration, and regulatory issues.

A major limitation of this study is that the presented numerical results are an illustrative research model rather than results from a completed field survey. Therefore, the findings should not be generalized to all organizations until they are validated using actual organizational data.

Future research should collect primary data from Lebanese companies and compare organizations using traditional financial reporting systems with organizations using AI-enabled or blockchain-based systems. Future studies could also examine the effects of company size, industry, employee technological skills, implementation costs, and regulatory requirements.

Overall, the research model demonstrates how AI and blockchain can be studied as complementary technologies within financial reporting and provides a framework for future empirical research in finance and accounting.

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