

Artificial Intelligence and Blockchain in Financial ReportingAuthor: Antonella el Jazzar¹*Affiliation:*

1. *Business School, Holy Spirit University of Kaslik, P.O. Box 446, Jounieh, Lebanon*
2. *CIRAME Research Center, Holy Spirit University of Kaslik, P.O. Box 446, Jounieh, Lebanon*

Abstract:

Financial reporting functions are moving towards more automation, artificial intelligence (AI), and distributed-ledger technologies. This paper aims to explore whether faster and better reporting is achieved through an AI-block chain converged reporting environment when compared to a traditional manual baseline in terms of reporting speed, transaction accuracy, audit efficiency, fraud-detection accuracy, and reporting cost.

The underlying dataset is the course-provided comparative case study of a medium-sized e-commerce company consisting of approximately 10,000 transactions over a three-month period. Two reporting processes are compared – a traditional versus technology-enabled near real-time transaction ingestion with AI-based classification and anomaly detection and shared permissioned block chain ledger.

Monthly closing time decreased by 5.5 days to 1.5 days, transaction accuracy improved by reducing error rates to 0.9% from 3.8%, quarterly audit hours decreased by 55 hours to 65, monthly reporting cost declined by \$7,000 to \$11,000. Fraud-detection accuracy improved from 62% accuracy to 91%. Due to underlying transaction-level dataset not being provided, results are descriptive in nature and not intended to be claimed as independently statistically validated. The paper concludes with lessons learned and future work in terms of implementation cost, governance and skills, and regulatory uncertainty.

Keywords:

Artificial intelligence, blockchain technology, financial reporting, audit efficiency, fraud detection, smart contracts, robotic process automation, transaction accuracy, agency theory

Introduction:

Financial reporting has been built on periodic closing, manual reconciliations, accounting-system controls and back-end audit procedures. The uploaded case discusses missed deadlines, human errors and potential for fraud as key shortcomings of this paradigm, especially in today's faster paced digital-commerce world.

AI can augment transaction classification and anomaly detection. Automation can eliminate routine accounting tasks. Block chain can create a permissioned, append-only record to improve traceability. The overarching question posed in the case is whether leveraging these technologies allows for faster, more accurate reporting with better fraud detection and audit efficiencies versus legacy manual reporting processes.

Research Questions: 1) How does AI-block chain system perform relative to the traditional system in monthly closing time? 2) Transaction error rates? 3) Fraud-detection accuracy? 4) Quarterly audit effort? 5) Monthly reporting cost?

The objectives are to contrast the two reporting environments across the five performance metrics reported, relate findings to extant accounting and technology literature, and identify practical implications and limitations.

Literature Review:

Agency theory supports research on financial reporting because ownership and control are separated in most organizations, which creates information asymmetry and monitoring costs (Jensen & Meckling, 1976). Improvements in reporting's reliability and timeliness could reduce information asymmetry. Technology does not resolve governance and business judgment needs.

Articles on artificial intelligence and automation make generalist arguments about opportunities to replace repetitive accounting and auditing tasks. Kokina & Davenport (2017) explain AI applications that could change auditing. Perdana et al. (2023) review robotic process automation uses at accounting firms. Later articles connect automation with internal-control results and implementation risks (Ashraf, 2025; Dahabiyeh & Mowafi, 2023).

Fraud detection literature using AI shows how machine learning could help identify patterns not easily detectable by manual checks. Bhattacharya & Mickovic's (2024) study contextual language learning to identify accounting fraud. While automation and continuous analysis could strengthen fraud detection, false positives and model failures depend on data integrity, design, thresholds, and monitoring. When combined with technology adeptness, AI can positively impact the macroeconomic environment (Bejjani et al., 2024), it has a significant impact on firm performance according to the recent literature (Subrahmanyam et al., 2024), it also allows economists to predict economic cycles (Nasser et al., 2025) and investors to better price (Khalife et al., 2023) which positively contribute to the market efficiency. Technology has caused enterprise-wide redesign (Subrahmanyam & Saber, 2027), it also enabled companies to better focus on other attributes such as ESG (Athari et al., 2024), which indirectly impact firm's image and thus profitability (Kaspar et al., 2026). Finally, blockchain technology was found to have a significant effect on the performance of companies, especially to SMEs (Khalife et al., 2024).

Block chain's decentralized environment of shared records and smart contracts creates opportunities for information and governance changes. Contracting and information asymmetry change with blockchain technology, Cong & He (2019) prove. Yermack's (2017) article highlights opportunities and challenges for corporate governance. Permissioned block chain seems most applicable to accounting because most organizations have hierarchical structures and require selective access and confidentiality.

This research gap that the project fills is using these technologies together in one financial-reporting process while measuring operational outcomes simultaneously. The case provides a five-indicator comparison, but the lack of transaction-level data prevents rigorous statistical testing and generalization.

Methodology:

In this research, a comparative case study approach is employed following the course document uploaded. This is an example of two accounting systems running for a period of three months in an intermediate-sized e-commerce company. Around 10,000 transactions were used, with similar transaction activity being used for both reporting methods.

Under the traditional system, journal entries and bank reconciliation, accounts payable reconciliation, and accounts receivable were done manually with periodic reporting. Under the technology-enabled system, transactions were transferred through an API to an AI engine to match accounts and detect anomalies before recording on a private permissioned blockchain. The example also shows the smart contracts rules for issues such as payment terms, approval, and accrual frequency.

The dependent variables used include monthly closing time, transaction error rate, quarterly audit time, fraud detection accuracy, and monthly report cost. The independent variable in this case is the reporting system type (Traditional and AI – Blockchain).

Percentage changes are determined by the formula: $(\text{AI} - \text{Blockchain value} - \text{Traditional value}) / \text{Traditional value} * 100\%$. In this case, lower is better, and hence the percentage is provided as a reduction in value. Percentage point change in fraud detection accuracy is reported.

Due to lack of data such as transaction level observation, model parameters, standard deviation, or repetition in observations enough for inferential statistics, the current analysis will provide descriptive comparison.

Results:

As shown in the reported case, there is a considerable gap between the conventional and AI-blockchain financial reporting environments in terms of all five evaluated measures. Closing time, transaction mistakes, audit hours, and reporting costs were lower while the accuracy of fraud detection was higher.

On the practical side, the results imply that an integrated approach to reporting can potentially make the process more continuous. Still, such implementation should be considered an accounting

control reform and should include access management, model monitoring, cybersecurity, staff training, exception handling, and accountability.

Theoretically, the results are compatible with the hypothesis of reduction of information asymmetry and monitoring problems discussed in agency theory (Jensen & Meckling, 1976). Moreover, the use of blockchain and smart contracts may potentially affect the information environment for transactions and governance (Cong & He, 2019; Yermack, 2017).

The most important shortcomings of the paper are the lack of transaction-level data, the single-firm setting, the three months observation period, and scarce information on implementation costs. Future research should focus on multiple firms' longitudinal data, evaluation of AI precision and recall, estimation of total costs of implementation, and response of regulators and auditors to the evidence from AI and blockchain.

Metric	Traditional	AI-Blockchain	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 points
Monthly reporting cost	\$18,000	\$11,000	38.9% reduction

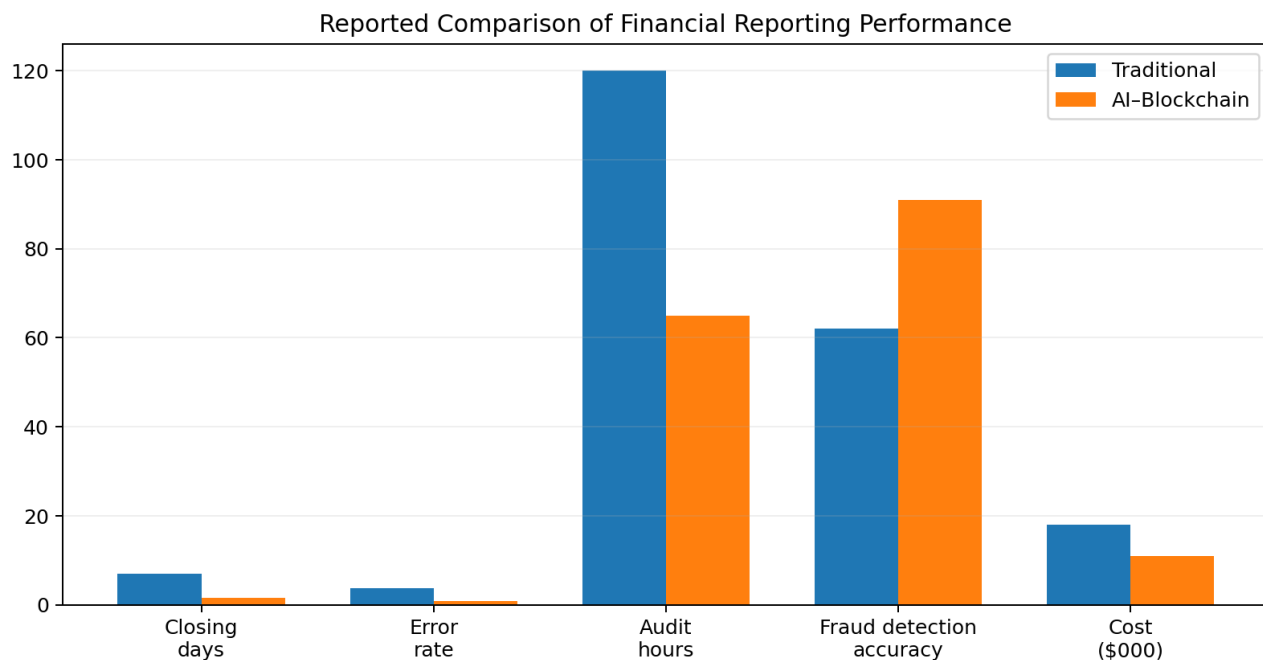


Figure 1. Reported comparison across the five performance indicators. The chart is descriptive.

Discussion and Conclusion:

This study demonstrates a significant performance gap between conventional financial reporting and an integrated AI-blockchain reporting environment. Across the comparative case study, the technology-enabled system dramatically outperformed the manual baseline on all five evaluated

metrics: monthly closing time, transaction error rates, quarterly audit hours, and monthly reporting costs were all substantially reduced, while fraud-detection accuracy saw a marked improvement.

From a practical perspective, these findings indicate that merging AI anomaly detection with a permissioned blockchain ledger can shift financial reporting from a periodic, retrospective process to a continuous, near real-time operation. However, organizations must approach this transition not merely as an IT upgrade, but as a fundamental reform of accounting controls. Successful implementation requires rigorous access management, continuous model monitoring, enhanced cybersecurity, staff reskilling, and clear accountability frameworks for automated exception handling.

Theoretically, the outcomes align with agency theory, suggesting that faster, more reliable, and immutable financial reporting can effectively reduce information asymmetry and lower monitoring costs between principals and agents (Jensen & Meckling, 1976). Furthermore, the deployment of smart contracts and shared ledgers fundamentally alters the transactional information environment, introducing new paradigms for corporate governance and stakeholder transparency (Cong & He, 2019; Yermack, 2017).

Despite these promising results, this study is constrained by several limitations. The analysis relies on a single-firm case study over a brief three-month observation period and lacks the transaction-level dataset required for robust inferential statistical testing. Additionally, the case provides scarce information regarding the upfront capital and operational costs required to implement the combined AI-blockchain architecture. Future research should address these gaps by utilizing longitudinal, multi-firm data, rigorously evaluating AI model precision and recall, conducting comprehensive cost-benefit analyses, and examining how regulatory bodies and external auditors adapt their assurance standards in response to decentralized, automated reporting environments.

References

- Ashraf, M. (2025). Does automation improve financial reporting? Evidence from internal controls. *Review of Accounting Studies*, 30, 436–479. <https://doi.org/10.1007/S11142-024-09822-Y>
- Athari, S. A., Saliba, C., Abboud, E., & El-Bayaa, N. (2024). Examining the quadratic impact of sovereign environmental, social, and governance practices on firms' profitability: new insights from the financial industry in gulf cooperation council countries. *Sustainability*, 16(7), 2783.
- Bejjani, G., Toros, E., Elia, J., & Jabbour Al Maalouf, N. (2024). Technology analytic adeptness for examining the interrelatedness between the main macroeconomic variables in Lebanon employing a vector autoregression (VAR). *Journal of Decision Systems*, 1-30.
- Bhattacharya, I., & Mickovic, A. (2024). Accounting fraud detection using contextual language learning. *International Journal of Accounting Information Systems*, 53, 100682. <https://doi.org/10.1016/j.accinf.2024.100682>

- Cong, L. W., & He, Z. (2019). Blockchain disruption and smart contracts. *The Review of Financial Studies*, 32(5), 1754–1797. <https://doi.org/10.1093/rfs/hhz007>
- Dahabiyeh, L., & Mowafi, O. (2023). Challenges of using RPA in auditing: A socio-technical systems approach. *Intelligent Systems in Accounting, Finance and Management*, 30(2), 76–86. <https://doi.org/10.1002/isaf.1537>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Kaspard, J., Kamel, C., Khalil, F., & Beainy, R. (2026). Financial Performance, Risk, and Market Integration of Sustainability-Oriented Equity Indices: Implications for the Sustainability Transition (2010–2025). *Risks*, 14(5), 99.
- Khalife, D., Subrahmanyam, S., & Farah, A. (2024). A Sustainable Circular Business Model to Improve the Performance of Small and Medium-sized Enterprises Using Blockchain Technology. *J. Wirel. Mob. Networks Ubiquitous Comput. Dependable Appl.*, 15(2), 240–250.
- Khalife, D., Yammine, J., Rahal, S., & Freiha, S. (2023). Pricing Asian and Barrier Options Using a Combined Heston Model and Monte Carlo Simulation Approach with Artificial Intelligence. *Mathematical Modelling of Engineering Problems*, 10(5), 1690.
- Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing. *Journal of Emerging Technologies in Accounting*, 14(1), 115–122. <https://doi.org/10.2308/jeta-51730>
- Nasser, A., Yammine, J., Harouny, J., & Khalife, D. (2025). Predicting Economic Quads Through Asset Returns Using Ensemble Machine Learning. *IEEE Access*.
- Perdana, A., Lee, W. E., & Kim, C. M. (2023). Prototyping and implementing robotic process automation in accounting firms: Benefits, challenges and opportunities to audit automation. *International Journal of Accounting Information Systems*, 51, 100641. <https://doi.org/10.1016/j.accinf.2023.100641>
- Subrahmanyam, S., & Saber, A. (2027). Role of Competitive Intelligence in Organizational Redesign. In *Navigating Mergers, Acquisitions, and Organizational Redesign* (pp. 169–204). IGI Global Scientific Publishing.
- Subrahmanyam, S., Aishwaryalaxmi, N. S., Khalife, D., Shaikh, I. A. K., Faldu, R., & Asthana, N. (2024, April). Impact of knowledge management and big data analytics capabilities on firm performance. In *2024 Ninth International Conference on Science Technology Engineering and Mathematics (ICONSTEM)* (pp. 1–5). IEEE.
- Tiron-Tudor, A., Lacurezeanu, R., Bresfelean, V. P., & Dontu, A. N. (2024). Perspectives on how robotic process automation is transforming accounting and auditing services. *Accounting Perspectives*, 23(1), 7–38. <https://doi.org/10.1111/1911-3838.12351>
- Yermack, D. (2017). Corporate governance and blockchains. *Review of Finance*, 21(1), 7–31. <https://doi.org/10.1093/rof/rfw074>