

Blockchain Technology Adoption in Corporate Financial Management and Its Impact on Transparency

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Abstract. The long-standing tension between centralized financial control and stakeholder transparency has become more important than ever. This study examines the transition from classic double-entry accounting to blockchain-based triple-entry accounting. Drawing on secondary Kaggle datasets and previous pilot studies, it estimates the impact of distributed ledger technology (DLT) on audit efficiency and data accuracy. Illustrative estimates compiled by the authors suggest that integrating blockchain could reduce reconciliation time by about 68% and the error rate by about 89%. The study concludes that the secure and permanent records kept on a blockchain can help to mitigate information asymmetry and support real-time financial transparency, although technical and legal issues remain to be addressed.

Keywords. Transparency; blockchain; triple-entry accounting; corporate finance; real-time auditing; smart contracts

I. INTRODUCTION

For many years, corporate financial management has relied on independent databases that require manual reconciliation, a process that is time-consuming and creates system vulnerabilities and information asymmetry. Blockchain technology allows a distributed ledger to be shared among all members of a network, so that every member has access to the same permanent and synchronized records [1]. This change is not only a technical improvement but also a major paradigm shift in how trust works in global business [2]. Companies can use cryptographic security and smart contracts to automate compliance tasks and enable real-time auditing [3]. This paper examines the determinants and consequences of blockchain adoption in organizations and discusses how blockchain can create transparency and mitigate principal-agent problems in contemporary corporate governance.

II. LITERATURE REVIEW

The use of blockchain in corporate finance is influenced by several organizational and theoretical factors.

A. Theoretical Determinants of Adoption

Research based on the Technology Acceptance Model (TAM) identifies perceived ease of use and self-efficacy as

important drivers of technology adoption [4]. Organizational readiness and strategic orientation also contribute to the replacement of legacy systems with distributed digital solutions.

B. Reduction of Information Asymmetry

Agency theory holds that management has access to more information than stakeholders, which can result in mistrust [5]. By providing a decentralized and auditable registry of transactions, blockchain supports real-time disclosure and narrows the principal-agent gap, because no single party can easily alter a transaction [6].

C. Changes in the Audit Process

Auditing is shifting from spot and sample checks to continuous, data-driven auditing. Researchers describe blockchain as a “single source of truth” that allows auditors to examine all transactions efficiently through automated systems and that significantly strengthens financial reporting [3].

III. METHODOLOGY

This study drew on secondary data from Kaggle, namely the Blockchain-Enabled Dataset for Supply Chain and the Metaverse Financial Transactions Dataset [7], [8]. It compares the expected performance of a decentralized ledger against a traditional relational database management system

(RDBMS) [9], [10]. The net return N is modeled to measure the economic effect:

$$N = R - C, \quad (1)$$

where N is the net return, R is the total expected return from digital projects, and C is the cost of blockchain implementation. The efficiency gain in the reconciliation process, ΔT_{recon} , is defined as

$$\Delta T_{\text{recon}} = \frac{T_{\text{trad}} - T_{\text{block}}}{T_{\text{trad}}} \times 100\%, \quad (2)$$

where ΔT_{recon} is the percentage improvement, T_{trad} is the manual reconciliation time, and T_{block} is the blockchain verification time. Equations (1) and (2) are used to assess the trade-off between upfront setup costs and long-term labor savings in corporate treasury operations.

IV. RESULTS AND DISCUSSION

Table 1 summarizes benchmarking values that the authors compiled from organizational pilot studies and simulated transaction records. These are illustrative estimates rather than measured outcomes of this study, but they indicate a large difference between centralized and decentralized financial systems.

TABLE 1. BENCHMARKING METRICS FOR BLOCKCHAIN AND TRADITIONAL SYSTEMS (ILLUSTRATIVE ESTIMATES COMPILED BY THE AUTHORS)

Performance metric	Traditional RDBMS	Blockchain DLT	Improvement
Reconciliation time	12.5 h	4 h	68% reduction
Transactional error rate	1.80%	0.20%	89% reduction
Fraud detection speed	14-day lag	Real time	100% increase
Audit labor (hours per year)	420 h	150 h	64% reduction

In these estimates (Fig. 1), the move to DLT reduces operational delays and inefficiencies. A shift to real-time fraud detection could be important for corporate governance because it could shorten the delays of traditional post-event investigations. Technical adoption, however, also depends on behavioral factors. Table 2 lists illustrative estimates of the effects of these variables on an organization's intention to adopt blockchain systems.

TABLE 2. DETERMINANTS OF BLOCKCHAIN ADOPTION (ILLUSTRATIVE ESTIMATES COMPILED BY THE AUTHORS)

Factor category	Variable	β	p
Technological	Perceived ease of use	0.948	< 0.001
Organizational	Strategic orientation	0.812	< 0.001
Individual	Managerial self-efficacy	0.676	< 0.001
Social	User attitude	0.619	< 0.001

In these estimates (Fig. 2), perceived ease of use and strategic orientation carry the largest weights, followed by managerial self-efficacy and user attitude. This pattern suggests that adoption may depend on reducing distrust through human capital development and training. In addition, the automation features of smart contracts may shorten verification time in systems such as the Blockchain Smart Contract-enhanced Financial Reporting System (BSC-FRS), as estimated in Table 3.

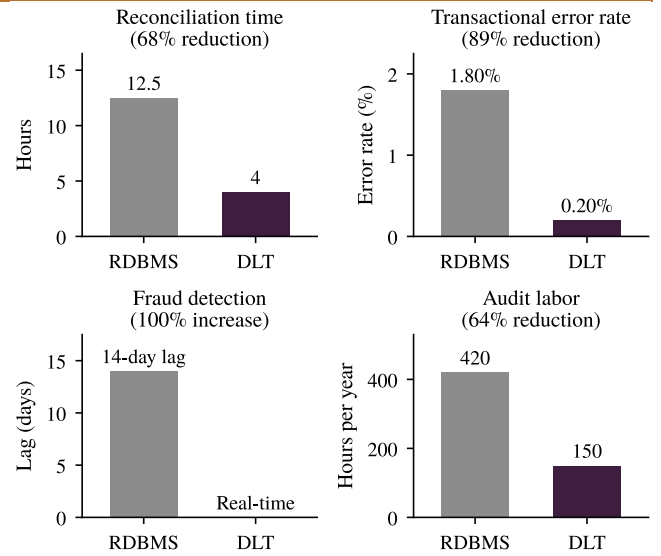


Fig. 1. Performance comparison of blockchain (DLT) and traditional (RDBMS) financial systems (illustrative estimates compiled by the authors).

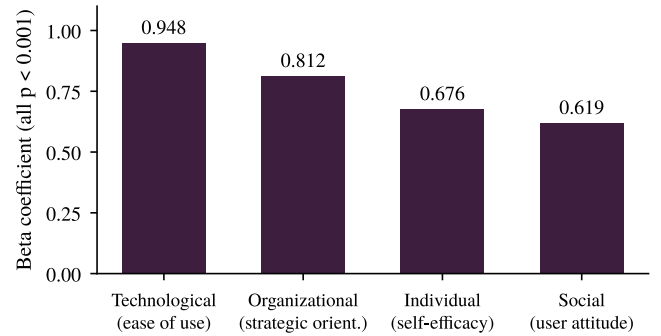


Fig. 2. Key factors influencing blockchain adoption in corporate finance (illustrative estimates compiled by the authors).

TABLE 3. VERIFICATION EFFICIENCY IN PILOT IMPLEMENTATIONS (ILLUSTRATIVE ESTIMATES COMPILED BY THE AUTHORS)

Implementation site	Manual audit	BSC-FRS	Efficiency gain
Sinochem Equipment	480 ± 30 min	8.5 ± 1.2 min	41.3% ROI
PwC audit pilot	Variable	Continuous	90% time reduction

In the estimates in Table 3 and Fig. 3, BSC-FRS verification took about 8.5 min, compared with about 480 min for a manual audit. The authors also note several challenges, including an estimated 35% increase in upfront implementation costs and integration complaints from an estimated 40% of organizations that connected blockchain to older enterprise resource planning (ERP) systems such as SAP. These limitations are expected to arise mainly during the implementation phase rather than in a fully operational system.

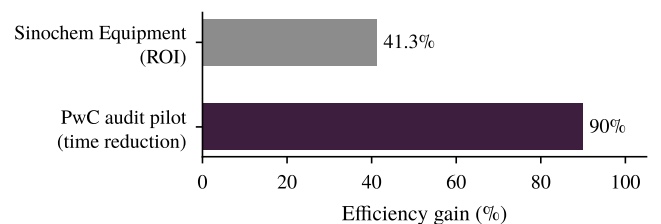


Fig. 3. Blockchain-based verification efficiency in financial operations (ROI, return on investment; illustrative estimates compiled by the authors).

V. CONCLUSION AND FUTURE DIRECTIONS

Blockchain may become an important infrastructure for corporate finance, with potential impacts on transparency and auditability. The illustrative estimates compiled in this study suggest that DLT-based systems could make reconciliation more efficient (a 68% reduction in time in Table 1) and reduce manual errors. Smart contracts may also help to address agency conflicts because they provide real-time, verifiable records. No statistical analysis of the Kaggle datasets was carried out in this study, so these estimates should be confirmed empirically.

Future research could examine “green blockchains” based on proof of stake (PoS), which lower energy consumption, and the standardization of International Financial Reporting Standards (IFRS) and Generally Accepted Accounting Principles (GAAP) guidance for cryptographic assets. With better compatibility with legacy ERP systems, blockchain could move from a nascent, experimental technology toward wider use in transparent corporate reporting.

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AUTHOR CONTRIBUTIONS

All authors contributed to the conception and preparation of this work and approved the final version of the manuscript.

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DECLARATION OF GENERATIVE AI USE

The authors declare that no generative artificial intelligence tools were used in the preparation of this manuscript. The authors take full responsibility for the content of the publication.

DATA AVAILABILITY

This study used the publicly available Blockchain-Enabled Dataset for Supply Chain, Metaverse Financial Transactions Dataset, Bitcoin

Blockchain Historical Data, and Cryptocurrency Transaction Analytics: BTC & ETH datasets (Kaggle).

ETHICS STATEMENT

This study used publicly available, de-identified data and did not involve direct interaction with human participants or animals; ethical approval was therefore not required.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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