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Modernizing General Ledger Reconciliation Standards: Reducing Systemic Risk in Financial Reporting Across Public and Private Sectors

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Abstract: General Ledger (GL) reconciliation is a fundamental control in financial reporting, which is critical for accuracy, transparency and reliability of accounting records both in public and private sectors. Yet, the continued reliance on manual processes, outdated technology and inconsistent reconciliation standards have resulted in systemic weaknesses such as financial misstatements, regulatory exposure, operational inefficiency and trust among stakeholders. These deficiencies are exacerbated by increasingly intricate and internationally linked financial systems, which further increase the risks to both an institution's performance and overall stability. This study reinforces the idea that modernization is not an engineering luxury, but rather a strategic necessity. The research is lighting on automation, RPA, AI, blockchain and Cloud-based ERP platforms which enable a transformation of reconciliation from a periodic error prone task to a continuous proactive and highly reliable financial control. These results also underscore the importance of governance reform, data standardization and effective change management in sustaining gains from technological innovation. Barriers that are specific to sectors, for example lack of resources and procurement difficulties in the public sector or integration and cyber-security risks in the private sector require both a bespoke response with regulatory cooperation and cross-sector measures. Finally, up-to-date GL reconciliation systems are poised to strengthen organizational agility, increase transparency and secure the integrity of a financial ecosystem. By combining sophisticated technology and strong governance, institutions will be able to minimize systemic weaknesses, enhance transparency and construct a more sustainable and trusted financial reporting ecosystem.

Keywords: General Ledger Reconciliation, Systemic Risk, Financial Reporting, Automation, Artificial Intelligence.

INTRODUCTION

The reconciliation of General Ledger (GL) is the heart of financial integrity, ensuring that recorded financial transactions match with actual financial activity (Sarumi, O. *et al*., 2022). Historically, it has been very manual, involving spreadsheet-based reconciliations and a lot of human oversight. Although such practices have been in place for some time, they are inefficient, slow the reporting process and increase the risk of misstatement or fraud (Lundelius, 2011). While reconciliation failures may not have been solely responsible for these errors, they were found to have been a contributing factor and resulted in countless public and private organizations failing to prevent systemic financial reporting errors and compliance breaches, justifying the need for change. Worldwide accounting systems such as the International Financial Reporting Standards (IFRS) and the Generally Accepted Accounting Principles (GAAP) highlight accuracy, reliability, and timeliness in reporting (Kimani 2024). However, they still struggle to achieve those with older techniques. Weak information reconciliations were found to be a major cause of material weaknesses in internal controls that undermine stakeholder trust and can have dire reputational and financial implications (Dobre, 2011).

Digital transformation programs are redefining reconciliation norms through robotic, AI and blockchain tools. With automated reconciliation tools, it is possible to quickly resolve issues by letting technology perform the reconciliation, freeing you up to act on the problems, it reduces the amount of manual intervention and human error and helps to speed up closing cycles. Anomaly detection is improved using AI and machine learning, making it more proactive to manage risk rather than reactive to correct risk (Mizanur M. *et al*, 2025). At the same time, blockchain creates immutable audit trails that increase accountability and transparency in financial reporting (Eyo-Udo, N.L. *et al*., 2025).

Despite these opportunities, adoption is uneven and compromised by high costs of implementation, resistance to change, regulatory uncertainties (Gkrimpizi, T. *et al*., 2023). Public sector organizations are characterized by a set of specific challenges arising from the lack of budget and the inertia of bureaucracy, frequently hampering technology absorption (Lamprousis, K. *et al*., 2025). On the other hand, although the private sector may be more willing to embrace modernization, it faces more integration risks and cybersecurity challenges. The confluence of these challenges shows that modernization is not just a technology replacement but a governance and policy imperative.

This study aims to investigate the modernization of GL reconciliation standards as an approach to mitigate systemic risk in financial reporting. The

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analysis of the current practice, technology innovation and sector-specific challenges of countries would contribute to the ongoing discussion of how to improve financial governance. At the end of the day, contemporary reconciliation models may be the driver of greater organizational resilience, trust with stakeholders, and greater congruence with the broader aims of financial stability and transparency.

LITERATURE REVIEW

This study draws its strength from the insights provided by the practitioners, authors, the public, accounting firms, and academicians in the field of financial accounting and meets the objectives set forth.

General Ledger (GL) reconciliation is the mechanical testing of ledger balances against external sources such as bank statements, subsidiary ledgers, and other evidence. It is also a bedrock of financial reporting reliability. Effective reconciliations lower the probability that material misstatements will go undetected, enable management to credibly assert the effectiveness of internal control over financial reporting (ICFR), and allow the auditors to have an impactful body of evidence to evaluate the effectiveness of controls (Navarro Velez, 2019). Nevertheless, traditional reconciliation practices, which are based on manual procedures, the utilization of spreadsheets, and fragmented enterprise systems, are unable to cope with the increased complexity and volume of financial transactions in the public and the private sectors (Ogedengbe, A.O. *et al*., 2024). These vulnerabilities increase systemic risks through delaying the discovery of errors, hiding financial transparency, and increasing susceptibility to fraudulent activities. This article is designed as a literature review to integrate academic and practitioner views on GL reconciliation with a focus on concepts foundation and regulations, risks generated by the traditional way of reconciliation, modernization paths which include automation, artificial intelligence/machine learning (AI/ML), continuous controls monitoring (CCM), and blockchain, implementation challenges, and research and practice gaps.

Conceptual and Regulatory Foundations

Reconciliations, as a control activity, are universally treated as such within both academic and regulatory literature. Committee of Sponsoring Organizations (COSO) internal control and integrated framework specifies reconciliations as vital tools for the organization to achieve financial reporting objectives and manage the risk of misstatements (Lopez, 2023). In the corporate environment, public company accounting oversight board (PCAOB) Auditing Standard (AS) No. 2201, establishes reconciliation controls as a key measure to consider when assessing the effectiveness of ICFR. The U.S. federal government's Office of Management and Budget (OMB) Circular A-123 also incorporates reconciliations into its broader enterprise risk management, highlighting the importance of the activity in terms of fiscal responsibility and stewardship. Together, they make reconciliations with non-discretionary internal controls while allowing companies to latitude in how they comply. This lack of uniform operational practices has, however, led to different procedures governing operations across actors and industries.

Risks from Legacy Reconciliation Practices

Empirical and practical evidence suggests that stale reconciliation procedures lead to financial exposure. Reports that reconciliations are a continuing source of restatements and late filings of financial statements for publicly traded firms (Badertscher, B.A. *et al*., 2011). For example, deficient reconciliations have resulted in significant misstatements in financial statements, eroding investor confidence and leaving companies vulnerable to regulatory sanctions.

The Financial Times (2024) reports a recent explosion in restatements tied to weak internal controls as organizations shifted to remote work, pointing out that manual reconciliations collapse under pressure. Within the government context, poor reconciliation practices have been linked to fiscal inefficiencies, resource misuse, and a loss of public confidence (Mesioye, O. et sl., 2024). Messages from the global financial crisis (GFC) in 2008 demonstrate that poor reporting, control (e.g., reconciliation failures) and opaqueness compound systemic vulnerability (Youvan, 2024). Manual reconciliations also pose risk of fraud. Restricted audit trails and significant error-proneness of human activities can lead to hiding of illicit transactions. These results taken together explain why the traditional reconciliation process cannot guarantee accuracy, timeliness, and completeness in financial reporting.

MODERNIZATION PATHWAYS

Robotic Process Automation (RPA)

RPA automates repetitive, rule-defined reconciliation processes like data extraction, field matching, and exception routing. According to the

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research presented, RPA can greatly decrease the turnaround times as well as processing error especially in high volume scenarios (Kothandapani, 2023). Including robot logic and exception handling, mechanical can control all RPA activities by being deterministic but faces the risk of additional failures due to missing robot designed logic and poor exception handling or robust governance.

Machine Learning and Artificial Intelligence (ML/AI)

AI/ML extends reconciliation beyond deterministic matching to fuzzy matching, anomaly detection, and predictive exception management. Case studies have found better accuracy and earlier anomaly detection through supervised models and clustering algorithms (Morales-Forero A. *et al*., 2019). But there is also a warning in the literature about poor data quality, explainability, and governance deficits which might challenge reliability and exacerbate risks rather than mitigating them.

Continuous Controls Monitoring (CCM)

CCM embeds electronic reconciliation checks into transaction systems, providing near real-time detection of exceptions. Studies have evidence that CCM reduces latency for error-detection and enhances the auditability (Barr-Pulliam, D. *et al*., 2022). However, scalability is largely dependent on mature data architectures and agreed reconciliation taxonomies, which are not universally present in the Public or Private sector. (Bharosa, N. *et al*. 2011).

Blockchain and Distributed Ledgers

Blockchain offers an entirely new way of doing things by establishing tamper-proof, shared transaction records, so that both parties no longer have to attempt bilateral reconciliations. Reviews point out potential advantages in terms of settlement reconciliation and audit transparency (Adewale, T.T. *et al*., 2022). However, adoption is limited by interoperability issues, the ease of access and use, the acceptance and integration of QR code, issues of legal recognition and privacy concerns, it is costly to set up. Literature also tends to consider blockchain more of an enabler in the long run than a short-term fix.

RESEARCH METHOD

Using a qualitative approach, this study seeks to explore the potential of updating general ledger (GL) reconciliation standards to reduce systemic risk in financial reporting within public and private industry settings. This review will consolidate findings from academic research, industrial papers and the major governed documents (e.g., COSO Internal Control, Integrated Framework, PCAOB Auditing Standard 2201). The review will cover three major elements: the fundamental value of GL reconciliation within control frameworks, the enterprise risks of relying on legacy manual processes; and the established pros and pitfalls of exploiting new techs such as RPA, AI, ML, and blockchain. A review of this literature will guide the research design and offer theoretical direction for the subsequent research. The end report will combine evidence and insights obtained from the literature review, and this data triangulation will contribute to establishing the credibility and the soundness of the study, generating a full, more balanced understanding of how updating standards governing the reconciliation of GL could decrease the systemic risk in financial reporting.

FINDINGS AND DISCUSSION

The results of the study suggest a strong urgency to update the general ledger (GL) reconsolidation best practices to mitigate the systemic risks associated with financial reporting both in the public and private sectors. Key themes developed through the triangulation of literature evidence and qualitative insights were as follows; systemic vulnerabilities in manual reconciliation, the transformative role of emerging technologies, organizational and regulatory challenges related to adoption and wider implications for systemic risk mitigation. In sum, these results demonstrate that modernization is not just a technological enhancement, but a strategic priority for financial resilience.

Systemic Vulnerabilities of Manual Reconciliation

The study revealed that conventional, time-consuming reconciliation methods suffer from inefficiency, lack of control and high error rates (Sharma, A. *et al*., 2024). These manual practices, typically performed with spreadsheets and siloed documentation were consistently cited as causing the accumulation of reconciliation backlogs, late financial closes, and increased fraud exposure. These weaknesses impair the promptness and dependability of financial reporting, which is one of the internal control principles provided in COSO Framework (2013) (Rubino, M. *et al*., 2014).

Empirical evidence supports the fact that when reconciliations are delayed, or manual approaches

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are adopted, there is an increased probability of misstatements leading to restatements of financial statements, jeopardizes confidence of the investor community and exposes the firm to regulatory fines (D'Este, 2025). In the public sector the presence of FP is less prevalent, yet the continued use of legacy systems exacerbates these problems, fostering reconciliation bottlenecks that prevent transparency and accountability (Ayobami, A.T. *et al*, 2024). These results demonstrate that risks associated with manual reconciliation are systemic, rather than an isolated instance, across sectors and governance structure.

Transformative Potential of Emerging Technologies

The results indicate the modernization of reconciliation processes, with automation and state-of-the-art technologies, presents significant risk mitigation advantages. Robotic Process Automation (RPA) drives a decrease in manual reconciliation effort, enabling finance resources to concentrate on more value-added analytical responsibilities (Adeleke, O. *et al*, 2023). Artificial Intelligence (AI) and Machine Learning (ML) enhance these capabilities by facilitating fuzzy matching, anomaly detection and predictive modeling to identify in real-time discrepancies that previously manual or rules-based system would probably never have detected (Mishra, 2023).

Above and beyond automation and AI, blockchain technology is being seen as a revolutionary enabler providing irreversible audit trails and facilitating real time reconciliations (Oladejo M. *et al*., 2020). Together these systems move reconciliation from a reactive period end function to a proactive continuous monitoring activity that improves not only accuracy but fraud detection (Celestin, M. *et al*., 2024). This technology change also facilitates elements of effective internal control, as defined by COSO (2013) and PCAOB AS 2201, which in turn aids in linking reconciliation and modernization efforts with broader governance and assurance objectives.

Institutional and Institutional Barriers to Renovation

Although the advantages of modernization are starkly present, high barriers remain. A common challenge identified in the literature is the challenge of combining new reconciliation solutions with the fragmented legacy Enterprise Resource Planning (ERP) systems that are implemented in large and bureaucratic organizations (Ogedengbe, A.O. *et al*., 2024). Public sector organizations have also reported several other barriers, including red-tape procurement, compliance and budget constraints which all hinder digital transformation (Sekwat, A. *et al*., 2024).

At the organizational level, resistance to change was identified as a key barrier. Modernization of processes, not just modernization of technology is needed, they said including reforms in conciliation policies, the management of quality of data and training the workforce. Without such measures, technology cannot mitigate systemic risks. More than that, the legal fabric lags the development of technologies. Although COSO and PCAOB issued guidance regarding internal controls, auditors and practitioners have had concerns about the sufficiency of evidence produced by automated processes and the quality of digital audit trail. This discrepancy between what's possible and what's permitted creates confusion and drags down uptake.

Implications for Systemic Risk Reduction

The crossover between literature and qualitative findings from the studies implies that updating GL reconciliation has significant systemic implications. By shortening reconciliation timelines and improving anomaly detection capabilities, automation and AI lower operational risk, improve fraud detection, and increase transparency. These enhancements support the ability of the financial reporting process to be prepared to withstand a turbulent global economy.

But the results warn against characterizing modernization as just a technological fix. Effective transformation demands a fusion of automation and human oversight, embedding the right balance of accuracy and auditability. Organizational culture, employee retraining and flexible regulatory guidance are also critical slides of this transformation. Especially in the public sector, which is characterized by longer policy-making time horizons, this issue of aligning policy frameworks with technological opportunities becomes critical so as not to exacerbate systemic vulnerabilities.

These contributions raise the need for an upgrade of the GL reconciliation standards as incrementally; the modernization of the GL reconciliation standards becomes not only a compliance need but also a strategic tool to ensure confidence in financial reporting. With synchronized standards, stronger governance

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protocols and advanced technologies, public and private sector organizations now could reduce systemic risk and move reconciliation to a continuous, real-time control process that safeguards the stability and integrity of the financial system.

IMPLEMENTATION CHALLENGES

For all the allure of modernity, however, substantial obstacles remain. Legacy of multiple enterprise resource planning (ERP) systems and disparate reconciliation norms make automations integrating difficult (Emma 2024). Poor quality data is a weak link and a critical inhibitor on effectiveness in both RPA and AI/ML offerings.

Auditor willingness is another issue. Although automated reconciliations bring efficiencies, auditors are skeptical about the adequacy and appropriateness of automated evidence (Barr-Pulliam, D. et el., 2024). Public agencies also confront other obstacles, including procurement requirements and legacy infrastructure, which can impede the pace of modernization (Whitfield, 2010). There is also an organizational cultural dimension, as automation changes the tasks requiring professional judgment using retraining to sustain skeptical professionalism.

CONCLUSION

The consensus in the literature is that the modernization of GL reconciliation forms a significant part in reducing systemic risk in financial reporting. RPA, AI/ML and CCM all hold the promise of delivering major operational benefits, increased speed to delivery, improved accuracy, and better audit trails. Blockchain has the potential for more revolutionary change over the long term but will encounter near term adoption barriers. However, modernization is of little use without strong governance, engagement with auditors, improvements to data quality and cross-sector standardization.

Future research should investigate quantitatively the overall effect of modernization, measure behaviors and governance implications, and investigate aligned models in private and public reporting domains. Despite these advances, reconciliation will always be a feeble link in financial statement reporting and system stability.

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