



Automation of Financial Accounting Using Artificial Intelligence

Research Methodology in Computer Science (AI800)

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Key Points

- Research suggests that AI technologies like machine learning and robotic process automation are increasingly automating financial accounting tasks, improving efficiency and accuracy, though challenges such as data quality and ethical concerns persist.
- Evidence leans toward significant benefits in fraud detection and reporting, but integration requires careful oversight to mitigate risks like algorithmic bias.
- Studies indicate that while AI enhances decision-making, human expertise remains essential for complex judgments, highlighting a complementary rather than replacement role.
- The evidence suggests that adoption is heterogeneous, with productivity gains observed in firms, but barriers like high costs and skill gaps could slow widespread implementation.
- Research points to opportunities in areas like sustainability and SMEs, but gaps in empirical data and ethical frameworks suggest the need for further exploration.

Problem Statement Overview

The problem domain focuses on financial accounting environments where AI tools are applied to automate processes. Challenges include data quality issues, lack of model interpretability, and regulatory gaps that hinder reliability and full adoption. Significance lies in impacts on efficiency and financial dependability, with existing solutions offering accuracy improvements but not fully addressing limitations. Justification for research emphasizes developing solutions to enhance integration.

Research Objectives Summary

Primary goal: To analyze and enhance AI's effectiveness in financial accounting automation by addressing challenges and proposing reliable solutions. Sub-objectives align with identifying limitations, analyzing impacts, evaluating frameworks, and recommending improvements.

Literature Review Highlights

Six 2025 studies provide insights: bibliometric analyses reveal evolving themes like fraud detection; empirical evidence shows productivity gains but risks of over-reliance; systematic reviews highlight synergies with internal controls, though gaps in ethics and long-term effects remain.

Problem Statement

Despite rapid advancements in artificial intelligence (AI) technologies such as machine learning (ML), natural language processing (NLP), and robotic process automation (RPA), organizations face persistent challenges in fully integrating these tools into financial accounting environments. The problem domain is financial accounting, where automation aims to streamline tasks like data entry, reconciliation, reporting, and fraud detection. However, key issues include poor data quality leading to inaccuracies, lack of interpretability in AI models causing trust deficits, insufficient regulatory frameworks exacerbating ethical risks like bias, and cybersecurity vulnerabilities that compromise data integrity (Elnakeeb & Elawadly, 2025; Alqahtani et al., 2025). These challenges slow adoption, affect the reliability of financial outputs, and limit the potential for real-time decision-making.

The significance of this problem is profound, as ineffective AI integration can result in operational inefficiencies, increased error rates (potentially up to 20-30% in manual processes), financial losses from undetected fraud, and non-compliance with standards like GAAP or IFRS, ultimately undermining organizational performance and stakeholder trust (Wang et al., 2025; Rikhardsson et al., 2025). Existing solutions, such as IPA systems that combine RPA with AI for judgment-intensive tasks, have demonstrated benefits like 40% efficiency gains in processes such as audits and financial closes, along with improved fraud detection through ML algorithms achieving up to 85% accuracy (Wang et al., 2025; Steingen & Löw, 2025). However, these solutions often require high-quality data and human oversight, falling short in addressing biases and long-term adaptability.

Justification for further research stems from the need to bridge these gaps through technical innovations (e.g., explainable AI) and organizational strategies (e.g., ethical guidelines and training), ensuring dependable automation that enhances accounting efficiency while mitigating risks (Rikhardsson et al., 2025; Alqahtani et al., 2025).

Research Objectives

Primary Goal: To analyze and enhance the effectiveness of artificial intelligence technologies in automating financial accounting through evaluating current challenges and proposing solutions to improve reliability and accuracy.

Sub-Objectives:

1. To identify the key limitations and challenges associated with AI-driven financial accounting automation, such as data quality and interpretability issues.
2. To analyze the impact of AI tools such as ML and RPA on accuracy, efficiency, and fraud detection in financial accounting.
3. To evaluate existing frameworks and practices used to implement AI in accounting environments, including integration with internal controls.
4. To propose recommendations or an improved framework that enhances the reliability, interpretability, and ethical aspects of AI-based accounting systems.

These objectives directly align with the problem challenges, providing a structured path from identification to solution proposal.

Literature Review

This section summarizes six academic studies published in 2025 that examine the role of artificial intelligence in automating financial accounting. Each includes a brief summary, followed by a critical analysis of strengths and weaknesses.

1. Accounting Automation's Intelligent Future (Wang et al., 2025)
Summary: This article discusses intelligent process automation (IPA) integrating RPA and AI for judgment-intensive accounting tasks like audits, financial closes, and tax compliance, enabling efficiency gains and shifting CPAs to advisory roles. Critical Analysis: Strength – Provides practical examples, such as 40% efficiency improvements

from real-world implementations; Weakness – Relies on hypothetical scenarios with limited empirical validation beyond referenced reports.

2. Automation and Artificial Intelligence in Accounting: A Comprehensive Bibliometric Analysis and Future Trends
(Elnakeeb & Elawadly, 2025) Summary: Analyzes 343 Scopus articles from 2001–2024, identifying clusters like AI for fraud detection and process automation, with evolving themes toward digital transformation. Critical Analysis: Strength – Systematic PRISMA methodology offers objective trends and intellectual mapping; Weakness – Lacks experimental data, focusing solely on literature without primary empirical insights.
3. Management Accounting and Artificial Intelligence: A Comprehensive Literature Review and Recommendations for Future Research (Rikhardsson et al., 2025) Summary: Reviews 91 articles on AI/ML in management accounting, highlighting task automation, decision shifts, and challenges like data privacy. Critical Analysis: Strength – Synthesizes multidisciplinary opportunities for collaboration and professional evolution; Weakness – Lacks quantitative results, emphasizing conceptual discussions over empirical evidence.
4. The Impact of Artificial Intelligence on Accounting Practices: An Academic Perspective (Alqahtani et al., 2025) Summary: Examines AI's role in Saudi accounting using TOE/UTAUT frameworks, showing efficiency boosts (e.g., 80% process improvements) but barriers like biases and fatigue. Critical Analysis: Strength – Empirical SEM analysis with high validity on a focused sample; Weakness – Small sample size (n=101) limits generalizability beyond academics and Saudi contexts.
5. Human + AI in Accounting: Early Evidence from the Field (Bamber et al., 2025) Summary: Provides field data on GenAI integration in SMEs, showing productivity gains (e.g., 18% increase in client support) but risks of over-reliance. Critical Analysis: Strength – Robust field evidence from transaction records demonstrating complementarity; Weakness – Early-stage focus with limited scope to one firm's software and SMEs.

6. A Systematic Review of AI Integration and Internal Control Practices (Smith et al., 2025) Summary: Analyzes 97 articles on AI in AIS, emphasizing automation for fraud detection and the mediating role of internal controls in enhancing effectiveness. Critical Analysis: Strength – Rigorous PRISMA-compliant approach ensures comprehensive thematic coverage; Weakness – Narrow focus on specific topics excludes broader perspectives like organizational culture.

Overall Synthesis

Across the reviewed studies, AI consistently improves efficiency, accuracy (e.g., up to 85% in fraud detection), and fraud detection through tools like ML and RPA, with gains such as 40% operational improvements and reduced close times by 7.5 days (Wang et al., 2025; Bamber et al., 2025). However, persistent challenges include governance gaps, data quality issues, skills shortages, model interpretability, and ethical concerns like biases, which hinder full adoption and require human oversight (Elnakeeb & Elawadly, 2025; Alqahtani et al., 2025). Thematic evolution shows a shift from basic automation to advanced integrations with blockchain and IoT, emphasizing multidisciplinary approaches (Rikhardsson et al., 2025; Smith et al., 2025). Future research should address gaps in ethics, SME applications, and long-term empirical studies to develop balanced frameworks.

Study	Key Focus	Benefits Highlighted	Challenges Noted	Strength	Weakness
Wang et al. (2025)	IPA for audits and closes	40% efficiency, error reduction	Data quality risks	Practical examples	Limited empirical data
Elnakeeb & Elawadly (2025)	Bibliometric trends	Fraud detection, real-time reporting	Ethical biases, costs	Comprehensive mapping	No experimental data
Rikhardsson et al. (2025)	AI in management	Task automation, decision	Privacy, job shifts	Multidisciplinary synthesis	Lacks quantitative results

Study	Key Focus	Benefits Highlighted	Challenges Noted	Strength	Weakness
	accounting	enhancement			
Alqahtani et al. (2025)	AI in Saudi practices	80% process speed, accuracy	Fatigue, skill gaps	Empirical SEM	Small sample
Bamber et al. (2025)	GenAI field evidence	18% productivity, granularity	Over-reliance risks	Field data	Limited to SMEs
Smith et al. (2025)	AI and internal controls	Risk mitigation, transparency	Cybersecurity, ethics	Systematic PRISMA	Narrow thematic scope

This table illustrates common themes, with benefits centering on efficiency (average 30-40% gains across studies) and challenges on ethics/data (noted in all). The synthesis underscores AI's transformative potential while calling for integrated solutions.

Key Citations

- Accounting automation's intelligent future
- Automation and artificial intelligence in accounting: a comprehensive bibliometric analysis and future trends
- Management accounting and artificial intelligence: A comprehensive literature review and recommendations for future research
- The impact of artificial intelligence on accounting practices: an academic perspective
- Human + AI in Accounting: Early Evidence from the Field
- A systematic review of AI integration and internal control practices