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REDESIGNING ACCOUNTING IN THE AGE OF AI AND BLOCKCHAIN: A VISION FOR 2030 WITH SPECIAL REFERENCE TO ICAI INITIATIVES

DR. GOUR GOPAL BANIK
Professor & Dean
School of Management and Commerce
Girijananda Chowdhury University,
Guwahati-781017, Assam.

DR. JANARDHAN P. BHOSALE
Head,
Research Centre in Commerce and Management
Arts, Commerce and Science College,
(Sabitribai Phule Pune University)
Narayangaon, Pune, Maharashtra, India.

Abstract:

The rapid advancement of Artificial Intelligence (AI) and Blockchain technology is reshaping the accounting profession. Traditional accounting systems, based on periodic reporting, manual verification and centralized control, are increasingly inadequate in a digital business environment. This conceptual and exploratory study examines how the integration of AI and Blockchain can redesign accounting practices and professional roles by 2030. Based on an extensive review of prior literature and recent technological developments, the paper analyses their impact on key accounting functions, including financial reporting, auditing, assurance and internal control. AI enables advanced analytics, real-time decision support and predictive insights, while Blockchain ensures transparency, security and trust through decentralized and immutable records. A forward-looking conceptual framework is proposed to explain their synergistic role in creating a continuous and reliable accounting ecosystem.

The study further analyses the professional, ethical, governance and regulatory implications of integrating AI and Blockchain in accounting, with particular emphasis on the initiatives undertaken by the Institute of Chartered Accountants of India (ICAI). The study contributes to the digital accounting literature and offers insights for academics, practitioners, standard-setters and policymakers.

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Keywords: Artificial Intelligence; Blockchain Technology; Accounting Transformation; Digital Accounting Systems; Continuous Auditing; Financial Reporting, ICAI.

1. Introduction

The accounting profession is undergoing a significant transformation due to rapid advances in digital technologies. Traditional accounting systems, which rely on manual work, periodic reporting and post-transaction verification, are increasingly inadequate in today's fast-paced and complex business environment. Organizations now process large volumes of transactions, make decisions in real time, and operate under growing regulatory scrutiny. As a result, there is a strong demand for accounting systems that are efficient, transparent and reliable.

In this context, Artificial Intelligence (AI) and Blockchain have emerged as two key technologies driving change in accounting practices. Artificial Intelligence enhances accounting by automating routine tasks and analysing large datasets efficiently. It is widely applied in transaction processing, fraud detection, anomaly identification, predictive analysis and continuous auditing. These applications improve speed and accuracy while enabling accountants to focus more on professional judgement, analysis and strategic decision-making. At the same time, the use of AI raises concerns related to data integrity, algorithmic bias, transparency and ethical accountability.

Blockchain technology represents another important development in accounting and auditing. As a decentralized and distributed ledger, Blockchain enables secure, transparent and tamper-resistant recording of transactions. Its adoption can reduce reconciliation efforts, strengthen internal controls and support continuous assurance by providing a single, verifiable source of financial information. These features significantly enhance the reliability and credibility of accounting data.

While prior studies have largely examined Artificial Intelligence and Blockchain independently, their combined impact on accounting systems remains underexplored. The integration of these technologies has the potential to create a smart and continuous accounting ecosystem that extends beyond automation to support strategic value creation. By 2030, such integration is expected to redefine accounting processes, professional roles and regulatory frameworks.

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Against this backdrop, the present study adopts a conceptual and exploratory approach to examine how the integration of AI and Blockchain can redesign accounting practices by 2030. A conceptual framework is developed to explain this transformation and to analyse its implications for financial reporting, auditing, ethics and regulation, with particular reference to the initiatives undertaken by the Institute of Chartered Accountants of India (ICAI). By offering a forward-looking perspective, the study contributes to the literature on digital transformation in accounting and provides useful insights for academics, practitioners, standard-setters and policymakers.

2. Literature Review

2.1 Artificial Intelligence in Accounting

The adoption of Artificial Intelligence in accounting has expanded rapidly with advancements in machine learning, data analytics and intelligent automation. Prior research highlights AI's ability to automate routine accounting tasks such as transaction processing, data classification, reconciliation and report preparation, thereby improving efficiency and reducing human error (Sutton, Holt, & Arnold, 2016; Baldwin & Brown, 2020).

AI-driven systems are increasingly applied in fraud detection, anomaly identification, and risk assessment by analysing large volumes of financial data in real time (Issa, Sun, & Vasarhelyi, 2016).

The literature also emphasizes AI's role in enabling continuous auditing and predictive accounting. Machine learning algorithms support forward-looking analysis, allowing organizations to anticipate financial risks and performance trends rather than relying solely on historical data (Kokina & Davenport, 2017). As a result, AI is viewed as a transformative force that shifts accounting from a record-keeping function to a value-adding, decision-support role.

Despite these advantages, scholars have raised concerns regarding the ethical and professional implications of AI adoption. Issues related to data quality, algorithmic bias, transparency and accountability are widely discussed (Baldwin & Brown, 2020). Several studies stress that AI should be regarded as an augmenting tool rather than a substitute for professional judgement (Sutton et al., 2016).

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2.2 Blockchain Technology in Accounting and Auditing

Blockchain technology has attracted significant scholarly attention due to its potential to enhance transparency, trust and reliability in accounting systems. As a decentralized and immutable ledger, Blockchain enables secure and tamper-resistant recording of transactions, reducing the risk of manipulation and fraud (Dai & Vasarhelyi, 2017).

Blockchain-based accounting systems can minimize reconciliation efforts, improve data accuracy, and provide a single, verifiable source of truth for financial information (Schmitz & Leoni, 2019).

In auditing, Blockchain supports continuous assurance by providing real-time access to transaction-level data, reducing reliance on periodic sampling (Dai & Vasarhelyi, 2017). Smart contracts further automate accounting rules, compliance checks and settlements, increasing efficiency and accountability (Yermack, 2017). However, challenges such as scalability, interoperability, cost, and regulatory uncertainty remain (Schmitz & Leoni, 2019).

2.3 Convergence of AI and Blockchain

Although extensive research exists on AI and Blockchain individually, studies examining their combined application in accounting are limited. Integration can generate synergistic benefits by combining reliable, tamper-proof data infrastructures with advanced analytical capabilities (Kokina, Mancha, & Pachamanova, 2017). Blockchain ensures data integrity, while AI delivers real-time insights, predictive reporting and automated controls.

The integration enables intelligent accounting systems with continuous reporting, real-time assurance, and enhanced decision-making (Dai & Vasarhelyi, 2017). However, empirical validation and comprehensive conceptual models are scarce (Schmitz & Leoni, 2019).

2.4 Implications and Research Gap

AI and Blockchain adoption will shift accountant roles from clerical tasks to strategic advisory, risk management and technology oversight (ACCA, 2020; IFAC, 2021). Ethical, regulatory and governance challenges, such as data privacy, algorithmic transparency and compliance, must be addressed.

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A critical review shows that most studies examine AI or Blockchain separately, with limited attention to their combined effect. This paper fills this gap by proposing a forward-looking conceptual framework that captures the synergy of AI and Blockchain in redesigning accounting systems by 2030.

3. Conceptual Framework and Research Propositions

3.1 Rationale

The convergence of AI and Blockchain is expected to transform accounting. Blockchain provides a secure, immutable ledger, while AI enables intelligent data analysis. Together, they shift accounting from retrospective processes to continuous, automated, real-time systems, influenced by organizational, professional and regulatory contexts.

3.2 Framework Components

1. **Enabling Technologies:** AI and Blockchain as foundational drivers.
2. **Redesigned Accounting Processes:** Financial reporting, auditing and internal control become automated and continuous.
3. **Transformed Professional Roles:** Accountants evolve to strategic advisors and analysts.
4. **Governance & Regulation:** Adoption depends on ethical standards and adaptive regulatory frameworks.

3.3 Research Propositions

- **P1:** AI and Blockchain integration enhances transparency, accuracy and reliability of accounting information.
- **P2:** Their convergence enables continuous, real-time reporting and auditing.
- **P3:** Accounting roles shift from transactional tasks to strategic advisory and assurance functions.
- **P4:** Effective adoption is influenced by governance, ethics and regulatory frameworks.

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3.4 Conceptual Diagram

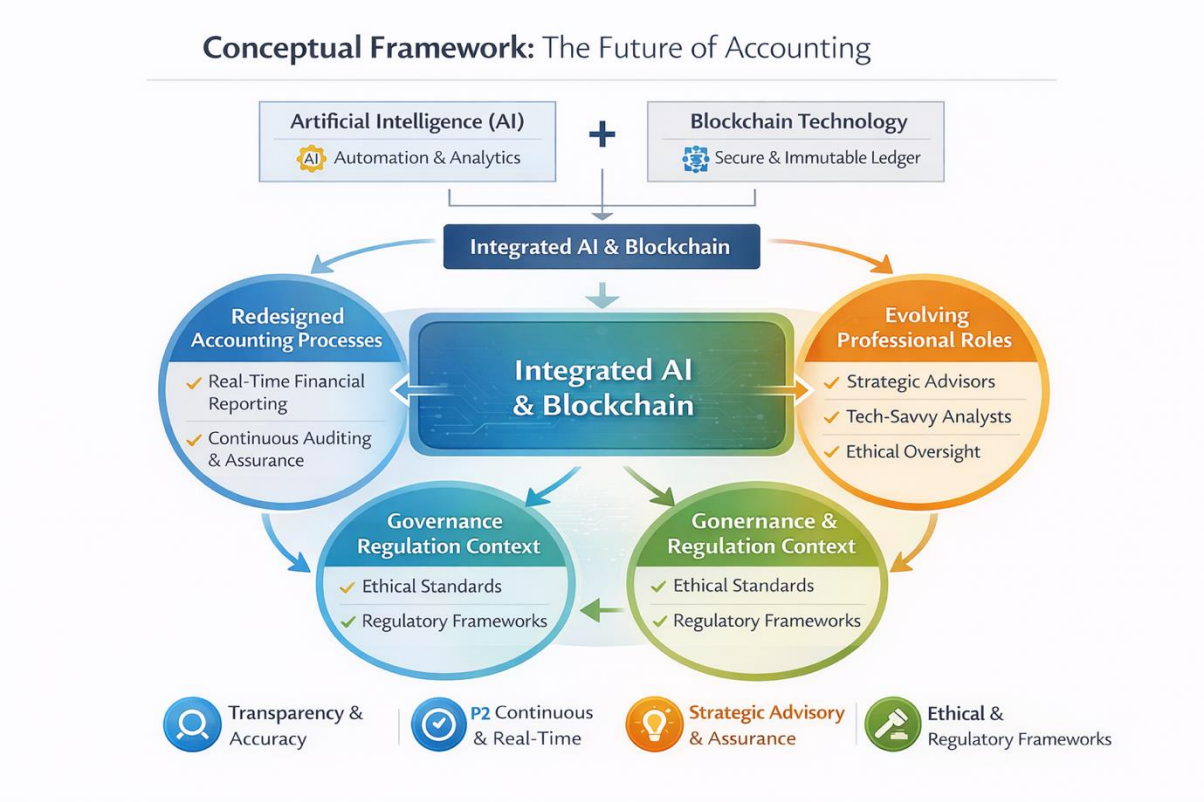

Figure 1: Integrated AI & Blockchain Framework for Accounting Transformation

4. Methodology

Given the exploratory nature of this study, a **conceptual research methodology** was adopted. A **systematic review** of literature, industry reports and professional publications was conducted to:

1. Examine AI and Blockchain applications in accounting.
2. Identify trends affecting processes and professional roles.
3. Detect gaps in research on their combined impact.

A **conceptual framework** was developed linking technologies, processes, roles, and governance. **Propositions** were formulated to illustrate hypothesized relationships and expected outcomes by 2030.

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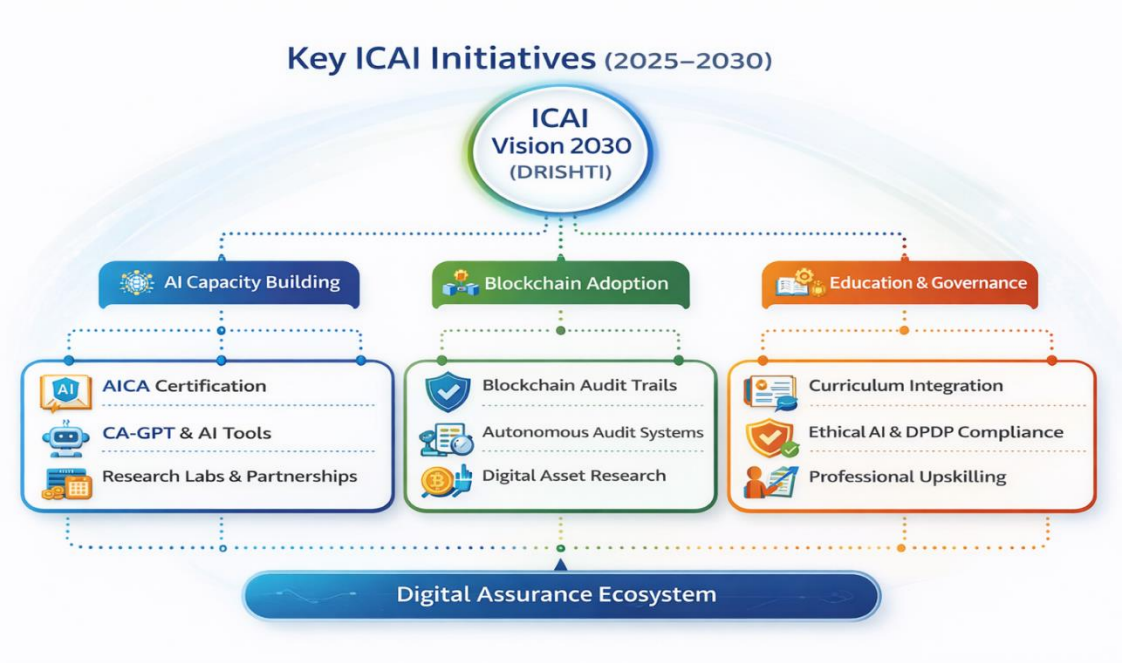
Scope and limitations: The study provides a **theoretical vision** rather than empirical testing. Future research should validate the framework across industries and regulatory contexts.

5. Roadmap of ICAI for the Integration of Artificial Intelligence and Blockchain in the Accounting Profession (2025–2030)

Between 2025 and 2030, the Institute of Chartered Accountants of India (ICAI) has prioritized the adoption of Artificial Intelligence (AI) and blockchain technologies to transform the accounting profession into a technology-enabled strategic advisory function. Key initiatives include AI capacity building through AICA certification programmes, deployment of AI-based tools such as CA-GPT and the formulation of ethical AI governance frameworks. Parallel efforts focus on blockchain-enabled audit trails, autonomous audit systems, and research on digital assets. Curriculum reforms embed AI, blockchain and analytics, supported by targeted professional upskilling. These initiatives align with ICAI's Vision 2030 (DRISHTI framework), aiming to enhance audit quality, transparency and global competitiveness of Indian Chartered Accountants.



Source: Compiled by the authors based on ICAI policy directions and professional announcements.

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6. Description of Key ICAI Initiatives (2025–2030):

The diagram illustrates ICAI's (Institute of Chartered Accountants of India) strategic initiatives for integrating Artificial Intelligence (AI) and Blockchain technologies under its Vision 2030 (DRISHTI: Digitalization, Research, Innovation, Skill, Technology and Inclusion) framework, aimed at transforming the accounting profession into a technology-enabled advisory ecosystem.

AI Capacity Building focuses on upskilling members through the Artificial Intelligence for Chartered Accountants (AICA) Certification, deployment of CA-GPT (Chartered Accountant–Generative Pre-trained Transformer) and AI-enabled audit tools, and fostering innovation via AI Research Labs and industry partnerships.

Blockchain Adoption includes the development of secure and immutable blockchain audit trails, autonomous audit systems for real-time ledger verification and research on digital assets, including Decentralized Finance (DeFi) and virtual currencies, to guide professional practice in emerging financial technologies.

Education & Governance initiatives embed AI and Blockchain into the Chartered Accountancy (CA) curriculum, ensure ethical AI usage and compliance with the Digital Personal Data Protection (DPDP) Act, 2023, and support continuous professional upskilling to prepare members for digital finance challenges.

Together, these initiatives establish a **Digital Assurance Ecosystem**, enhancing audit accuracy, transparency, operational efficiency and global competitiveness of Indian Chartered Accountants.

7. Discussion and Conclusion

The rapid convergence of Artificial Intelligence (AI) and Blockchain technologies is fundamentally transforming the accounting profession. This study demonstrates that traditional accounting systems, based on periodic reporting, manual checks and centralized controls, are increasingly inadequate for today's digital business environment. By integrating AI and Blockchain, accounting processes can become continuous, automated and real-time, enhancing accuracy, transparency and reliability.

The conceptual framework developed in this paper highlights how AI-driven analytics and predictive insights, combined with Blockchain's immutable and decentralized ledger, can

redesign financial reporting, auditing, assurance and internal controls. Professional roles are also evolving: accountants are transitioning from transactional tasks to strategic advisory, risk management and technology oversight. Effective implementation, however, requires attention to governance, ethical standards and regulatory compliance.

ICAI's strategic roadmap (2025–2030) exemplifies this transformation in practice. Initiatives such as AI certifications (AICA), CA-GPT tools, blockchain-enabled audit trails, autonomous auditing systems, curriculum integration and ethical AI guidelines collectively establish a Digital Assurance Ecosystem. These measures aim to equip Indian Chartered Accountants with the skills and infrastructure required for a digitally empowered profession by 2030.

In conclusion, using AI and Blockchain together can change accounting in a major way. It can improve accounting systems, reshape professional roles, and update regulations, helping the profession move toward a more strategic and technology-based future.

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