

BLOCKCHAIN AND AI IN COMBATING FINANCIAL CORRUPTION: A SYSTEMATIC LITERATURE REVIEW

Rimal Mahdani and Dara A. Soufyan

Universitas Teuku Umar, Indonesia

e-mail: rimalmahdani@utu.ac.id (corresponding author); dangreka@utu.ac.id

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Abstract

Corruption in the financial sector threatens economic stability, resource allocation, and public trust. This study explores how blockchain and artificial intelligence (AI) can combat this corruption. Using a systematic literature review (SLR) guided by the PRISMA methodology, we analysed articles from 2020 to 2024. Findings show that blockchain enhances transparency through immutable, decentralised ledgers, while AI improves fraud detection through real-time anomaly detection and predictive analytics. Case studies reveal successful applications, such as greater accountability in public procurement and enhanced fraud detection in banking. However, adoption of these technologies faces challenges, including scalability, regulatory hurdles, and data privacy concerns. Integrating blockchain and AI into financial institutions' operations can strengthen existing anti-corruption measures, boosting transparency and accountability. Yet, this study is limited by the technologies' early development stage and the shifting regulatory environment. Future research should address barriers to unlocking the full potential of AI and blockchain to build a more equitable financial system.

Keywords: *blockchain, AI, financial corruption, transparency, fraud detection.*

I. INTRODUCTION

Corruption is the abuse of power for personal gain. In the finance sector, this is done through unlawful activities, such as money laundering, which erodes our faith in the integrity of our markets.¹ Studies have consistently shown that corruption is detrimental to the economy and exacerbates income disparity.² Most people wouldn't consider it damaging to the economy or to income inequality when corruption is considered moderate, and that is also the case in

¹ Jacopo Costa, "Working Paper 36: Revealing the Networks behind Corruption and Money Laundering Schemes: An Analysis of the Toledo–Odebrecht Case Using Social Network Analysis and Network Ethnography," *Basel Institute on Governance Working Papers*, July 1, 2021, 1–35, <https://doi.org/10.12685/bigwp.2021.36.1-35>.

² Tenace Kwaku Setor et al., "Do Digital Payment Transactions Reduce Corruption? Evidence from Developing Countries," *Telematics and Informatics* 60 (July 2021): 101577, <https://doi.org/10.1016/j.tele.2021.101577>.

the business sector. Perhaps most damaging is that even low-level corruption acts prevent vulnerable people from accessing the vital financial resources they need to survive.³ The misallocation of capital and increased business costs reduce investments and innovation, decreasing financial market efficiency.⁴ In the financial sector, fighting corruption is essential to achieving integrity, trust, and steady economic growth. Global and local governing bodies have introduced initiatives to reduce corruption by tightening financial supervision and increasing the transparency and accuracy of financial reports.⁵ Such initiatives, however, have inherent disadvantages, as corrupt individuals detect loopholes and use their political power to hide their actions. To significantly reduce corruption, policymakers, regulators, the financial sector, and engineers must unite behind such measures.⁶ For instance, fraud can be better addressed by expanding the scope of financial auditing and monitoring, increasing the use of digital payment technology, promoting financial inclusion, and enhancing financial literacy and transparency. Tackling financial crimes will help develop a stronger, fairer, and more robust financial system that will invigorate economic development.⁷

Blockchain and artificial intelligence are revolutionising the future of financial security. One can think of blockchain as an immutable record, and AI as an instant fraud detection specialist.⁸ Together, they form an impenetrable

³ Julio Maturana Padilla et al., “Estimation of Financial Fraud Present in Industrial and Commercial Companies,” *International Journal of Engineering and Technology* 10, no. 6 (2018): 1548–54, <https://doi.org/10.21817/ijet/2018/v10i6/181006208>; João Jungo et al., “Controlling Corruption in African Countries: Innovation, Financial Inclusion and Access to Education as Alternative Measures,” *International Journal of Social Economics* 50, no. 6 (2023): 766–86, <https://doi.org/10.1108/IJSE-08-2022-0520>.

⁴ Arusha Cooray and Friedrich Schneider, “Does Corruption Throw Sand into or Grease the Wheels of Financial Sector Development?,” *Public Choice* 177, nos. 1–2 (2018): 111–33, <https://doi.org/10.1007/s11127-018-0592-7>; Norhasimah Shaharuddin et al., “Does Financial Development and Corruption Reduce the Level of Income Inequality? Evidence from Malaysia,” *Information Management and Business Review* 15, no. 3(SI) (2023): 108–16, [https://doi.org/10.22610/imbr.v15i3\(SI\).3463](https://doi.org/10.22610/imbr.v15i3(SI).3463).

⁵ Tumiso D. Mokhomole, “The Role and Impact of Forensic Investigations Unit in the Fight Against Fraud, Corruption, Irregularities, Financial Misconduct and Maladministration in the Public Sector of South Africa,” *Khazānah Hukam* 5, no. 1 (2023): 18–32, <https://doi.org/10.15575/kh.v5i1.22605>.

⁶ Yuniasih Dwi Astuti and Vid Adrison, “The Audit Board of Republic of Indonesia Opinion and Bribery in Local Governments in Indonesia,” *Jurnal Tata Kelola Dan Akuntabilitas Keuangan Negara* 5, no. 2 (2019): 125–38, <https://doi.org/10.28986/jtaken.v5i2.379>.

⁷ Ismunarno Ismunarno et al., “Optimization of the Corruption Crime in Minimizing State Losses Due to Corruption,” in *Proceedings of the International Conference for Democracy and National Resilience 2022 (ICDNR 2022)*, ed. Gayatri Dyah Suprobawati, Dona Budi Kharisma, and Waluyo Waluyo (Atlantis Press SARL, 2023), 208–17, https://doi.org/10.2991/978-2-494069-75-6_26.

⁸ Rimal Mahdani et al., “Exploring the Potential Applications of Blockchain Technology in Accounting Practice: A Systematic Literature Review,” *Jurnal Dinamika Akuntansi dan Bisnis* 11, no. 1 (2024): 15–32, <https://doi.org/10.24815/jdab.v11i1.33476>.

barrier against malfeasance. These technologies complement one another to provide a system of checks and balances. AI can monitor blockchain transactions and prevent fraud from occurring. In exchange, blockchain guarantees that the data AI uses and the conclusions it draws are not manipulable, enhancing security.⁹

Currently, the finance world relies on blockchain solutions to address corruption issues in financial systems. Due to the decentralised structure of blockchain, this technology can provide greater accountability and garner trust in the financial system. Every minute transaction is traceable, and the advances of AI and blockchain can shine a light on systemic corruption. Akhtaruzzaman¹⁰ agrees that blockchain management is multimodal and complements anti-money laundering systems. These changes to financial systems and their practices have the potential to revolutionise the detection and tracking of corruption.

The body of research on the intersection of blockchain, AI, and corruption in the financial sector is growing; however, there are still gaps in understanding how best to employ these technologies to reduce corruption. Existing studies have individually investigated the use of blockchain and AI to ensure transparency, automate compliance, and detect fraud; however, there is a consensus that a broader understanding of their combined use in combating financial corruption is needed. This study address this gap in research by performing a Systematic Literature Review (SLR), as defined by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline. The SLR methodology is especially well suited for this inquiry, as it permits a thorough analysis and critical evaluation of the body of literature available and helps determine if there are any patterns and identifying successful use cases of employing blockchain together with AI to counter financial corruption. The systematic review procedure assisted in outlining the existing state of research in relation to the use of blockchain in conjunction with AI in the fight against financial corruption; examine the use cases of this combination by focusing on the potential for greater transparency, automatic compliance, and fraud detection; hence, it assesses

⁹ Mehrdad Salimitari et al., "AI-Enabled Blockchain: An Outlier-Aware Consensus Protocol for Blockchain-Based IoT Networks," *2019 IEEE Global Communications Conference (GLOBECOM)*, IEEE, December 2019, 1–6, <https://doi.org/10.1109/GLOBECOM38437.2019.9013824>; Rucha Shinde et al., "Blockchain for Securing AI Applications and Open Innovations," *Journal of Open Innovation: Technology, Market, and Complexity* 7, no. 3 (September 2021): 189, <https://doi.org/10.3390/joitmc7030189>.

¹⁰ Md. Akhtaruzzaman et al., "A Combined Model of Blockchain, Price Intelligence and IoT for Reducing the Corruption and Poverty," in *Proceedings of the 6th International Conference on Poverty and Sustainable Development* 6, (2019): 13-24, <https://doi.org/10.17501/23621028.2019.6102>.

the potential impact of such intervention on corruption, determine any other existing gaps and/or weaknesses, and suggest a model or framework that helps in the implementation and integration of solutions based on blockchain and AI technologies to fight corruption in the financial system. This paper aims to add to the existing body of literature by explaining how blockchain and AI may be used together in novel ways to tackle the overarching problem in the financial sphere by integrating the literature using a systematic review method.

This research assesses the contribution of blockchain and AI to the fight against corruption in the finance industry; develops and examines positive examples and optimal practices of utilising these technologies to improve transparency, compliance automation, and record creation that cannot be changed; and assesses the use of blockchain and AI to combat financial corruption, including the difficulties and constraints. The research also identifies shortcomings in the current implementations and provides recommendations for future work. This research comprehensively examines the literature regarding the use of blockchain in concert with AI to address financial corruption. Based on the identified research gaps, this study breaks down the examination into the following research questions:

1. RQ1: How can blockchain and AI be leveraged to combat corruption in the financial sector?
2. RQ2: How can these technologies complement existing anti-corruption measures employed by financial institutions?
3. RQ3: What gaps exist in the current use of blockchain and AI, and how can future research address these gaps?

The impact of this study focuses on understanding how transparent and corruption-free financial systems can be achieved by incorporating blockchain and AI technologies.

In the second section of this study, the research method is presented, defining the research questions, the search of literature, and the application of exclusion and inclusion criteria. Section 3 describes the results and discussion, enhancing the findings of the literature review and the results of integrating blockchain and AI to combat corruption. Finally, Section 5 outlines the conclusions, synthesises the findings and presents more ideas for future research.

II. RESEARCH METHOD

This study attempted a systematic review of the existing literature using a method that observes the fundamentals set out in the Preferred Reporting Items

for Systematic Reviews and Meta-Analyses (PRISMA) guidelines statement¹¹ over a span of five years from 2020 to 2024. The review was conducted in a manner that guarantees that relevant interventions are included, while reducing bias to the least possible extent. Such endeavours are characterised by a thorough investigation of the problem of prejudice and useful criticism of information. All these issues are addressed in this section by considering the search approach used for the review and selection of materials, data extraction and analysis, bias and quality assessment of the studies, limitations, and sources of heterogeneity. The Scopus database was used as the main resource for reviewing articles because of its broad coverage and trustworthiness in the synthesis of scientific documents.

II.A. Defining the Research Questions

Research questions provide the focus, rationale, and limitations of a systematic review.¹² Hence, we formulated the following research question.

RQ1. How can blockchain and AI be leveraged to combat corruption in the financial sector?

This study explores the fundamental capabilities of blockchain and AI in addressing corruption in the financial sector. The SLR seeks to identify and synthesise literature discussing the application, theoretical, and practical aspects of the technologies in question, and how together they improve the transparency, traceability, and automation of financial processes. Analytic attention is devoted to major works to demonstrate particular instances of the application of blockchain and AI, and the ways these technologies can assist in the positive and negative controls of corruption, including immutable record-keeping, real-time fraud detection, and anomaly detection.

RQ2. How can these technologies complement existing anti-corruption measures employed by financial institutions?

This query revolves around the combination of blockchain and AI with the conventional approaches that financial entities engage in to counter the phenomenon of corruption. SLR investigates ways in which literature posits that the aforementioned technologies complement existing structures, focusing on the detection of fraud, compliance controls, and the various activities associated with auditing. This study describes how, in the financial operations of various financial institutions, the combination of blockchain technology and AI seeks to improve the existing tools to provide a more effective, safer, and more scalable means of countering corruption.

¹¹ Matthew J. Page et al., "The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews," *BMJ*, March 29, 2021, n71, <https://doi.org/10.1136/bmj.n71>.

¹² Alex Pollock et al., "Stakeholder Involvement in Systematic Reviews: A Scoping Review," *Systematic Reviews* 7, no. 1 (2018): 208, <https://doi.org/10.1186/s13643-018-0852-0>.

RQ3. What gaps exist in the current use of blockchain and AI, and how can future research address these gaps?

The third research inquiry evaluated the constraints and the current challenges associated with the use of blockchain technology and AI in fighting financial corruption. This work investigates a broad range of literature to identify barriers such as technological limits, challenges of regulation, bias in AI, and the extent of the market and offers insights about these. In addition, this work offers knowledge of the gaps, extending the research in the field where these technologies could be utilised more effectively to address corruption.

II.B. Searching the Literature

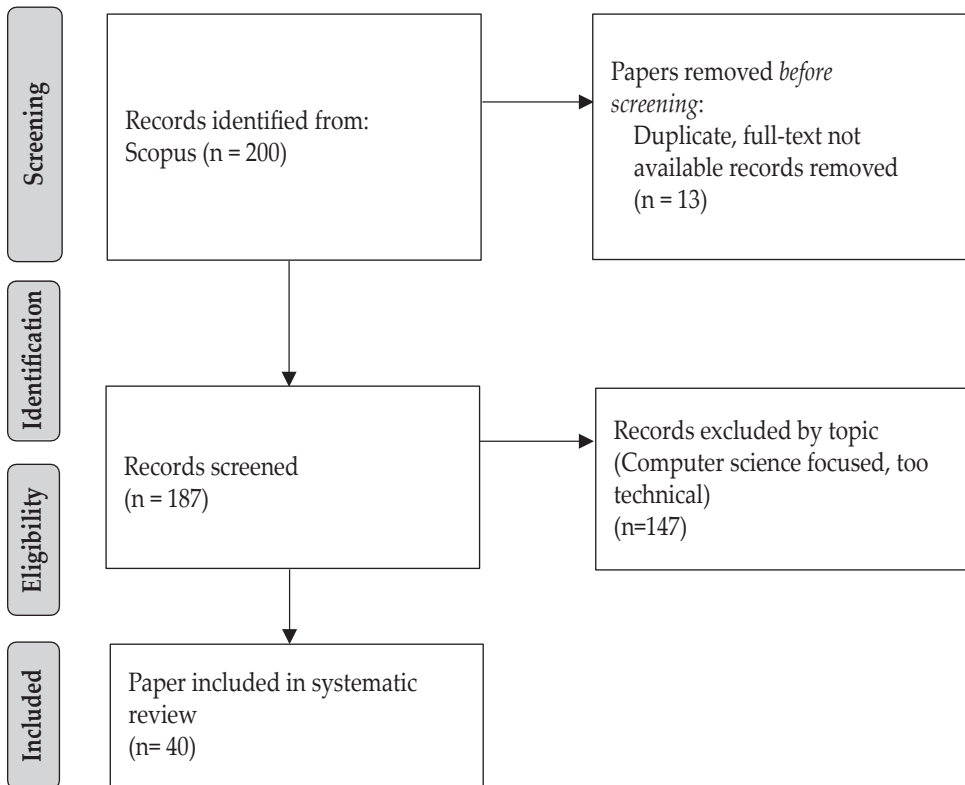
The search strategy and selection criteria for studies involved a comprehensive search. Scopus was our main source of information to ensure scientific soundness and inclusiveness. The terms searched were “blockchain”, “digital ledger”, “artificial intelligence”, “predictive analysis”, “financial crime”, “fraud”, “financial system”, and “financial technology”. There have been reports, non-peer-reviewed documents, and others to be found. Some were even found in conference papers not usually included in mainstream scientific journals. A total of 200 articles were collected based on the given strategies as of November 4, 2024. Basic relevance criteria were set for articles published within the time frame of 2020 to 2024. The number of returned documents, minus duplicates and documents without full text, was 187 unique documents. A research protocol was followed to select and retrieve two hundred documents. These protocols consisted of older and larger criteria, as the purpose was to refine to the set focus on the intersection of blockchain and technology, and financial systems and fraud. Then, each of the scanned documents was reviewed to refine based on title, abstract, and key terms.

II.C. Applying Exclusion and Inclusion Criteria

To understand the implications of AI and blockchain technologies for the detection and prevention of financial malfeasance, it is stipulated that the articles for review should be published in English. The relevant exclusions in this case include: [1] articles that are not fully accessible, [2] articles unavailable in English, and [3] articles that focus on other subjects not related to the financial field or those that relate to blockchain only as a technical, engineering, or computer science phenomenon. The form used for extraction and collating analysis of the data was cohesive and consistent, and it contained the following fields: name(s) of the author(s), year the article was published, the type of study conducted, number of subjects in the study, how data was collected and the approaches used to analyse the data, and what the main results of

the study were. The review took considerable care to provide a rationale that dealt with what is typical for systematic reviews in relation to the inclusion and exclusion criteria for the studies, the search strategy used, and the processes used in data extraction and analysis. The review was guided by the limitations of the studies included, such as small sample sizes, the specific circumstances of the studies, and possible bias of the study authors. Figure 1 indicates the methodological steps in our study as captured by the modified PRISMA diagram¹³ for a qualitative review. The PRISMA diagram illustrates the flow of data in a systematic review. This process must include a careful account of how many records were found, how many were included, and how many were excluded. The detailed exclusion rationale has also been included.

Figure 1. Identification and inclusion process of the systematic review.

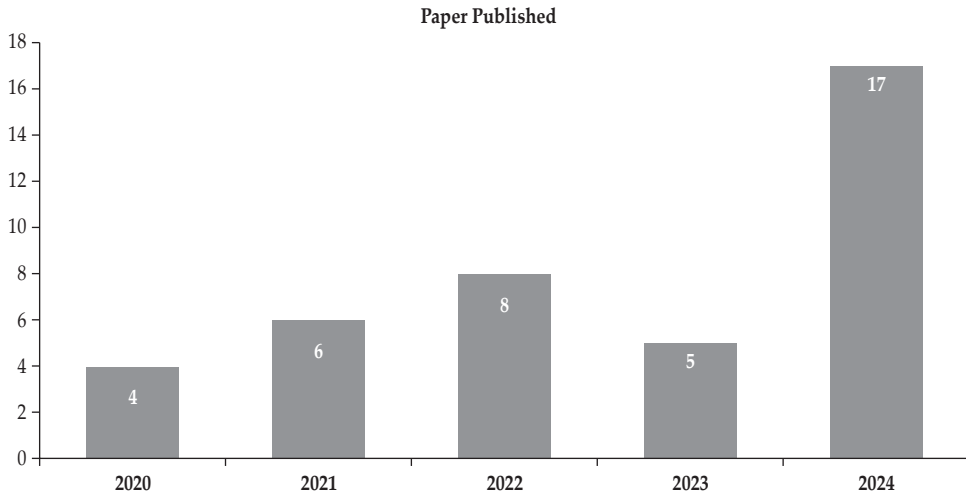


¹³ Page et al., "The PRISMA 2020 Statement."

III. RESULTS

III.A. Publication Year

Figure 2. Publication year of the selected papers.



The analysis of publications between the years of 2020 and 2024 shows a growing interest and interaction in the application of blockchain and AI for financial fraud detection and prevention. There were a modest four publications in 2020, followed by six in 2021 and eight in 2022. The research during this time frame addressed the theoretical frameworks of integrating AI and Blockchain in the prevention of financial fraud. A temporary decline in publications is observed in 2023, with five publications, during which researchers are presumably working on the improvement of these enduring projects or are attempting to embark on new research. However, the year 2024 was characterised by an unprecedented increase in the number of publications. The 17 publications were focused on the advancements of technology, the rise of global anti-corruption regulations, and the increased need for financial transparency.

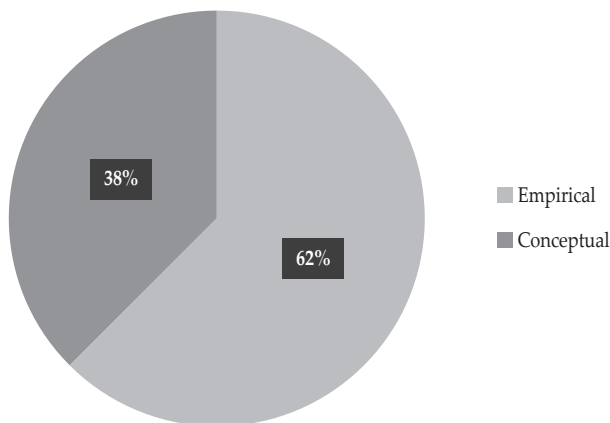
The increase in the number of publications (especially in the year 2024) demonstrates the growing social recognition of the application of blockchain technology and AI to solve financial fraud. The software recommends continuing research on blockchain and AI technology. This suggests the need for the social recognition of this research to be integrated, thereby facilitating future research.

III.B. Classification of the Relevant Papers

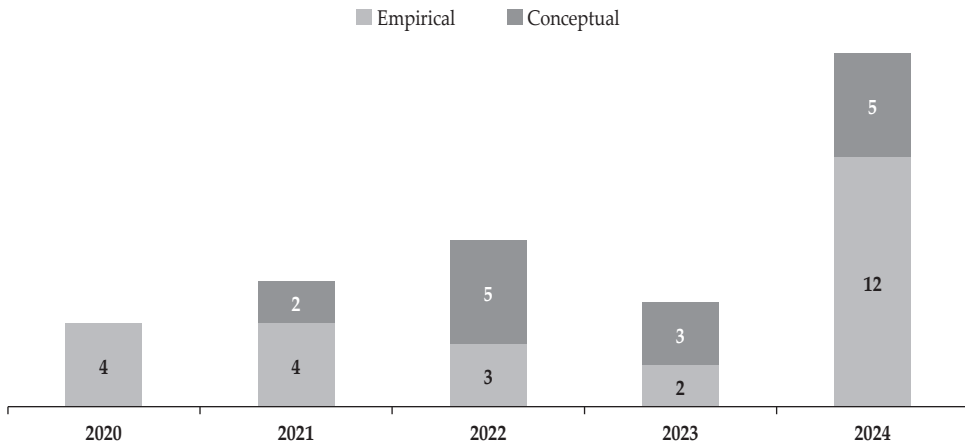
The articles were classified into empirical and conceptual categories to analyse research approaches from 2020 to 2024. Empirical studies focused on practical applications and case studies, while conceptual papers developed theoretical frameworks and models.

In 2020, empirical research dominated the discourse with four articles exploring practical applications of AI and blockchain.¹⁴ The field evolved in 2021, with four empirical studies and two conceptual papers, indicating growing interest in theoretical foundations. 2022 saw further theoretical development with five conceptual studies compared to three empirical papers, suggesting field maturation and deeper exploration of underlying frameworks. In 2023, there was a balance between the two approaches, with two empirical studies and three conceptual, indicating a sustained growth and development of the theory and its practical application. 2024 showed a major empirical shift, with eleven studies, only five of which were conceptual papers, demonstrating a significant emphasis on the application of theory and its validation.

Figure 3. Classification of Relevant Papers



¹⁴ Charanjit Singh and Wangwei Lin, “Can Artificial Intelligence, RegTech and CharityTech Provide Effective Solutions for Anti-Money Laundering and Counter-Terror Financing Initiatives in Charitable Fundraising,” *Journal of Money Laundering Control* 24, no. 3 (2021): 464–82, <https://doi.org/10.1108/JMLC-09-2020-0100>; Serge-Lopez Wamba-Taguimdje et al., “Influence of Artificial Intelligence (AI) on Firm Performance: The Business Value of AI-Based Transformation Projects,” *Business Process Management Journal* 26, no. 7 (2020): 1893–924, <https://doi.org/10.1108/BPMJ-10-2019-0411>; Ehi Eric Esoimeme, “Institutionalising the War against Corruption: New Approaches to Assets Tracing and Recovery,” *Journal of Financial Crime* 27, no. 1 (January 2020): 217–30, <https://doi.org/10.1108/JFC-12-2018-0125>; Amari Mouna et al., “International Comparative Evidence of E-Government Success and Economic Growth: Technology Adoption as an Anti-Corruption Tool,” *Transforming Government: People, Process and Policy* 14, no. 5 (2020): 713–36, <https://doi.org/10.1108/TG-03-2020-0040>.

Figure 4. Conceptual vs. empirical studies over time

This distribution demonstrates the field's evolution from an initial practical exploration to greater theoretical development, and finally to comprehensive empirical validation of established frameworks.

IV. DISCUSSION

This section provides responses to the research questions and analyses the findings in detail, focusing on the uses of and the implications of using blockchain and artificial intelligence (AI) to find and remove instances of financial sector corruption. In particular, it analyses the advantages and disadvantages of these technologies, their potential synergies with currently deployed anti-corruption technologies, and their stand-alone value, if any. Finally, this section extrapolates from the findings of the research conducted in this study and makes recommendations for future research on these technologies for combatting financial corruption and the positive opportunities that can be created with the technologies to remove financial corruption.

The geographical scope of the potential applications of these technologies is vast. However, the scope of the technologies, the policies, and the legal jurisdictions for which they are intended lacks alignment and is sometimes contradictory. This literature review indicates a misalignment in the scope of many case studies and research within a fragmented field of study. The objectives of the next section are not to present a single cohesive framework that can be applied internationally. Rather, the discussion aims to demonstrate divergent approaches to employing blockchain and AI technologies with illustrations from various jurisdictions (e.g., the EU, the US, and developing

countries) to reflect the diversity of approaches, which in turn highlights the lack of international consensus on the scope of these technologies.

RQ1: How can blockchain and AI be leveraged to combat corruption in the financial sector?

Combining AI and blockchain technology provides a solid foundation for anti-corruption measures, where blockchain technology protects transaction data while AI evaluates outlier data for suspicious activity.¹⁵ From one perspective, blockchain technology provides a baseline of transparency to an unprecedented level through its immutable records and smart contracts, drastically lowering the chance of fraud to almost zero, while simultaneously allowing for live auditing of transactions.¹⁶ Besides, the operational level of efficiency would further escalate to one never before witnessed with AI technology, and the accountability would drastically increase due to the ability of the AI to analyse fraudulent activity on a massive scale, while also determining the patterns of fraud, recognising outlier data, and engaging in predictive analysis on the anomalies.¹⁷ Thus, the combination of these measures provides an answer to the persistent challenge of fraud and corruption in the financial sector.

To clarify this integration architecture, the reviewed literature indicates a model in which AI and blockchain are treated not as one system, but rather as two separate, yet interrelated systems. In this model, blockchain is viewed as a first layer or foundation that provides safe and unalterable storage of data, while AI is the layer of intelligence that is either on top of or alongside the blockchain and works to analyse that data. In some useful scenarios, AI can

¹⁵ Paulina Roszkowska, “Fintech in Financial Reporting and Audit for Fraud Prevention and Safeguarding Equity Investments,” *Journal of Accounting & Organizational Change* 17, no. 2 (2021): 164–96, <https://doi.org/10.1108/JAOC-09-2019-0098>; Silvana Secinaro et al., “Blockchain in the Accounting, Auditing and Accountability Fields: A Bibliometric and Coding Analysis,” *Accounting, Auditing & Accountability Journal* 35, no. 9 (December 2022): 168–203, <https://doi.org/10.1108/AAAJ-10-2020-4987>.

¹⁶ Himani Mishra and Prateek Maheshwari, “Blockchain in Indian Public Distribution System: A Conceptual Framework to Prevent Leakage of the Supplies and Its Enablers and Disablers,” *Journal of Global Operations and Strategic Sourcing* 14, no. 2 (2021): 312–35, <https://doi.org/10.1108/JGOSS-07-2020-0044>; Othmar Manfred Lehner et al., “Artificial Intelligence Based Decision-Making in Accounting and Auditing: Ethical Challenges and Normative Thinking,” *Accounting, Auditing & Accountability Journal* 35, no. 9 (2022): 109–35, <https://doi.org/10.1108/AAAJ-09-2020-4934>; Ilima Fitri Azmi and Alih Aji Nugroho, “Anti-Corruption System 4.0: The Adoption of Blockchain Technology in the Public Sector,” *Integritas : Jurnal Antikorupsi* 9, no. 1 (2023): 93–108, <https://doi.org/10.32697/integritas.v9i1.985>.

¹⁷ Sara Ebrahim Mohsen et al., “Digital Transformation and Integration of Artificial Intelligence in Financial Institutions,” *Journal of Financial Reporting and Accounting* 23, no. 2 (2025): 680–99, <https://doi.org/10.1108/JFRA-09-2023-0544>; Danielle Alves Batista, “Enhancing Transparency and Accountability in Public Procurement: Exploring Blockchain Technology to Mitigate Records Fraud,” *Records Management Journal* 34, no. 2/3 (2024): 151–70, <https://doi.org/10.1108/RMJ-10-2023-0054>.

analyse transactions to identify unusual patterns, which could then be prevented from becoming permanently validated on the blockchain. After data has been stored, AI can analyse the transaction history in the form of a review for either auditing or prediction purposes. On the other hand, blockchain can play an equally important role as a reliable record keeper of any decision outputs made by AI, thereby ensuring that the audit trail of AI activities remains unaltered for purposes of verification. Hence, the contribution of this research is framed by the intersection of ‘analysing AI’ and ‘verifying blockchain’.

It is this synergy that significantly enhances transparency, efficiency, and accountability in financial systems. AI incorporates a greater analytical ability to identify fraudulent patterns and automate compliance while ensuring that every transaction is documented. They both work to strengthen the fight against corruption by improving the operational integrity of governance structures to strengthen the anti-money laundering (AML) systems within an organisation.¹⁸ An example of this can be seen in the use of blockchain technology to securely guard transaction history, while the use of AI can help scan the history to find potential anomalies or violations in the blockchain. Such systems improve the trust in the system and defend against corruption within the decision-making of the stakeholders. The use of these systems to allocate resources is effective in public finance management and anti-tax evasion, and in the supervision of cross-border transactions.¹⁹

While the implementation of blockchain and AI systems can be quite beneficial, there are still practical and systemic challenges that must be addressed. Most notably, and perhaps most importantly, is the need for stakeholders to agree to a technological red line. This can be achieved by the demonstrable gain in efficiency of pilot projects. For example, blockchain can be deployed to track transactions, and AI can be deployed to automate compliance monitoring. The systems’ transparency and the reduction of misconduct in those systems should be enhanced.²⁰ To ensure transparency and accountability, policies for governance frameworks and ethics must be put in place. The interaction of governance and blockchain, as in the example of tax evasion, emphasises the need for clarity of purpose in the regulation of the

¹⁸ Roszkowska, “Fintech in Financial Reporting.”

¹⁹ Yamina Chouaibi et al., “Does Good Governance Moderate the Relationship between Blockchain Technology Use and Tax Evasion? Evidence from STOXX 600,” *EuroMed Journal of Business* 20, no. 4 (2024): 917-44, <https://doi.org/10.1108/EMJB-12-2023-0337>.

²⁰ Gifty Kenetey and Boris Popesko, “Budgetary Control and the Adoption of Consortium Blockchain Monitoring System in the Ghanaian Local Government,” *International Journal of Public Sector Management* 38, no. 1 (2025): 12-29, <https://doi.org/10.1108/IJPSM-07-2023-0212>.

adoption of the systems.²¹ In addition, reducing the educational and structural gaps, combined with skills training, can aid the resistance to change and ease the transition to new technologies.²² This greater trust and responsibility can be seen in public management, where balanced budget monitoring and financial accountability are easier to implement. For example, consortium blockchain systems tend to provide greater governance as a group and provide more transparent decisions. Using these technologies to combat financial corruption calls for a holistic approach that incorporates technology, legal frameworks, and third parties.

To summarise the selected studies, a condensed report of the studies is presented in Table 1. This table illustrates the range and significance of the studies in the mitigation of corruption through the application of blockchain and AI.

Table 1.
Summary of research findings on Leveraging Blockchain and AI to Combat Corruption in the Financial Sector

Author	Title	Year	Research Findings
Othmar Manfred Lehner, Kim Ittonen, Hanna Silvola, and Eva Ström	Artificial intelligence based decision-making in accounting and auditing: ethical challenges and normative thinking	2020	Blockchain enhances transparency and traceability in accounting and auditing while AI raises ethical challenges that need governance frameworks to mitigate risks associated with corruption.
Silvana Secinaro, Francesca Dal Mas, Valerio Brescia, and Davide Calandra	Blockchain in the accounting, auditing and accountability fields	2021	Technology as an external force can create an intersection among several research areas: accounting, auditing, accountability, business, management, computer science and engineering fields.
Himani Mishra and Prateek Maheshwari	Blockchain in Indian Public Distribution System: A conceptual framework to prevent leakage of the supplies and its enablers and disablers	2021	Blockchain can address corruption in the Public Distribution System (PDS) by providing transparency, accountability, and traceability in the supply chain, which can help prevent manipulation and leakage of resources.

²¹ Charanjit Singh, "Artificial Intelligence and Deep Learning: Considerations for Financial Institutions for Compliance with the Regulatory Burden in the United Kingdom," *Journal of Financial Crime* 31, no. 2 (2024): 259–66, <https://doi.org/10.1108/JFC-01-2023-0011>.

²² Aliyu Abubakar Lawan and Pekka Henttonen, "Shaping Anti-Corruption Strategies: Investigator Perspectives on Electronic Records," *Journal of Financial Crime* 32, no. 3 (2025): 558–71, <https://doi.org/10.1108/JFC-03-2024-0120>.

Table 1.
Summary of research findings on Leveraging Blockchain and AI to Combat Corruption in the Financial Sector (Continued)

Author	Title	Year	Research Findings
Charanjit Singh and Wangwei Lin	Can artificial intelligence, RegTech and CharityTech provide effective solutions for anti-money laundering and counter-terror financing initiatives in charitable fundraising	2021	AI, RegTech, and CharityTech are suggested as effective solutions to combat the issues charities face in complying with AML and counter-terror finance legislation.
Ilima Fitri Azmi and Alih Aji Nugroho	Anti-corruption system 4.0: The adoption of blockchain technology in the public sector	2023	Blockchain increases transparency and accountability in financial management and public procurement, reducing corruption risks through smart contracts and decentralised systems.
Danielle Alves Batista	Enhancing Transparency and Accountability in Public Procurement: Exploring Blockchain Technology to Mitigate Records Fraud	2024	Blockchain provides a secure and tamper-proof ledger for recording transactions, ensuring the integrity of contracts and promoting accountability in public procurement.

IV.A. Illustration of the Regulatory Approach: European Union and United States Case Studies

Blockchain and AI are globally recognised as tools to combat financial fraud, yet there is uneven adoption across jurisdictions. In this case, the European Union has proactively developed a synchronised step-in strategy, as the European Investment Bank and European Commission report on a €10 billion developmental investment gap.²³ Spain, in particular, uses the technology to improve transparency after repeated corruption scandals.²⁴

The United States, on the other hand, follows a decentralised approach, with the Securities and Exchange Commission and Department of Justice using artificial intelligence to identify potential fraud.²⁵ AI's potential to influence the financial services sector is acknowledged by the US Treasury, although there is less emphasis on the use of blockchain technology to enhance the financial system's anti-corruption features, as compared with transparency.

²³ Arnold Verbeek and Maria Lundqvist, *Artificial Intelligence, Blockchain and the Future of Europe: How Disruptive Technologies Create Opportunities for a Green and Digital Economy: Main Report*. (Publications Office of the European Union), 2021), <https://data.europa.eu/doi/10.2867/126279>.

²⁴ Selva Ozelli, *Spain Tackles Corruption with Blockchain AI and Amendments to Its Anti-Corruption Laws: Expert Take*, June 15, 2018, <https://cointelegraph.com/news/spain-tackles-corruption-with-blockchain-ai-and-amendments-to-its-anti-corruption-laws-expert-take>.

²⁵ Anita B. Bandy et al., *The U.S. Government Is Using AI to Detect Potential Wrongdoing, and Companies Should, Too*, Thomson Reuters, April 12, 2024.

Undoubtedly, the EU has a greater potential to foster a unified approach to implementing new technology, as the US system's splitting of functions among its several agencies leaves open the possibility of creating tailored systems, albeit with little coherence. Future Studies may be able to provide insights into the relative effectiveness of the two systems, and in doing so, assist in the formulation of model policies to be adopted by countries around the world. Table 2 illustrates the relative positions of the EU and the US, and the consequences of their different positions.

Table 2.
Comparison of EU and US Approaches to AI and Blockchain in Combating Financial Corruption

Aspect	EU Approach	US Approach
Strategy	Centralised, strategic reports	Decentralised, agency-driven
Key Examples	Spain's AI/blockchain for transparency	SEC/DOJ AI for wrongdoing detection
Focus on Anti-Corruption	Explicit, with investment plans	Implicit, through financial oversight
Potential Impact	Uniform adoption, benchmark setting	Tailored solutions, possible fragmentation

RQ2: How can these technologies complement existing anti-corruption measures within financial institutions?

Through the use of blockchain technology, financial transactions are recorded on decentralised distributed ledgers in a way that cannot be manipulated. This makes it nearly impossible to commit fraud, thereby increasing trust from participants and accurate audits. Many studies have observed the benefits of blockchain.²⁶ With the addition of AI technology, blockchain has the potential to reinforce the anti-corruption features already in place in financial institutions. More specifically, AI technology improves blockchain's transactional data analytics in a way that recognises data patterns and outliers, flagging cases of questionable behaviour. Instead of being reactive, this approach of deploying technology is proactive. This creates a more effective control system by allowing all stakeholders visibility on the flow of funds and an understanding of how the financial decisions were made. The technologies also help mitigate the influence of human biases and errors, especially in the traditional approach of verification, to deliver better and more

²⁶ Mohsen et al., "Digital Transformation;" Simone Caruso et al., "Artificial Intelligence to Counteract 'KPI Overload' in Business Process Monitoring: The Case of Anti-Corruption in Public Organizations," *Business Process Management Journal* 29, no. 4 (2023): 1227–48, <https://doi.org/10.1108/BPMJ-11-2022-0578>.

reliable results. As such, the anti-corruption potential of these systems can be further enhanced to strengthen institutions and improve the trust placed in them by society when blockchain and AI are used optimally.

Case studies illustrate successful implementations. In Ghana, consortium blockchains have improved public accountability in local government operations.²⁷ Bahrain's financial institutions employed AI-based solutions for enhanced fraud detection and customer support.²⁸ These examples show how blockchain and AI strengthen both international and local anti-corruption initiatives.

In numerous cases, advancements in technology have illustrated the potential of incorporating AI and blockchain to enhance operational productivity and ensure compliance. For instance, Kenetey and Popesko²⁹ state that employing blockchain technology can enhance public accountability by encouraging citizens to engage in the budgeting process. In line with Mouna, Nedra, and Khaireddine³⁰ accountability frameworks should be strengthened to address corruption using technology. Use cases demonstrate that AI has more to bring to the table. For instance, Lehner³¹ shows how AI can smooth biases during and after auditing. Moreover, blockchains maintain immutable records, whereas AI uses predictive model, which fosters trust in the financial sector. Certainly, the convergence of these technologies is a revolutionary turn in anti-corruption strategy.

Automated alerts combining AI and blockchain technologies to address corruption in banks are just one of many synergistic deployments. These are more qualitative warnings that someone can see if it looks like a transaction or behaviour that has been structured to disguise corrupt activity. These refined detection algorithms (RDA) will evolve using machine learning to develop ever better detection mechanisms and be 'trained' to detect new forms of misconduct that are more accurate and targeted to sift through noise and accurately identify financial misconduct.³² That is, you can resize and reposition every single transaction onto a ledger that cannot be changed, which lends credibility to the data associated with those alerts. This combined form enables monitoring teams to take a more proactive stance in relation to the response time of likely nefarious activities, especially in jurisdictions where corruption is rife. This incident is a real-time conflict of interest, and along with AI, it

²⁷ Kenetey and Popesko, "Budgetary Control."

²⁸ Mohsen, "Digital Transformationns."

²⁹ Kenetey and Popesko, "Budgetary Control."

³⁰ Mouna et al, "International Comparative Evidence of E-Government Success and Economic Growth."

³¹ Lehner et al., "Artificial Intelligence Based Decision-Making."

³² Singh, "Artificial Intelligence and Deep Learning."

becomes possible to prevent procurement corruption practices through real-time moves. For example, AI-based audit systems optimise efficiency; blockchain helps users manage the verification process unilaterally.³³ In Ghana, consortium blockchains have been deployed in an effort to develop value for money with transparency, using modern public management principles to build confidence and trust in local authorities' operations. Similarly, AI-based solutions such as machine learning and chatbots used in Bahrain drove fraud detection and customer support at financial institutions, which tackled some of the chronic issues born out of conventional banking systems.³⁴ From the perspective of a literature review, the employment of bibliometrics in the analysis of fraud detection literature suggests that there is an emerging topical trend in the academic literature on the use of technology, particularly the role of AI in the automation of compliance processes together with real-time monitoring.³⁵ Such incidents also demonstrate how blockchain and AI can be used as tools to strengthen international and local anti-corruption initiatives and safeguard honest financial systems.

Although there is a lot of exploration of AI's integration with blockchain, financial institutions are still having trouble combining the two technologies. One major hurdle is the computational infrastructure, which must be adequate to accommodate rapidly evolving distributed networks that are still missing in many institutions. This shortcoming often fosters a lack of change among employees and management, as noted by Andrade, Abreu, and Santos.³⁶ Blockchain technology guarantees the quality of the stored information together with the transparency of its availability; however, smooth operations and an effective cycle of governance depend on competent management, as discussed in detail by Lawan and Henttonen.³⁷ The use of AI techniques in the detection of fraud depends on the degree of a company's adaptability to change and the quality of the received data.³⁸ In addition, there should be some consideration to build stakeholders' confidence in new solutions that consider ethical issues, such as data privacy and algorithmic discrimination.³⁹ All these

³³ Chouaibi et al., "Does Good Governance Moderate?"

³⁴ Mohsen et al., "Digital Transformation."

³⁵ Ala'a Zuhair Mansour et al., "Discovering the Global Landscape of Fraud Detection Studies: A Bibliometric Review," *Journal of Financial Crime* 29, no. 2 (2022): 701–20, <https://doi.org/10.1108/JFC-03-2021-0052>.

³⁶ Guilherme Paulo Andrade et al., "The Impact of Blockchain on Brazilian Public Procurement Processes from the Perspective of Transaction Costs: Scenarios as Perceived by Experts," *International Journal of Organizational Analysis* 33, no. 2 (2025): 365–89, <https://doi.org/10.1108/IJOA-07-2023-3829>.

³⁷ Lawan and Henttonen, "Shaping Anti-Corruption Strategies."

³⁸ Mohsen et al., "Digital Transformation."

³⁹ Chouaibi et al., "Does Good Governance Moderate?"

points point to the urgent need for financial institutions and other stakeholders to devise and execute plans for the transformation of technology united with governance and ethics. Firm strategies are imperative for blockchain and AI to bring about necessary changes in institutions' integrity and accountability.

Finally, Table 3 provides a detailed summary of the selected studies and their contributions to understanding how blockchain and AI can supplement existing anti-corruption measures in financial institutions. This table serves as a valuable resource for understanding the breadth, significance, and impact of research in this field.

Table 3.
Summary of research findings on blockchain and artificial intelligence to supplement current anti-corruption initiatives in financial institutions.

Author	Title	Year	Research Findings
Mouna, Nedra, and Khaireddine	International comparative evidence of e-government success and economic growth: technology adoption as an anti-corruption tool	2020	Found a positive correlation between ICT use and economic growth; Revealed the significant role of corruption control in economic growth.
Serebrennikova et al.	Countering corruption in the context of digitalisation: criminal and criminological aspects	2022	Established that electronic document management enhances anti-corruption efforts in customs; Demonstrated the importance of human resources management in anti-corruption
Caruso et al.	Artificial intelligence to counteract 'KPI overload' in business process monitoring: the case of anti-corruption in public organisations	2023	Developed an AI-based solution combining Business Intelligence and Artificial Intelligence for fraud detection; Demonstrated reduction in analyst workload while maintaining monitoring effectiveness.
Charanjit Singh	Artificial intelligence and deep learning: considerations for financial institutions for compliance with the regulatory burden in the United Kingdom	2023	Identified successful applications in fraud prevention, credit scoring, and customer service; Emphasised the role of AI in meeting regulatory requirements and fighting financial crime
Lawan and Henttonen	Shaping anti-corruption strategies: investigator perspectives on electronic records	2024	Identified significant resistance to technological change ("IT Apathy") in anti-corruption institutions; Demonstrated the critical role of ICT platforms in enhancing accountability

RQ3: What gaps exist in the current use of blockchain and AI, and how can future research address these gaps?

The existing use of blockchain technology and AI encounters critical functionality and the recognition of operational challenges. Blockchain's limited throughput (five transactions per second vs. traditional banking at ~ 1,000 transactions/second) makes scalability theoretically impossible.⁴⁰ Concerns related to privacy, data protection, and managing security of sensitive financial data.⁴¹

Private procurement corruption elimination and mitigation employs blockchain technology applications in the bid and tender process. Legal and regulatory issues include compliance challenges, data protection laws, and inadequately defined contracts. The presence in mitigation of black-box governance structures is the path to cybercrime on blockchain.

Technologies that enhance operational efficiencies in public procurement processes and public financial management still have numerous technology implementation gaps. Such gaps have implications on the likelihood of public procurement corruption. Recent studies on public procurement in Brazil suggest that the adoption of blockchain technology to reduce corruption in public procurement and public financial management is still in its infancy. There are, however, advanced anti-corruption tools available for the public procurement corruption combating during the bidding and the evaluation phases of the procurement process, but what is lacking attention to the fundamental, critical, record-keeping, and document reliability throughout the document life cycle of a purchase.⁴² This is concerning, given that public procurement malfeasance, such as poor contract management, bid manipulation, and dossier corruption, remains rampant. Some gaps still call for more research, particularly in the context of the impact of technology on the legal framework. Financial institutions operate under strict regulations, and the integration of AI-blockchain has far-reaching implications on compliance with data protection laws as well as legal consequences, such as enforceability of contracts and resolution mechanisms for resolving disputes. It has been found out that lack of collaborative governance frameworks is a major contributory factor towards cybercrimes related to blockchains and other financial sector crimes.⁴³ Future research should address several key areas:

⁴⁰ Mohamad Osmani et al., "Blockchain for Next Generation Services in Banking and Finance: Cost, Benefit, Risk and Opportunity Analysis," *Journal of Enterprise Information Management* 34, no. 3 (2021): 884–99, <https://doi.org/10.1108/JEIM-02-2020-0044>.

⁴¹ Olubusola Odeyemi et al., "Integrating AI with Blockchain for Enhanced Financial Services Security," *Finance & Accounting Research Journal* 6, no. 3 (2024): 271–87, <https://doi.org/10.51594/farj.v6i3.855>.

⁴² Andrade et al., "The Impact of Blockchains."

⁴³ Olubusola Odeyemi et al., "Integrating AI with Blockchain;" Osmani et al., "Blockchain for Next Generation."

1. Development of privacy-preserving AI techniques for encrypted blockchain data that meet regulatory requirements;
2. Standardised frameworks for AI-blockchain integration to improve interoperability;
3. Pilot projects with clear success metrics for specific corruption aspects;⁴⁴
4. Training programs to address the shortage of AI-blockchain specialists;⁴⁵
5. Quantum-resistant blockchain protocols and autonomous AI agents; and
6. Cross-border collaboration frameworks for international corruption prevention.⁴⁶

Table 4.

Summary of research findings on exist gaps in the current use of blockchain and AI, and future research

Author	Title	Year	Research Findings
Osmani et al.	Blockchain for next generation services in banking and finance: cost, benefit, risk and opportunity analysis	2020	Framework for cost-benefit analysis of blockchain implementation
Teichmann, Fabian Maximilian Johannes, and Marie-Christin Falker	Cryptocurrencies and financial crime: solutions from Liechtenstein	2020	Liechtenstein's innovative and comprehensive blockchain act could be used as a basis for said standard. Practitioners should also consider cooperating transnationally when prosecuting financial crime via cryptocurrency.
Falwadiya, Himanshu, and Sanjay Dhingra	Blockchain technology adoption in government organisations	2022	Developed the conceptual framework for the adoption of blockchain technology in government organisations with four factors of the unified theory of acceptance and use of technology model and four additional factors
Odeyemi et al.	Integrating Ai with Blockchain for Enhanced Financial Services Security	2024	Provides a framework for integrating AI and blockchain in financial services

⁴⁴ Abhinav Pal et al., "Blockchain Technology in Financial Services: A Comprehensive Review of the Literature," *Journal of Global Operations and Strategic Sourcing* 14, no. 1 (2021): 61–80, <https://doi.org/10.1108/JGOSS-07-2020-0039>.

⁴⁵ Himanshu Falwadiya and Sanjay Dhingra, "Blockchain Technology Adoption in Government Organizations: A Systematic Literature Review," *Journal of Global Operations and Strategic Sourcing* 15, no. 3 (2022): 473–501, <https://doi.org/10.1108/JGOSS-09-2021-0079>.

⁴⁶ Fabian Maximilian Johannes Teichmann and Marie-Christin Falker, "Cryptocurrencies and Financial Crime: Solutions from Liechtenstein," *Journal of Money Laundering Control* 24, no. 4 (2021): 775–88, <https://doi.org/10.1108/JMLC-05-2020-0060>.

Success requires collaboration between academic institutions and financial sector stakeholders to address technical, regulatory, and implementation challenges. Table 4 provides the foundation for identifying research gaps. By examining the scope and findings of existing studies, we can pinpoint areas in which further investigation is crucial for unlocking the full potential of blockchain and AI in combating corruption in the financial sector.

IV.B. Policy Recommendations

Based on the diverse findings across jurisdictions, the following policy recommendations are formulated as a general framework. The implementation of each of these recommendations should be carefully tailored to the legal, regulatory, and market conditions in each jurisdiction.

For Regulators and Supervisory Bodies:

1. **Develop Adaptive Regulatory Frameworks:** Establish flexible regulations that accommodate blockchain and AI innovations while ensuring compliance with existing financial regulations and data protection laws.
2. **Create Standardisation Guidelines:** Develop technical standards for blockchain implementations and AI algorithms in financial systems to ensure interoperability and enhance cross-border corruption prevention.
3. **Implement Regulatory Sandboxes:** Establish controlled testing environments where financial institutions can experiment with blockchain and AI technologies without a full regulatory burden, encouraging innovation while monitoring risks.

For Financial Institutions:

1. **Invest in Technical Infrastructure:** Allocate resources for robust computational infrastructure capable of supporting distributed networks and AI-powered analytics to overcome scalability limitations.
2. **Develop Expertise through Training:** Address the shortage of specialists by investing in training programs that build internal capacity for implementing and maintaining blockchain and AI systems.
3. **Adopt a Phased Implementation Approach:** Begin with pilot projects in high-risk areas to demonstrate value and build organisational support before full-scale implementation.
4. **Establish Ethical Frameworks:** Develop clear guidelines for addressing algorithmic bias and data privacy concerns in AI-powered fraud detection systems.

For Policymakers:

1. **Promote Cross-Border Collaboration:** Facilitate international cooperation to address transnational corruption through harmonised approaches to blockchain and AI implementation.

2. Incentivise Technology Adoption: Create financial incentives and public-private partnerships to encourage the adoption of blockchain and AI for transparency and accountability.
3. Invest in Digital Infrastructure: Support the development of fundamental infrastructure necessary for widespread blockchain and AI implementation, particularly in developing economies.
4. Enhance Public Awareness: Fund educational initiatives to increase understanding of how these technologies enhance financial integrity and combat corruption.

For Technology Developers:

1. Prioritise Privacy-Preserving Solutions: Develop techniques for analysing encrypted blockchain data without compromising confidentiality.
2. Focus on User Experience: Create intuitive interfaces that make blockchain and AI solutions accessible to non-technical users in financial oversight roles.
3. Develop Quantum-Resistant Protocols: Anticipate future security challenges by creating blockchain protocols resistant to quantum computing threats.

Disciplined collaboration with the described stakeholder groups will be crucial to understanding the identified obstacles in the tech landscape and to fully leverage the impact of the blockchain and AI tools for fighting financial misconduct. Especially the cooperation between the tech builders and the regulators is crucial to achieve the balance where the developed tools will adequately tackle the corruption loopholes.

V. CONCLUSION

This study looked at the impact of blockchain technology, along with the AI paradigm, within the area of financial corruption. The study's findings suggest that the incorporation of a transparent and immutable blockchain system, along with advanced AI reasoning and forecasting capabilities, has the potential to alleviate corruption in the financial system. These technologies help combat corruption through the automation of compliance at various system levels and the detection of fraud at various levels of the financial system due to the industrialised real-time processing of augmented systems.

Blockchain technology provides a system of record keeping with immutable information locking and builds a reputation of reliability through its decentralised structuring. AI supplements the system through anomaly pattern recognition at a system level, which provides evidence of potential corrupt working. The system of technologies not only provides avenues to strengthen and broaden the anti-corruption technology-gap solutions but also

provides avenues to forecasting and monitoring governance fraud systems without overly querying outside financial system auditors.

The study's organised policy recommendations focus on particular outcomes such as action from certain stakeholders, including technology policymakers and developers, financial system institutions, and regulators, to overcome the specific adoption barriers. The recommendations also suggest the need for inter-stakeholder collaboration to realise the desired outcome of implementation.

Although these positive aspects have been articulated, the degree of implementation continues to be constrained by the typical problems of any new technology, e.g., the problems of scale, the problems of regulation, the problems of cost of implementation, etc. Future efforts ought to be directed at the collaboration of the adaptation of these technologies, along the lines of the proposed infrastructure, and along the lines of the proposed regulation. Integration of blockchain and AI, under the mechanisms we have proposed, will greatly aid the global struggle against fraud and the corruption of finance, and we trust this will result in finance in a system of finance that is of greater equity and justice in the world.

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