

عنوان البحث

Research Title

**The impact of AI-Blockchain integration on the accuracy of
investors' credit status**

تأثير دمج الذكاء الاصطناعي والبلوكتشين على دقة الحالة الائتمانية للمستثمرين

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Introduction

The digitization of company systems has allowed for the adoption of new technological tools that streamline business processes and reshape business models, fostering operational innovation (Gomber et al., 2018). This shift is facilitated by enhanced access to advanced computing power and extensive databases (de Sousa et al., 2019). Currently, the most valuable enterprises globally are those that are driven by the Internet and based on platforms (Iansiti & Lakhani, 2017). Scholars, online platforms, businesses, and public sectors invest considerable effort in engaging with the digital manifestations of technology: blockchain, artificial intelligence (AI), big data, the Internet of Things (IoT), and cloud computing. The innovations significantly transform both organizations and individuals (Benlian et al., 2018), with blockchain serving as the cornerstone for what Tapscott and Euchner (2019) refer to as an Internet of value, poised to fundamentally alter society and its business landscape. Blockchain, currently recognized as a crucial element of the IT revolution (Thakkar, 2019), is anticipated to serve as the foundational technology for the next-generation Internet (Iansiti & Lakhani, 2017; Shermin, 2017). Since Nakamoto (2008) established the foundation for blockchain technology in 2008, various sectors including banking, finance, insurance, education, health care, and government have increasingly adopted this technology. It is projected that by 2027, 10% of the global GDP will be recorded and stored on blockchain (World Economic Forum, 2015).

Blockchain has surfaced as one of the most commemorated innovations of our time, attracting considerable interest as a multifaceted technology with broad applicability across numerous domains (Gatto, 2022). The rapid increase and creation of data from sensing systems, IoT devices, social media, and web applications have been crucial in the progress

of AI (Misra et al., 2020). This data can be utilized through the application of various machine learning techniques. Blockchain smart contracts enable the programming of the Blockchain to manage transactions among participants engaged in decision-making or in the generation and access of data (Kayikci & Khoshgoftaar, 2024). Both AI and blockchain technology have driven tremendous and applications across a wide variety of fields. Artificial Intelligence has seen an increase in the number of applications in various sectors. In Finance, AI algorithms are used for credit scoring, algorithmic trading, and fraud detection (Cao, 2022).

Applications of artificial intelligence that make use of blockchain technology have the potential to provide decentralized learning, which can facilitate the trustful and secure sharing of knowledge and decision outcomes among a large number of autonomous agents (Ahmed et al., 2022). These agents can contribute, coordinate, and vote on additional decisions. Autonomous systems and machines that are based on smart contracts have the ability to learn and adapt to changes over time (Kuznetsov et al., 2024). Additionally, they are able to make decisions that are trustworthy and accurate, and these decisions are verified and validated by all mining nodes of the Blockchain (Alabdulatif et al., 2023). These decisions cannot be challenged, and in addition, they can be traced, tracked, and verified by all of the entities that are participating.

Accordingly, the current research examines the impact of AI - blockchain integrating on the accuracy of investors' credit ratings in the case of investment companies in Jordan.

مشكلة الدراسة:

The problem statement

The gap in understanding how the integration of artificial intelligence (AI) and blockchain technology impacts the accuracy of investors' credit ratings within investment companies in Jordan. Despite the extensive research of AI and blockchain individually, their combined

effects, particularly concerning security aspects, remain underexplored. This Reasearch, therefore, seeks to examine how this integration could enhance credit rating accuracy, potentially benefiting policymakers, academics, and practitioners by offering insights into the secure and reliable use of these emerging technologies in finance.

المنطلقات النظرية للدراسة:

Literature review

Artificial intelligence

Over the past few decades, the advances of artificial intelligence have transformed many industries, and the financial sector has felt its impact as well (Farahani & Esfahani, 2022). One of the most significant uses of AI in finance is credit scoring. In fact, AI has successfully improved and enhanced traditional credit scoring models, which were based on algorithms dating back to the 1950s and 1960s, to facilitate more accurate risk assessments and promote fair lending (Gikay, 2020).

Artificial intelligence refers to systems or devices that mimic human intelligence in performing tasks. AI aims to significantly enhance human capabilities and contributions, making it a valuable business asset (Wang, 2019). One of the key benefits of AI systems is their ability to process a lot of data in a very short time. Traditional credit scoring systems often rely on narrow data sets that primarily include years of credit (Sadok et al., 2022). For example, social media interactions or online retail habits as well as past utility bill payments are alternatives that AI can consider. Access to this broader range of data helps lenders understand a consumer's full financial behavior, thereby improving their credit score estimates (Vincent et al., 2024).

Blockchain

Blockchain is a large peer-to-peer (P2P) database that stores information publicly, encrypted, and securely. It stores information in sequential blocks with a timeline that makes

them immutable (Komalavalli et al., 2020). The information is stored on all computers connected to the chain, where each computer is called a node. These nodes work together to store and encrypt the information to prevent it from being modified or changed (Praveena Anjelin & Ganesh Kumar, 2021). This makes the stored information extremely secure, as each block is stamped with time codes that make it immutable at a later time, but you can still interact with it as digital data without the need for an intermediary.

Blockchain technology is unimaginably revolutionary, as it carries many benefits that no other database system has. Although we cannot imagine the extent to which its uses can be reached (Mosteanu & Faccia, 2021), one of these benefits is complete privacy, although all transactions on the blockchain are publicly recorded, the user's personal information remains completely confidential as the transaction does not require proof of real identity (Javed et al., 2021). Blockchain technology also reduces costs, as the blockchain provides an integrated database that does not require an intermediary, thus eliminating transaction fees and brokerage fees such as banks (Laroiya et al., 2020). Blockchain also protects the intellectual property rights of artists and creators as it provides proof of the authenticity of the artistic or intellectual work using smart contract technologies such as non-fungible tokens (NFTs) (Bamakan et al., 2021). Blockchain technology works to speed up the authentication and verification of transactions, as the contract authenticates any exchange immediately upon verification of the conditions (Imam et al., 2021).

أهمية الدراسة:

The importance of the Research

This research is crucial as it addresses the need for more secure, transparent, and reliable financial assessment methods in investment, particularly within Jordan. The findings are expected to provide valuable insights for policymakers, academic researchers, and financial

practitioners by demonstrating how AI-blockchain integration can improve credit rating accuracy, support data privacy, ensure regulatory compliance, and potentially reduce implementation costs.

أهداف الدراسة:

The aims of the Research

1. Examine the impact of AI and blockchain integration on the accuracy of credit ratings for investors.
2. Identify how AI-blockchain technology enhances data privacy, regulatory compliance, and transparency within the financial sector.
3. Explore the cost implications and challenges of implementing AI and blockchain in credit rating systems.
4. Provide insights to support decision-making for policymakers, academics, and practitioners in adopting AI-blockchain technology in investment contexts

تساؤلات الدراسة:

Research questions

1. Does the integration of AI and blockchain positively impact the accuracy of investors' credit status?
2. How does AI-blockchain integration, specifically through enhanced data privacy, affect the accuracy of investors' credit status?
3. What is the impact of AI-blockchain integration on the accuracy of investors' credit status in terms of regulatory compliance?
4. How does the high cost of implementing AI-blockchain integration influence the accuracy of investors' credit status?
5. To what extent does AI-blockchain integration improve transparency, and how does this impact the accuracy of investors' credit status?

These questions align with each hypothesis to explore the various factors through which AI-blockchain integration might impact credit status accuracy.

Hypotheses development

As dependence on innovative applications utilizing Artificial Intelligence (AI) and Blockchain increases, the demand for secure and reliable solutions becomes increasingly vital. While extensive studies have been carried out on AI and Blockchain, there remains a lack of thorough investigations into their integration concerning security aspects. Therefore, this survey tackles this gap and offers valuable insights for policymakers, academics, and practitioners leveraging the evolving integration of AI and Blockchain. Kuznetsov et al. (2024) sought to explore the integration of AI and BCT, emphasizing security considerations. The findings indicate that although these technologies can greatly improve security, efficiency, and transparency in various sectors, they also introduce new challenges and risks. In the domain of AI, challenges including adversarial attacks, data privacy, transparency, and bias have been recognized, whereas in the area of Blockchain, issues related to consensus mechanisms, key management, smart contract vulnerabilities, and quantum resistance have been emphasized. The combination of these technologies enhances their benefits and challenges, resulting in a multifaceted environment that requires careful navigation. Han et al. (2023) showed how changes in accounting and auditing, with inclusions of blockchain and AI technologies, could make the accounting profession more transparent and trustworthy. To this avail, accountants might make better decisions based on data that is immutable, append-only, shared, verified, and consensus-driven-characteristics of blockchain technology-and the learning capability of AI which underpins informed and successful decision-making.

Artificial intelligence (AI) and blockchain represent two transformative technologies arising from the Fourth Industrial Revolution (IR4.0), bringing about significant changes in

the industry. The combination of AI and blockchain presents significant opportunities for the development of innovative business models driven by digitalization. This Reasearch employs bibliometric analysis to identify the most impactful articles on the topic, evaluating them through their publication records, citation counts, and significance within the intellectual network. Through content analysis, Kumar et al. (2023) illuminated the intellectual structure of the subject, which is supported by four primary thematic clusters: supply chains, healthcare, secure transactions, and finance and accounting. While Kanaparthi (2024) seeks to assess the incorporation of blockchain, AI, and ML into financial accounting methodologies. The findings indicate a transformative potential for financial accounting with the integration of blockchain technology and machine learning, offering the prospect of lower accounting costs, increased accuracy, immediate financial reporting, and faster auditing procedures. The automation of repetitive financial accounting tasks through AI enables organizations to avoid the necessity for extra personnel, thus reducing related expenses. As a result, to enhance efficiency, companies are progressively adopting blockchain technology and AI applications in their financial accounting processes. AI improves financial reporting timeliness and accuracy, according to Antwi et al. (2024). AI automates data entry, reconciliation, and financial statement preparation, speeding up reporting and delivering financial information to stakeholders. This meets regulatory deadlines and lets stakeholders make informed decisions with current financial data. AI also allows organizations to monitor financial performance metrics in real time, identifying trends, risks, and opportunities. Financial reporting agility and responsiveness can be improved by predictive analytics algorithms that predict future financial outcomes and allow organizations to adapt to market changes. Financial reporting accuracy and timeliness are improving with AI. AI automates routine tasks, analyzes massive datasets, and provides valuable insights to help organizations

produce high-quality financial reports for stakeholders in a fast-changing business environment.

According to the above, the following hypotheses can be reached:

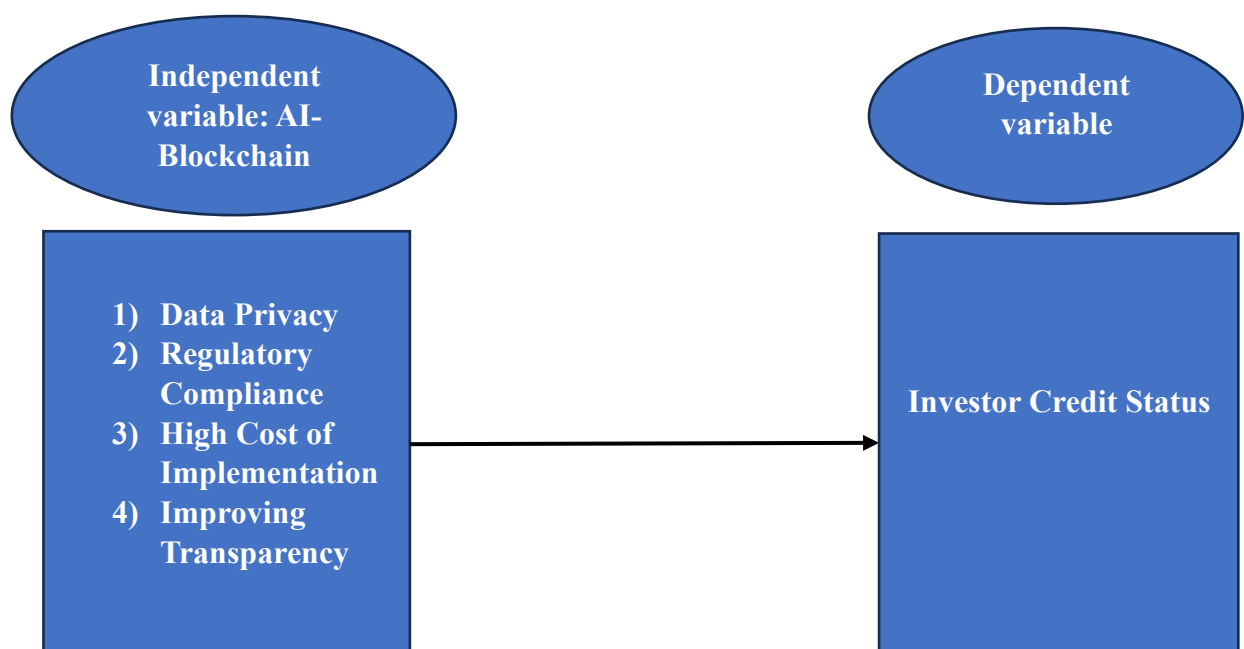
H.1: There is a positive impact of the of AI - blockchain integration on the accuracy of the credit status of investors.

H1.1: There is a positive impact of the of AI - blockchain integration (through Data Privacy) on the accuracy of the credit status of investors.

H1.2: There is a positive impact of the of AI - blockchain integration through (Regulatory Compliance) on the accuracy of the credit status of investors.

H1.3: There is a positive impact of the of AI - blockchain integration through (High Cost of Implementation) on the accuracy of the credit status of investors.

H1.4: There is a positive impact of the of AI - blockchain integration through (Improving Transparency) on the accuracy of the credit status of investors.



Research Methodology

Will be discussed later

Test type: PLS

Test method: Questionnaire

أدوات الدراسة:

Research Instruments

Test type: PLS

Test method: Questionnaire

حدود الدراسة:

Research Limitations

Research location: Jordan

Research population: Investment companies

Research time limits: The last four years.

المراجع:

References

- Ahmed, I., Zhang, Y., Jeon, G., Lin, W., Khosravi, M. R., & Qi, L. (2022). A blockchain-and artificial intelligence-enabled smart IoT framework for sustainable city. *International Journal of Intelligent Systems*, 37(9), 6493-6507.
- Alabdulatif, A., Al Asqah, M., Moulahi, T., & Zidi, S. (2023). Leveraging artificial intelligence in blockchain-based e-health for safer decision making framework. *Applied Sciences*, 13(2), 1035.
- Antwi, B. O., Adelakun, B. O., & Eziefule, A. O. (2024). Transforming Financial Reporting with AI: Enhancing Accuracy and Timeliness. *International Journal of Advanced Economics*, 6(6), 205-223.
- Bamakan, S. M. H., Nezhadsistani, N., Bodaghi, O., & Qu, Q. (2021). A decentralized framework for patents and intellectual property as nft in blockchain networks.

- Benlian, A., Kettinger, W. J., Sunyaev, A., Winkler, T. J., & Guest Editors. (2018). The transformative value of cloud computing: a decoupling, platformization, and recombination theoretical framework. *Journal of management information systems*, 35(3), 719-739.
- De Sousa, W. G., de Melo, E. R. P., Bermejo, P. H. D. S., Farias, R. A. S., & Gomes, A. O. (2019). How and where is artificial intelligence in the public sector going? A literature review and research agenda. *Government Information Quarterly*, 36(4), 101392.
- Farahani, M. S., & Esfahani, A. (2022). Opportunities and challenges of applying artificial intelligence in the financial sectors and startups during the coronavirus outbreak. *International Journal of Innovation in Management, Economics and Social Sciences*, 2(4), 33-55.
- Gatto, G. (2022). "Blockchain: the relation with accounting and its application to Smart Cities". <http://dspace.unive.it/handle/10579/21347>
- Gikay, A. A. (2020). The American Way-Until Machine Learning Algorithm Beats the Law?. *Case W. Res. JL Tech. & Internet*, 12, ii.
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of management information systems*, 35(1), 220-265.
- Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. *International Journal of Accounting Information Systems*, 48, 100598.
- Iansiti, M., Lakhani, K. R., & Mohamed, H. (2017). It will take years to transform business, but the journey begins now. *Harvard Business Review*, 95(1), 118-128.
- Iansiti, M., Lakhani, K. R., & Mohamed, H. (2017). It will take years to transform business, but the journey begins now. *Harvard Business Review*, 95(1), 118-128.
- Imam, I. T., Arafat, Y., Alam, K. S., & Shahriyar, S. A. (2021, February). DOC-BLOCK: A blockchain based authentication system for digital documents. In *2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV)* (pp. 1262-1267). IEEE.
- Javed, I. T., Alharbi, F., Margaria, T., Crespi, N., & Qureshi, K. N. (2021). PETchain: A blockchain-based privacy enhancing technology. *IEEE Access*, 9, 41129-41143.
- Kanaparthi, V. (2024, January). Exploring the Impact of Blockchain, AI, and ML on Financial Accounting Efficiency and Transformation. In *International Conference on Multi-Strategy Learning Environment* (pp. 353-370). Singapore: Springer Nature Singapore.
- Kayikci, S., & Khoshgoftaar, T. M. (2024). Blockchain meets machine learning: a survey. *Journal of Big Data*, 11(1), 9.

- Komalavalli, C., Saxena, D., & Laroia, C. (2020). Overview of blockchain technology concepts. In *Handbook of research on blockchain technology* (pp. 349-371). Academic Press.
- Kumar, S., Lim, W. M., Sivarajah, U., & Kaur, J. (2023). Artificial intelligence and blockchain integration in business: trends from a bibliometric-content analysis. *Information Systems Frontiers*, 25(2), 871-896.
- Kuznetsov, A., Sernani, P., Romeo, L., Frontoni, E., & Mancini, A. (2024). On the integration of artificial intelligence and blockchain technology: a perspective about security. *IEEE Access*.
- Laroia, C., Saxena, D., & Komalavalli, C. (2020). Applications of blockchain technology. In *Handbook of research on blockchain technology* (pp. 213-243). Academic press.
- Misra, N. N., Dixit, Y., Al-Mallahi, A., Bhullar, M. S., Upadhyay, R., & Martynenko, A. (2020). IoT, big data, and artificial intelligence in agriculture and food industry. *IEEE Internet of things Journal*, 9(9), 6305-6324.
- Mosteanu, N. R., & Faccia, A. (2021). Fintech frontiers in quantum computing, fractals, and blockchain distributed ledger: Paradigm shifts and open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 19.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. Satoshi Nakamoto.
- Praveena Anjelin, D., & Ganesh Kumar, S. (2021). Blockchain technology for data sharing in decentralized storage system. In *Intelligent Computing and Applications: Proceedings of ICICA 2019* (pp. 369-382). Springer Singapore.
- Sadok, H., Sakka, F., & El Maknoui, M. E. H. (2022). Artificial intelligence and bank credit analysis: A review. *Cogent Economics & Finance*, 10(1), 2023262.
- Tapscott, D., & Euchner, J. (2019). Blockchain and the Internet of Value: An Interview with Don Tapscott Don Tapscott talks with Jim Euchner about blockchain, the Internet of value, and the next Internet revolution. *Research-Technology Management*, 62(1), 12-19.
- Thakkar, P. (2019). BOSS Magazine| How Blockchain is Redefining the Rules of Supply Chain. *Boss Magazine*.
- Vincent, G., Narashimman, G., Suresh, M., Kingsly, P. J., Rajendhiran, M., & Rajalakshmi, M. (2024). Examine Ai Models For Credit Scoring And Risk Assessment, Integrating Nontraditional Data Sources Such As Social Media And Transaction Histories To Enhance Accuracy And Inclusivity. *Educational Administration: Theory and Practice*, 30(5), 13931-13940.
- Wang, P. (2019). On defining artificial intelligence. *Journal of Artificial General Intelligence*, 10(2), 1-37.

World Economic Forum., 2015. Deep Shift Technology Tipping Points and Societal Impact.
Available at.
http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf.