

OPTIMISING EFFICIENCY: BLOCKCHAIN IMPLEMENTATION IN THE FINANCIAL AUDIT PROCESS

Fitria Dita Kurniasari¹, Shofif Sobaruddin Akbar², Erni Ernanda³, Nevisa Ramadani⁴
^{1,2,3,4}Universitas PGRI Semarang, Jl. Sidodadi Timur, Semarang, Indonesia
Email: ditaf3391@gmail.com

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Abstract. Blockchain technology promises the potential to deliver high transparency, security, and efficiency in accounting processes. However, there are many expected benefits of this technology to optimise its application. The purpose of this article is to describe the development and system of blockchain, then identify the potential utilisation of blockchain especially in the field of finance. The research method was conducted through a literature study of relevant articles and sources in the context of blockchain technology and financial auditing. The results of this study indicate that blockchain technology has the potential to be attractive financial process efficiency and fast transaction validation process to reduce the time and cost required so as to help achieve operational performance. The conclusion of this study is that the use of blockchain technology in the financial audit process offers the potential to improve transparency, reliability, and efficiency.

Keywords: blockchain technology, financial audit system, potential, transparency

Abstrak. Teknologi blockchain menjanjikan potensi untuk menghasilkan transparansi, keamanan, dan efisiensi yang tinggi dalam proses akuntansi. Namun terdapat banyak manfaat yang diharapkan dari teknologi ini untuk mengoptimalkan penerapannya. Tujuan dari artikel ini adalah mendeskripsikan perkembangan dan sistem dari blockchain, kemudian mengidentifikasi potensi pemanfaatan blockchain khususnya dalam bidang keuangan. Metode penelitian dilakukan melalui studi literatur terhadap artikel-artikel dan sumber yang relevan dalam konteks teknologi blockchain dan audit keuangan. Hasil penelitian ini menunjukkan bahwa teknologi blockchain memiliki efisiensi proses keuangan menjadi potensi yang menarik dan proses validasi transaksi yang cepat untuk mengurangi waktu dan biaya yang diperlukan sehingga membantu mencapai kinerja operasional. Kesimpulan dari penelitian ini adalah penggunaan teknologi blockchain dalam proses audit keuangan menawarkan potensi untuk meningkatkan transparansi, keandalan, dan efisiensi. Abstrak harus jelas, ringkas, dan deskriptif.

Kata Kunci: teknologi blockchain, sistem audit keuangan, potensi, transparansi

INTRODUCTION

Blockchain is an ever-expanding database, called Block, which is secured and connected using cryptographic techniques (Nugraha, 2022). Blockchain technology provides new innovations for recording, processing, storing transactions, and financial information so that it can change the perspective of the accounting profession to create an integrated business. The application of blockchain technology in the financial audit process promises a number of significant benefits. First, blockchain technology contains a distributed ledger system that can increase transparency in the financial audit process, allowing auditors to verify transactions more easily. Second, blockchain technology can address data security issues by using a secure consensus mechanism. Third, by using blockchain technology, the financial audit process can become more efficient and reduce time and costs (Muhammad & Junianti, 2023).

Financial auditing and accounting could be one of the professions where blockchain could bring great benefits to its users. However, its application is also faced with challenges that need to be carefully considered. Miller et al. (2019) argue that blockchain technology supports transactions to be more transparent, secure, fast, and efficient. Some of the challenges that may arise include scalability to cope with high transaction volumes, integration with existing audit and accounting systems and implementation costs which will be an important factor in decision making in an organisation.

The audit process also helps to ensure the accuracy and reliability of financial statements, instilling confidence among shareholders, creditors, and regulatory agencies. However, with increasing technological advancements the effectiveness of the audit process has come under scrutiny. Recent research has explored various factors that influence the audit process, including organisation size, processes, and relationships (Azzali & Mazza, 2018; Nugraha, 2022). This research also shows that an effective integrated internal audit management system can help to ensure business sustainability and increase competitive advantage for developing countries. The audit process is essential to ensure transparency and accountability in the business world.

Based on the above background, this research aims to describe the development and system of blockchain, then identify the potential utilisation of blockchain, especially in the financial sector. This research is expected to provide benefits in terms of scientific development and can be a reference for further research related to blockchain technology.

LITERATURE REVIEW

Blockchain is ‘a digital mechanism for creating a directly distributed digital ledger without the need for trusted intermediaries’ (Furlonger & Uzureau, 2020). Blockchain is a ledger system that creates a secure and immutable cryptographic record of every transaction of value, whether it is money, goods, property, work or votes. Blockchain in P2P networks makes it easier to access funds transparently, safely, and quickly without more complicated and expensive bank procedures (Sangwan et al., 2020). According to Smith & Castonguay (2020) blockchain is the result of technological development in the form of a platform that allows users to continuously access the blockchain network, and is protected by encryption so that it cannot be hacked easily. In every financial transaction blockchain represents the exchange of value between participants either digital assets that represent rights, obligations, or ownership.

Quoted from Swan (2015) there is a blockchain revolution that can be categorised into three, *Blockchain 1.0* is the focus of currency and the deployment of cryptocurrencies in cash-related applications such as currency transfers, and digital payment systems. *Blockchain 2.0* is the development of contracts where all financial applications that use blockchain are broader than simple cash transactions. *Blockchain 3.0* is the development of blockchain applications outside of currency, finance in this case in the fields of government, health, culture, and art.

According to Bible et al. (2017) the basic elements that determine the overall design and investment in a blockchain infrastructure are the trust model that makes blockchain effective and the main characteristics of blockchain technology, namely, trust, security, transactionality, and ownership.

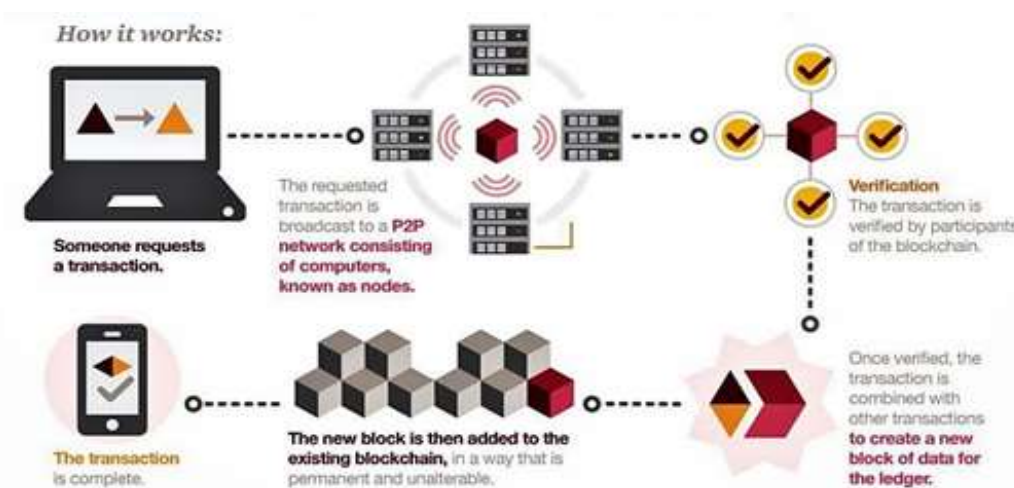


Figure 1. How Blockchain Works

Source: PWC (2018)

Current audit procedures are time-consuming and expensive, and there are even cases where they are ineffective. Basically, blockchain is a more advanced recording solution than traditional processes, with blockchain-based recording aimed at protecting the recording system from corruption, fraud, and other interference, so that it will result in increased accuracy and reliability from traditional systems (Lemieux, 2017). Although the first version of blockchain was designed to perform a series of simple operations, techniques were later developed to allow the blockchain to perform more complex operations that were fully defined in programming languages (Casey & Vigna, 2018).

METHOD, DATA, AND ANALYSIS

Based on observations made by Pratiwi (2022), the potential benefits and challenges generated by Blockchain technology in the context of audit accounting still need to be researched more deeply. As stated by Najibulloh & Rahmalia (2024), that blockchain technology has great potential in overcoming the challenges of transparency, risk awareness, and efficiency in the financial audit system. Therefore, it is important for us to have a deep understanding of the basic concepts of blockchain technology. This is because we cannot rely on separate expertise between the fields of accounting, information systems, and auditing, but must combine the three into one unit in order to become a safe, fast and precise system.

This research uses a qualitative research method using a literature study approach or literature study, where the data obtained is secondary data derived from various recent articles and journals. The data collected comes from journals obtained through google scholar. The techniques used in processing and analysing data include the stages of data collection, data production, data analysis and validation until the right conclusions are made.

To ensure data validity several steps will be taken. Firstly, the data source research is verified. Second, data analysis methods are explained in detail. Third, the use of case studies that reinforce the findings.

RESULTS AND DISCUSSION

Blockchain technology has become a major concern in auditing in the financial system. With the use of this technology, information related to products can be recorded and shared in a decentralised manner across the network, which can be used by stakeholders to access data in real-time and verify the origin and integrity of a product.

In the current implementation, blockchain technology can be divided into three levels, namely *blockchain 1.0*, which is digital currency, *blockchain 2.0*, which is the use of smart

contracts and digital access, and *blockchain 3.0*, which is the application of blockchain in various fields (Fu & Zhu, 2019).

Using blockchain to improve the auditability of information. One of the most important benefits of blockchain is that it improves the auditability of information. High data security and transparency in recording transactions are key benefits in the application of blockchain technology. The efficiency of financial processes is an attractive potential and fast transaction validation processes to reduce the time and cost required, helping to achieve operational performance.

Blockchain will allow auditors to verify any amount of data in a short period of time. Even the use of blockchain technology can reduce the cost and time required to conduct audits (Vijai et al., 2019). The existence of blockchain provides an opportunity to provide a broad scope of financial reporting and auditing processes. The application of blockchain and the access that auditors have through read-only nodes to real-time data on the blockchain, will allow auditors to obtain the information needed for audit purposes consistently. Blockchain technology in this era of digitalisation applies automation, analytics, and machine learning (Raphael, 2018) to obtain real-time information.

The use of blockchain technology will greatly facilitate fraud indicators that can be obtained in real-time, second by second, anomaly by anomaly. Auditors are able to focus more on transactions that are more risky so that auditors can generate time in areas that can add more value (Deloitte Switzerland, 2017). With blockchain technology, it can facilitate auditors in examination procedures or inspection of records and documents, allowing a thorough evaluation of the data in the system (Gero & Suardikha, 2020). Furthermore, the use of blockchain technology in financial auditing also opens up opportunities to improve data security. Due to the decentralised nature of blockchain, the data to be stored on it cannot be manipulated without the consent of all parties involved. Providing a higher level of security than data systems that are vulnerable to cyber attacks and data manipulation. Blockchain can also help reduce the risk of fraud and forgery in the financial audit process. Blockchain technology also facilitates good communication between auditors, clients, and other stakeholders, on the other hand, the use of blockchain can also result in long-term cost savings. To reduce the need for manual processes that will consume time and resources, and minimise the risk of human error (Gurning, 2024).

Audit is a process carried out by auditors to examine financial reports prepared by company management accompanied by supporting records and evidence. In carrying out the audit, it is carried out by an independent party to a certain party so that it can obtain the final

result in the form of an opinion on the fairness of the financial statements that have been given (Setiadi, 2019). In the audit process, auditors have access rights to blockchain technology that can be done at any time to view key records, so that auditors can check and assess directly the suitability between cryptocurrency financial statements and actual transactions. So with the help of blockchain technology, auditors are given access to retrieve information from the blockchain and auditors can conduct audits easily in examining the financial statements that have been provided by companies regarding transactions that occur. In blockchain is limited, giving this access is not given to unauthorised parties so only the auditor concerned can access the blockchain (Gurning, 2024).

Blockchain technology is a tool that needs to be used to record cryptocurrencies such as bitcoin. Recording cryptocurrency transactions is done in a ledger formed from a block that has a lot of storage done by users. Each block in the blockchain will help a chain where there is a connection between blocks and others (Simoyama et al., 2017). Blockchain will replace many accounting roles in the future, especially in bookkeeping which is often prone to errors. However, as an accountant his role will remain by positioning himself as a business advisor by using their professional judgment to help an organisation understand the financial challenges of the digital age, which cannot be done by technologies such as blockchain (Bandaso et al., 2022).

Challenges in the use of blockchain technology need to be a major concern that can affect the performance of blockchain networks when the volume of transactions, challenges and initial costs, the long-term benefits can be significant. One of the main reasons for the lack of blockchain development in accounting is the lack of knowledge between blockchain developers and accounting experts. On the one hand, accountants and academic researchers lack sufficient expertise on the concept of blockchain infrastructure. On the other hand, blockchain experts lack support from more specific accounting professions (Cai, 2021). Therefore, auditors need to carefully consider the benefits and risks of blockchain technology.

CONCLUSION

Based on literature analysis Blockchain is a digital mechanism for creating a distributed digital ledger in real time without the need for trusted intermediaries. The use of blockchain technology in the financial audit process offers the potential to increase transparency, reliability, and efficiency. In particular, blockchain could be a potential implementation opportunity for financial auditing and summarise existing work. This study examines the opportunities and implementation of blockchain technology, the results provide ample

evidence that blockchain technology presents valuable benefits to accountants, yet the majority are still sceptical about blockchain technology.

RECOMMENDATIONS

This research opens up opportunities for other researchers to conduct empirical studies on the implementation of blockchain in the financial audit process. Given that most of the existing studies are still theoretical, there is a great need for empirical data-based research.

This research still uses literature reviews that are theoretical in nature. To advance this research, it would be valuable to conduct empirical studies that examine real-world implementations of blockchain in the financial audit process. This could involve case studies of companies that have adopted blockchain for auditing or surveys of auditors' experience with the technology.

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REFERENCES

- Azzali, S., & Mazza, T. (2018). The Internal Audit Effectiveness Evaluated with an Organizational, Process and Relationship Perspective. *International Journal of Biometrics*, 13(6), 238–254. Retrieved from <https://api.semanticscholar.org/CorpusID:55444607>
- Bandaso, T. I., Randa, F., & Mongan, F. F. A. (2022). Blockchain Technology: How to Deal With It - From an Accounting Perspective. *Accounting Profession Journal (APAJI)*, 4(2), 97–115. <https://doi.org/10.35593/apaji.v4i2.55>
- Bible, W., Raphael, J., Riviello, M., & Taylor, P. (2017). *Blockchain Technology and Its Potential Impact on the Audit and Assurance Profession*. Canada: CPA. Retrieved from <https://www.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/blockchain-technology-and-its-potential-impact-on-the-audit-and-assurance-profession.pdf>
- Cai, C. W. (2021). Triple-entry Accounting with Blockchain: How Far Have We Come? *Accounting & Finance*, 61(1), 71–93. <https://doi.org/10.1111/acfi.12556>

- Casey, M. J., & Vigna, P. (2018). In *Blockchain We Trust*. Retrieved December 2, 2024, from [technologyreview.com](https://www.technologyreview.com/2018/04/09/3066/in-blockchain-we-trust/) website: <https://www.technologyreview.com/2018/04/09/3066/in-blockchain-we-trust/>
- Deloitte Switzerland. (2017). *The Blockchain (R)evolution-The Swiss Perspective White Paper*. Retrieved February 12, 2024, from [deloitte.com](https://www2.deloitte.com/ch/en/pages/innovation/articles/the-blockchain-) website: <https://www2.deloitte.com/ch/en/pages/innovation/articles/the-blockchain->
- Fu, Y., & Zhu, J. (2019). Big Production Enterprise Supply Chain Endogenous Risk Management Based on Blockchain. *IEEE Access*, 7, 15310–15319. <https://doi.org/10.1109/ACCESS.2019.2895327>
- Furlonger, D., & Uzureau, C. (2020). *The Real Business of Blockchain*. Brighton: Harvard Business Review Press.
- Gero, V. M. S., & Suardikha, I. M. S. (2020). Supporting and Inhibiting Factors for the Value of Blockchain Use by Auditors in Public Accounting Firms. *E-Jurnal Akuntansi*, 30(10), 2604–2618. <https://doi.org/10.24843/EJA.2020.v30.i10.p13>
- Gurning, M. Y. (2024). Application of Block Line Technology in Financial Auditing: Trends and Implications. *Economics Student Assignments*, 1(1).
- Lemieux, V. L. (2017). Evaluating the Use of Blockchain in Land Transactions: An Archival Science Perspective. *European Property Law Journal*, 6(3), 392–440. <https://doi.org/10.1515/eplj-2017-0019>
- Miller, D., Mockel, P., Myers, G., Niforos, M., Ramachandran, V., Rehmann, T., & Salmon, J. (2019). Blockchain-Opportunities for Private Enterprises in Emerging Markets. Second and Expanded Edition. *International Financial Corporation (IFC)*, (January), 1–88. Retrieved from https://www.ifc.org/wps/wcm/connect/publications_ext_content/ifc_external_publication_site/publications_listing_page/blockchain+report
- Muhammad, A. D., & Junianti, S. A. (2023). Application of Blockchain Technology in Accounting Information Systems: Potential and Challenges. *Information System Jawara Journal*, 1(1), 1–7. Retrieved from <https://ejournal.universitاسmandiri.ac.id/index.php/jsi/article/view/21/11>
- Najibulloh, I. K., & Rahmalia, L. (2024). The Application of Blockchain Technology in the Islamic Finance Industry: Challenges and Opportunities. *J-EBI: Journal of Islamic Business Economics*, 3(1), 61–72. <https://doi.org/10.57210/j-ebi.v3i01.295>
- Nugraha, A. C. (2022). Application of Blockchain Technology in the Educational Environment: Case Study of POLBAN Computer Engineering and Informatics Department. *Productive: Scientific Journal of Information Technology Education*, 4(1), 302–307. <https://doi.org/10.35568/produktif.v4i1.386>
- Pratiwi, L. L. (2022). Blockchain Implementation in Accounting and Auditing in Indonesia. *Fair Value: Scientific Journal of Accounting and Finance*, 4(6), 2185–2203. <https://doi.org/10.32670/fairvalue.v5i01.873>
- PWC. (2018). *Fourth Industrial Revolution for the Earth Series: Building Block (Chain)s for*

a Better Planet. Retrieved from <https://www.pwc.com/gx/en/sustainability/assets/blockchain-for-a-better-planet.pdf>

- Raphael, J. (2018). Interview with Jon Raphael, Audit Chief Innovation Officer Deloitte & Touche LLP. *Financial Executives Research Foundation*.
- Sangwan, V., Harshita, H., Prakash, P., & Singh, S. (2020). Financial Technology: A Review of Extant Literature. *Studies in Economics and Finance*, 37(1), 71–88. <https://doi.org/10.1108/SEF-07-2019-0270>
- Setiadi. (2019). *Accounting Examination Book: Theory and Practice*. Yogyakarta: Bening Pustaka.
- Simoyama, F. D. O., Grigg, I., Bueno, R. L. P., & Oliveira, L. C. De. (2017). Triple Entry Ledgers with Blockchain for Auditing. *International Journal of Auditing Technology*, 3(3), 163–183. <https://doi.org/10.1504/IJAUDIT.2017.086741>
- Smith, S. S., & Castonguay, J. “Jack.” (2020). Blockchain and Accounting Governance: Emerging Issues and Considerations for Accounting and Assurance Professionals. *Journal of Emerging Technologies in Accounting*, 17(1), 119–131. <https://doi.org/10.2308/jeta-52686>
- Swan, M. (2015). *Blockchain: Blueprint for a New Economy*. California: O’Reilly Media, Inc.
- Vijai, C., Suriyalakshmi, S. M., & Joyce, D. (2019). The Blockchain Technology and Modern Ledgers Through Blockchain Accounting. *SSRN Electronic Journal*, 8(12), 545–557. <https://doi.org/10.2139/ssrn.3514501>