

Industrial Revolution Technology 4.0: The Concept Of Blockchain Accounting To Detect Corruption In Government Public Sector Finance

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Abstract : *The culture of corruption in the public sector of government is one of the cases that is still difficult to avoid until now. However, along with the development of industry 4.0, corruption cases can begin to be detected using current technology, one of which is blockchain technology. Blockchain technology can be combined with accounting so that it can detect corruption. This scientific work aims to provide a concept of blockchain performance in detecting corruption cases in the public sector of government. This research uses a literature review method of previous research which is then described using a qualitative approach. Blockchain public sector accounting is able to detect corruption because it uses a block recording system that is arranged with each other to form a chain and is permanent. If there is an invalid block, then there is data manipulation which can then be detected.*

Keywords: *Corruption, Blockchain, Government Public Sector Accounting*

INTRODUCTION

The industrial revolution 4.0 is a stage of industrial evolution characterized by the emergence of highly sophisticated technology. There are at least nine technologies that are the main pillars for developing an existing industry to be digital-ready, such as the Internet of Things (IoT), Augmented Reality (AR), Artificial intelligence (AI), big data, additive manufacturing, system integration, simulation, cloud computing, and blockchain technology. These technologies facilitate the implementation of various tasks and jobs and have the potential to advance productivity in a working system.

This increasingly effective and efficient industrial growth along with the development of the 4.0 revolution continues to spread throughout the world with various systematic brought and all the consequences that will be obtained. Entering 2018, all aspects of modern human life have undergone rapid changes and influenced the fields of education, socio-politics, and also the economy as mentioned by Tjandrawinata in Harian Momentum (2020), the rapid development of information technology is currently occurring automation that occurs in all fields, technologies, and new approaches that combine real, digital and fundamental.

In addition, the changing times have also raised various kinds of problems that are a challenge for the government. One of them is the public demand for transparency in public

services which is increasingly intensive to minimize the occurrence of fraudulent use of power or corruption.

Corruption is an act committed to gain some benefit that is contrary to official duties and other truths (Basri, 2022). Corruption is used to benefit oneself or the party concerned, thus causing financial or non-financial losses to other parties. The phenomenon of fraud or corruption has become a problem that almost most countries in the world experience. The Corruption Eradication Commission (KPK) has handled 85 cases of corruption during the period January 1 to October 6, 2023, according to (Annur, 2023).

No.	Data Name	Value/Case
1	Gratification/bribery	44
2	Procurement of goods/services	32
3	TPPU	6
4	Obstructing an investigation	2
5	Levies/extortion	1
6	Licensing	0
7	Misuse of budget	0
8	Total	85

Figure 1. Data on Corruption in Indonesia 2023
Sources: Annur, 2023

According to the data above, the most cases in Indonesia in 2023 were bribery or gratuities with a total of 44 cases, equivalent to 51.76% of the total corruption cases handled by the KPK until the end of October.

Corruption is a massive problem in society, especially in government. So, it requires serious handling. With the existence of technology that is increasingly developing, there is a greater opportunity to overcome this problem. Technology can be a solution that empowers the prevention, detection and prosecution of corruption.

To overcome corruption, the following methods can be used. 1) Transparent E-Government System. The use of this method is used in state financial audits, by providing open access to policy, budget, and administrative information carried out with the aim of presenting data to the public, so that the public can directly oversee the management of public finances. 2) Data Analysis with Artificial Intelligence (AI) The use of artificial intelligence is carried out with the aim of detecting patterns of fraud or suspicious behavior that occur in the financial audit process. 3) Use of Blockchain. Blockchain is a decentralized technology method that allows secure and transparent data storage. The use of blockchain can reduce fraud or corruption by providing security, integrity and constraints on data.

Blockchain is a distributed ledger technology in its most basic form where a database of current transactions is stored and managed among multiple nodes in a peer-to-peer network. Blockchain is a distributed database that records every transaction over the exchange in each block and is protected by cryptographic security methods, which guarantee security and cannot be easily changed in value (Angelis & Ribeiro da Silva, 2019). Blockchain itself has been applied in several economic sectors in Indonesia, based on research conducted by Triantonno (2019) revealed that blockchain technology can prevent accounting fraud. Blockchain is applied within the company by placing nodes in each division. The accounting system will be distributed on the blockchain so that each division can monitor the income and expenditure of other divisions' funds. This study also explained that blockchain can also be used to establish external company relationships such as investors, government, etc. because external companies can see the company's financial statements that cannot be changed.

Blockchain consists of four main types: public, private, hybrid, and consortium. A brief explanation of each type of blockchain is as follows one, public blockchain, this does not require permission to join. All members of the blockchain have the right to read, edit, and validate it. Two, Private blockchain or the so-called managed blockchain. Only certain people can become members and have rights in the network but this blockchain has access restrictions. Three, Hybrid blockchain is a blockchain that combines elements of a private blockchain with a public blockchain. Four, Consortium blockchain is a blockchain with a semi-decentralized type, which means that more than one organization can manage this network.

LITERATURE REVIEW

Corruption

The word corruption comes from the Latin *corruptio* or *corruptus*. *Corruptio* can be interpreted as rottenness, ugliness, depravity, dishonesty, bribery, immorality, perversion. Corruption is the misappropriation or misuse of public money for personal or other people's benefit. The act of corruption has been proven to have a negative impact on human life, both in the economic aspect, as well as the norms and culture of society. Until now, corruption has been a common chronic problem suffered by developed and developing countries around the world. Indonesia itself is severely affected by corruption, placing on the Corruption Perception Index (CPI) ranking, reported by Transparency International. Data in 2023 showed that Indonesia had ranked 115th out of 180 countries, with a score of 34 out of 100 (Transparency International, 2024). The above report shows that corruption cases in Indonesia are still not well resolved by the government.

Nur Syam provides a view that the cause of someone committing corruption is due to the inability of humans to protect themselves from the temptation of the material world or possessions that exceed their abilities (Syam, 2020). When the urge to get rich quickly is very large and unbearable, while there are opportunities or opportunities to gain wealth through corruption, then someone will often decide to corrupt even though they know it is not right. This it can be said that one of the causes of corruption is due to the wrong perspective on wealth and wealth, causing the wrong way of obtaining wealth (Maisondra, 2022).

Given the adverse effects of corruption, appropriate measures are needed to eradicate this crime through integrated cooperation between law enforcement and community support, as criminal sanctions alone have proven inadequate in reducing the number of cases of corrupt behavior (Einstein & Ramzy, 2020).

Blockchain

Blockchain technology was first implemented in Bitcoin in 2009. Bitcoin's blockchain system records digital contract signing transactions by Bitcoin users, who then transfer the signed information to other users. The blockchain records transactions publicly so that all network users can independently verify the validity of the transaction. Blockchain can be defined as a digital ledger of cryptographically signed transactions grouped into blocks of data. Each block is cryptographically linked to the previous block and validated. Every time a new block is added, the old block cannot be modified. New blocks are replicated across all copies of the ledger in the network, and each transaction is automatically completed according to set rules (Pratiwi, 2022).

There are three types of blockchain. Blockchain 1.0 which is designed to track financial transactions only on Bitcoin. Its features are decentralized, using cryptographic security, and its ability to facilitate peer-to-peer transactions. Blockchain 2.0 or smart contract, this blockchain functions more than just tracking financial transactions, it creates autonomous "smart" contracts that can store data on a distributed ledger without relying on third parties. Blockchain 3.0 or Distributed Ledger Technology (DLT), this blockchain feature is the most advanced compared to other blockchain features. It has scalability with faster transaction

speeds, better privacy with enhanced security protocols, and greater flexibility with the addition of new programming languages. Blockchain 3.0 is commonly applied to some industries for voting, supply chain management, and even in healthcare (Prabhat, 2023).

Blockchain has the following characteristics, 1) Immutable digital ledger, records of transactional activities cannot be changed, 2) Consensus mechanism, participants have an agreement on methods for conducting blockchain transactions without intermediaries, 3) Identity and ownership, cryptographic principles are able to interact with the blockchain and show ownership (Maguire, et al., 2018).

Blockchain is more secure because every transaction that takes place will be recorded in a new block in the form of different encryption and a distributed verification system that can avoid piracy. The use of digital platforms in this system makes the transaction process faster and more efficient and cheaper because it does not require intermediaries (Baza, 2023).

Smart Contract

Smart contracts are programs that automatically run when nodes reach consensus, without human intervention. Nodes in a blockchain are configured to check a set of conditions to see if their triggering criteria have been met. If the conditions are met, the nodes execute the agreed-upon contract, a program that performs a function specified by the business (Clavin et al., 2020).

Smart contracts can work according to given commands. The command is usually written in code on the blockchain. Then, the computer network will carry out the action once the condition is verified. After that, the transaction or program executed cannot be changed or only certain parties can see or change the results. In a smart contract, there are several conditions that are required for the transaction to run. To set these conditions, all parties must determine how the transaction and data will be stored on the blockchain. In addition, all parties must also agree on the rules that will govern the transaction (Jiantono, 2023).

Public Sector Accounting of Government Entities

Public sector accounting in its evolution, which is described as a public fund accounting, is a way of accounting and filing mechanism determined on the organization of public funds. Public sector accounting is used in order to provide information about the economic and financial transactions of governments that are not intended for profit. In Indonesia, public sector accounting in government entities can be interpreted as a way of accounting and analysis mechanism for the administration of public funds within the government, including ministries/agencies and local governments. The government requires adequate information on the management of assets and financial resources that are able to support transparency and accountability of its management, this information can be obtained through public sector accounting.

Public Sector Financial Accounting Standards will ultimately provide a framework for the functioning of the stages of the public sector accounting cycle. Which cycle includes all the sequences of how to start from a preparation, estimation, budget implementation, provision of goods and services, reporting, auditing, and public accountability. Accounting standards used in Indonesia are Financial Accounting Standards (SAK) and others (Gunawan, 2015). Government agencies require open publicity, which functions properly and accountably so that the government is free from fraud that harms the state and society with honesty, openness, transparency, and accountability to the public. This transparency requirement is often addressed to the government, both at the central and regional levels (Putri & Nevi, 2021).

METHODS

This research uses a literature review method or in other words, a secondary study using a qualitative approach. A literature review is generally a systematic way to collect and synthesize previous research (Snyder 2019). A well-conducted review will create a strong

foundation to facilitate theory development. When it has found theories with various perspectives from various studies, the literature review succeeds in creating new research that can complement previous research (Snyder 2019). Literature review is one of the important research methods because researchers will look for materials from previous studies to ensure that the research created is credible, reliable, and precise. To create quality research, it is necessary to take several steps to obtain representative materials.

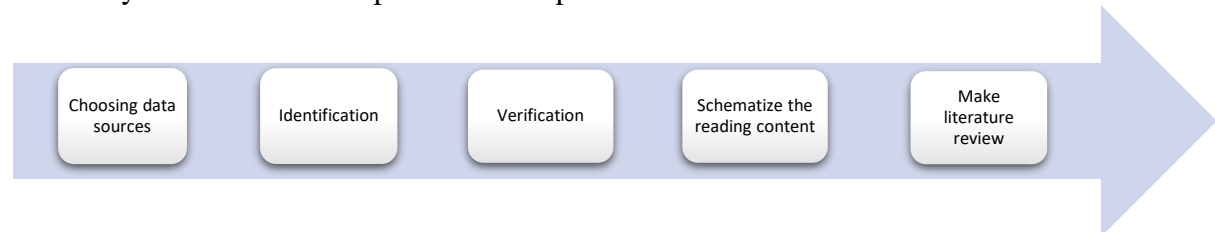


Figure 2. Stage of Research Methods
Sources: Belongs to the Researcher

1) Choosing data sources, selecting literature relevant to the research paper and checking the authority of the literature (identifying the number of times the literature is cited), 2) Identification, identifying in depth all the literature materials that match the topic of the research paper in order to get complete data sources, 3) Verification, confirming whether the data recorded in the literature material is valid, unmodified, and reliable, especially for historical data in ancient times which is difficult to verify because it is consumed by the changing times, 4) Schematize the reading content, make a literature review framework (write the necessary data) in order to find out things that need to be added to correct so that it can produce valid data, 5) Make literature review, make literature review according to the data that has been obtained.

The literature review method in this study uses a qualitative approach. The qualitative approach in literature review is used to summarize the results of descriptive qualitative research. The method of summarizing the results of qualitative research is called meta synthesis, which is a technique of integrating data or combining data from various sources to obtain new concepts (Suwastika, 2020).

ANALYSIS & DISCUSSION

1. Blockchain in Accounting System

Blockchain is an open and distributed ledger that can record transactions between two parties without intermediaries efficiently as well as in a verifiable and permanent way (Bandaso, et al., 2022). Blockchain can eliminate third-party transactions so as to cut admin costs and of course be more efficient, fast, and credible. This is what makes blockchain capable of being a replacement technology for accounting books. Here is an illustration of the difference between traditional database (traditional accounting bookkeeping) and distributed ledger (blockchain accounting).

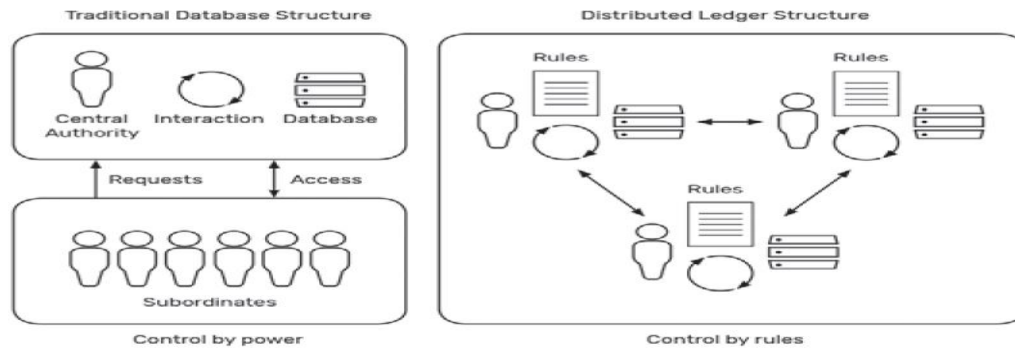


Figure 3. Differences between Traditional Accounting and Blockchain Accounting
Sources: Vasquez, 2021

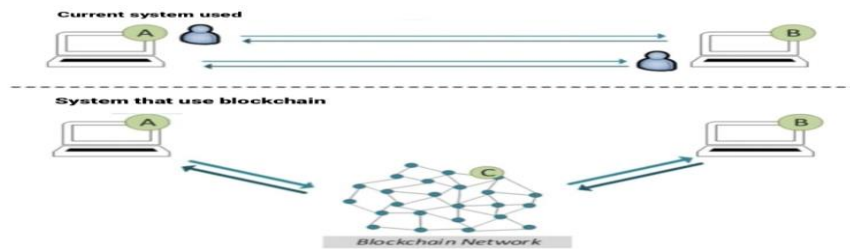


Figure 4. Blockchain Accounting System
Sources: Lumi, 2021

As seen in the illustration above, the traditional database structure is centrally controlled or centralized (third party). This centralization is vulnerable to hacking, errors, takes a lot of time and cost, and data is not validated from all parties. Whereas in the distributed ledger structure, data is controlled by rules, not by the authority (Bandaso, et al., 2022).

2. Corruption can be Viewed Through Accounting

Corruption is a case that is familiar to the public. Corruption has become a culture especially in the public sector. Therefore, to detect corruption cases, there are several ways to use accounting. A frequently used way is to use forensic accounting to detect corruption. Forensic accounting is a combination of accounting, auditing, and investment that results in specificity. The forensic accounting process can be done proactively and reactively. Proactive is used to detect the risk of corruption, while reactive is an action taken when a fraud case is detected so that the audit will conduct an in-depth investigation.

Whereas in our research, corruption can be detected through a blockchain accounting system.

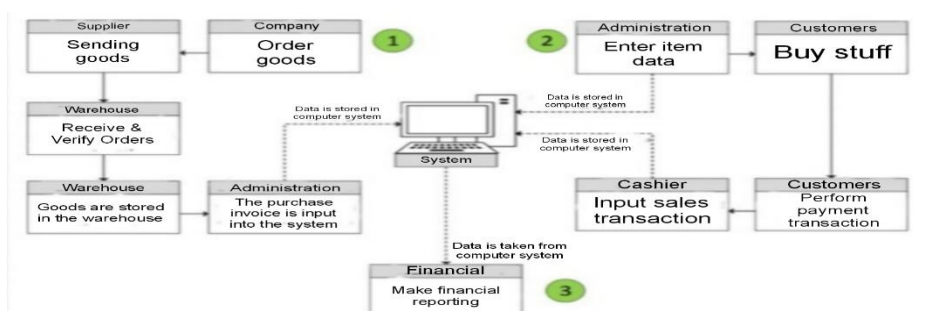


Figure 5. Illustration of Blockchain Accounting Records in a Company
Sources: Lumi, 2021

As can be seen in the illustration above, the blockchain accounting recording system is inputted by each field of the company into the computer system. This recording can be seen by other fields and the financial results report that has been recorded in the computer system cannot be changed. In this case, the fields in the public sector government will witness each other in recording the financial results report.

3. How Blockchain Works to Curb Corruption

The way blockchain works is using peer to peer technology, with this digital information is very much cared for and protected. Blockchain takes on the role of a ledger of transactions through a peer-to-peer technology network. The ledger serves to record every transaction from start to finish, so that the blockchain can find out and store these transactions without being able to change them. Every transaction is entered into a block, and each block is connected to each other.

All transaction lists are locked together with a unique marker and will be connected when added to the next block, thus creating a chain that is patent or cannot be changed. Blocks usually consist of the current information and previous transactions with a hash (unique code).

When one block is tampered with, the hash of that block can change and eventually make the entire chain of block hashes invalid (not found). For example, when someone tampers with a block and the hash of the entire block that follows repeats. Then it can be known that the block chain has been compromised. To solve this problem, we can use the Proof of Work (POW) concept (Suharjito, 2022)

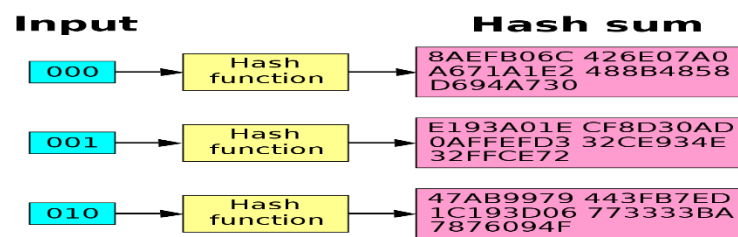


Figure 6. Hash Works
Sources: Fillah, 2023

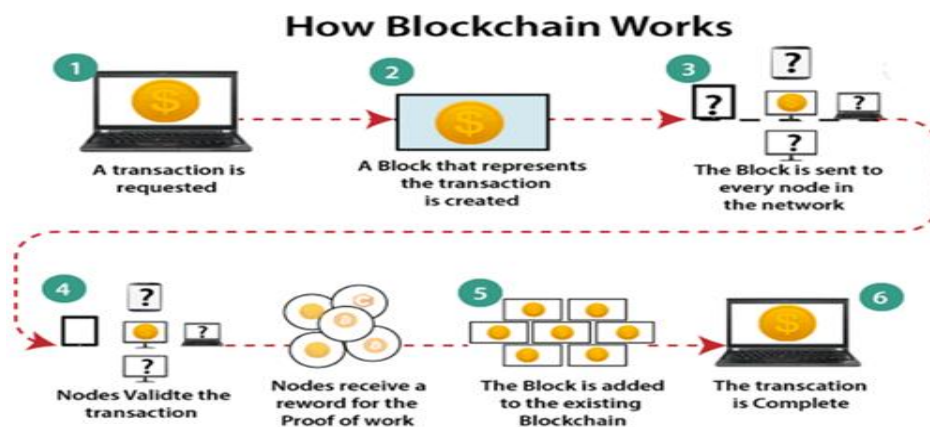


Figure 7. Blockchain Works
Sources: Singh, 2020

Blockchain is divided into three different layers, as shown in the figure 8. The core of the blockchain is the first layer, which is BFT consensus (machine replication), a common approach to tolerate failures. BFT consensus takes different forms, from Conventional BFT protocol to Proof of Work (PoW) based consensus. This layer ensures that there will only be one sequence of client transactions, if that sequence is interrupted then something is wrong with the chain. The second layer of the blockchain is smart contracts which can be called keying device code. Smart contracts can facilitate, verify, and enforce the execution of business transactions. They are also useful for connecting the underlying consensus protocol with subsequent layers, applications, and use cases. Smart contracts also mean that the process of distributing digital assets between two or more parties is automatically expressed by a formula that is obtained based on the data entered at the time of contract creation. Then, the third layer of blockchain technology is to apply it (Clavin et al., 2020)



Figure 8. Blockchain Technology Layers
Sources: Clavin et al., 2020

As mentioned in the introduction that there are four types of blockchain, for the scope of government and the public sector, the most suitable type to use is a private blockchain, so there is no freedom in accessing data and transactions. Blockchain technology can be a breakthrough for the development of public services that can interact easily and there is transparency. An example of blockchain implementation for government sector activities is data sharing between government agencies, the use of blockchain will allow data storage between departments to occur in a private network, providing mutual authentication on each network so that it can be useful in building trust and confidentiality. It can also be used when voting, which is by utilizing smart contracts that are in the blockchain feature. Voters will receive a voting ID that functions as a verified medium that their vote has been registered on the blockchain and counted as a valid vote. Third, government project contract activities, which are often a problem and a big opportunity for corruption. Blockchain technology will help real-time monitoring of e-government services so that it can continue to monitor the implementation of government contracts. (Suharjito, 2022)

4. Blockchain Implementation Model in Public Sector Accounting

The blockchain work process has a centralized and connected mechanism. When a transaction comes in, the blockchain system will process the information and forward it in a peer-to-peer (P2P) network consisting of various computers used by individuals. In a decentralized blockchain system, there is no reliance on a central authority to validate the authenticity of the data. Once a transaction is verified by a node to be valid, it is combined with other transactions to form a new block on the main ledger. This new

data block is then added to the blockchain, where the information is stored permanently and distributed to all individuals on the network. The information in the blockchain can be accessed by anyone who has access to the network, once the transaction has been processed. Distributed Ledger Technology (DLT), as described by Pedreano et al. (2021), refers to a database that is decentralized and distributed across multiple nodes, rather than stored in one central database. This is a significant difference compared to traditional financial ledger recording methods, where transactions are recorded and verified by a trusted third party (Financial Executives Research Foundation, 2018).

Blockchain's ability to record transactions on a distributed ledger can offer new opportunities for governments that can be used to increase transparency, prevent corruption, and can help build trust in society or the public sector. (Batubara et al., 2018). The use of Blockchain can be implemented in public sector accounting in government. The implementation of the blockchain system in government accounting is optimized by the existence of smart contracts, with the smart contracts system the government can monitor accounting run by blockchain technology, so as to increase transparency and reduce the risk of fraud.

A smart contract is a type of computer code that is placed in the blockchain. If certain conditions are met, the smart contract can run automatically without third-party intervention.

Smart contracts operate on blockchain technology that is decentralized, meaning there is no single party that controls and manages smart contracts. The information and code of smart contracts stored on the blockchain are immutable or unchangeable so that once a smart contract is implemented, changes can only occur if there is agreement from the majority of blockchain users.

These smart contracts make it easier for the government to monitor the flow of funds because smart contracts are often referred to as "smart contracts" they directly execute the agreement or terms that have been set without requiring human interaction afterwards. The application of smart contracts to blockchain systems provides transparency and effectiveness to the transaction process.

5. Advantages and Disadvantages of Blockchain

In its use blockchain has several advantages blockchain is transparent because the data recorded in this system is integrated and can be seen by anyone. Blockchain has a high security system because data that is difficult to steal or change, can only be changed by certain parties who have access to this system because of its distributed and encrypted nature. Blockchain systems require more economical costs compared to systems that have the same function, so blockchain can be the right choice to use. Compared to traditional systems, Blockchain has technology that is more capable of analyzing indications of fraud or corruption. Blockchain has lower costs compared to traditional systems because the blockchain system itself does not need to involve third parties such as banks and other parties.

But besides that, the use of blockchain also has several disadvantages, Blockchain has a system that is limited in inputting transaction volumes, and blockchain takes longer in the transaction process. The use of blockchain requires a good network because the system or workings of the blockchain depend on the network that forms the blockchain. Another limitation is the use of blockchain which is still lacking in regulation, regulations and policies for the use of blockchain are still limited

and still cannot overcome emerging problems such as money laundering and other illegal actions, this should be anticipated in the use of blockchain, but because there is no definite policy and regulation, this makes the use of blockchain cannot be applied optimally.

CONCLUSION

Corruption is an activity that is very detrimental to many parties, especially to society and the state. Data shows that the amount of corruption per capita continues to increase even though efforts to eradicate corruption have been made as much as possible. With the technology from the development of this era, it can be utilized to improve information systems and public security. One of them can utilize the role of blockchain which is a system for processing financial management transparency. Blockchain accounting records every sequence of transactions from start to finish. Then, each transaction will be entered into a block, and each block is connected to each other to form a chain so that the data is permanent. If a block is altered or tampered with, then the impact of another block cannot be found. Blockchain implements a hash, which is a unique code that is created when a new transaction is recorded. This hash is what makes the transaction logger anonymous, but can still monitor the transactions of other loggers.

This blockchain system is open to the running of state finances, so it can help convey clear transparency to the public on the financial management process. By using this technology, it can minimize the occurrence of corruption, so that the hope is that corruption cases will decrease every year. In addition, there are several ways that the government can eradicate corruption, namely by providing the best educational facilities for the nation's next generation, so that in the future it is hoped that this generation can use increasingly sophisticated technology, one of which can apply the blockchain system to eradicate corruption.

LIMITATION AND RECOMMENDATION

Research on the use of blockchain technology in the fight against corruption has significant value, but it still has some shortcomings that need to be addressed. One of the main drawbacks is that it cannot be directly applied to existing government accounting systems. This is due to the author's limitations in terms of the licensing required to integrate this technology into existing systems. Nonetheless, understanding these shortcomings can be a first step in identifying appropriate solutions to overcome these obstacles, so that the use of blockchain in the context of government can become more effective in fighting corruption.

REFERENCES

- Angelis, Jannis & Elias Riberio da Silvia. (2019). Blockchain adoption: A value driver perspective. *Business Horizon*. 62. Doi: <https://doi.org/10.1016/j.bushor.2018.12.001>
- Annur, Cindy Mutia. (2023, April 8). Gratifikasi, Kasus Korupsi Terbanyak di Indonesia sampai Oktober 2023. *Katadata*. Accessed from: <https://databoks.katadata.co.id/datapublish/2023/11/08/gratifikasi-kasus-korupsi-terbanyak-di-indonesia-sampai-oktober-2023>
- Azmi, Ilima Fitri & Alih Aji Nugroho. (2023). Sistem anti-korupsi 4.0: Adopsi teknologi *blockchain* di sektor publik. *Jurnal Anti Korupsi*. 9. Doi: 10.32697/integritas.v9i1.985
- Bandaso, Trinita Imelda et al. (2022). Blockchain Technology: Bagaimana Menghadapinya? – Dalam Perspektif Akuntansi. *Accounting Profession Journal*. 4. 98-100. Doi: <https://doi.org/10.35593/apaji.v4i2.55>
- Basri. (2022, December 9). Mulai dari Diri Sendiri dan dari Hal Terkecil, Kita Bisa Lawan Korupsi. *Kementerian Keuangan Republik Indonesia*. Accessed from: <https://www.djkn.kemenkeu.go.id/artikel/baca/15689/Mulai-dari-Diri-Sendiri-dan-dari-Hal-Terkecil-Kita-Bisa-Lawan-Korupsi.html>

- Batubara, F. Rizal et al. (2018). Challenges of blockchain technology adoption for e-government: A systematic literature review. *ACM International Conference Proceeding Series*. Doi: <https://doi.org/10.1145/3209281.3209317>
- Baza, Moch. Ravy Mauludy. (2023). Peran Teknologi Blockchain dalam Upaya Mengurangi Kasus Korupsi Penggelapan Surat Berharga. *Jurnal Hukum dan Sosial Politik*. 1. 47. Doi: <https://doi.org/10.59581/jhsp-widyakarya.v1i3.524>
- Clavin, James et al. (2020). Blockchains for government: use cases and challenges. *Digit. Gov.: Res. Pract*, 1(3), 22. Doi: <https://doi.org/10.1145/3427097>
- Dragos, Alin S. (2017, June 27). Blockchain and Financial Inclusion. *MIT Media Lab Digital Currency Initiative*. Accessed from: <https://medium.com/mit-media-lab-digital-currency-initiative/blockchains-and-financial-inclusion-f767a2347e3d>
- Einstein, Tigor., & Ahmad Ramzy. (2020). Eksistensi Komisi Pemberantasan Korupsi berdasarkan Undang-Undang Nomor 19 Tahun 2019 tentang perubahan kedua atas Undang-Undang Nomor 30 Tahun 2002 tentang komisi pemberantasan tindak pidana korupsi. *fu*, 3(2). Doi: <https://doi.org/10.47313/nlj.v3i2.919>
- Fillah, At Tafani. (2023 September 27). Teknik Hashing-Inti dari Blockchain. *Medium*. Accessed from: <https://medium.com/@attafaniff/teknik-hashing-inti-dari-blockchain-bae08756225b>
- Financial Executives Research Foundation. (2018). Blockchain for Financial Leaders: Opportunity vs. Reality. *Financial Executive International*. Accessed from: www.financialexecutives.org
- Furlonger, David., & Uzureau, Christophe. (2020). The Real Business of Blockchain (I. Gartner, Ed.). Harvard Business Review Press.
- Gunawan, H. (2015). Akuntansi Sektor Publik (Anggaran Sektor Publik). Yogyakarta: Andi, 25. Accessed from: http://www.academia.edu/download/54793453/AKUNTANSI_SEKTOR_PUBLIK_Dana_Umum_Genera.docx
- Jiantono, Angelia Cristine. (2023 May 2). Mengenal Smart Contract dalam Blockchain. Binus University School of Information System. Accessed from: <https://sis.binus.ac.id/2023/05/02/mengenal-smart-contract-dalam-blockchain/>
- Jurusan Akuntansi Politeknik Manado. (2021, September 27). Presentasi Skripsi - Analisis Peran Blockchain terhdp Sistem Akuntansi dlm Mencegah Accounting Fraud. YouTube Video. (2021, September 27). Accessed from: <https://youtu.be/42FFqMuLwL8?si=ECxJ-M2ud8br9w8L>
- Maguire, Eamonn et al. (2018). Realizing Blockchain's Potential. United States: KPMG International. Accessed from: <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/09/realizing-blockchains-potential.pdf>
- Maisondra. (2022). Semangat Aparatur Melawan Korupsi (Seri Manajemen Sumber Daya Manusia Aparatur). Bandung: CV. RTujuh Media Printing.
- Prabhat, Singh. (2023, January 2). Comparison Between Blockchain 1.0, 2.0, and 3.0. *Cyberium*. Accessed from: <https://www.cyberium.info/comparison-between-blockchain-1-0-2-0-and-3-0/>

- Pratiwi, Lady Liesdyana. (2022). Implementasi Blockchain pada Akuntansi dan Audit di Indonesia. *Jurnal Ilmiah Akuntansi dan Keuangan*. 6. 2187. Doi: <https://doi.org/10.32670/fairvalue.v5i01.873>
- Pusat Edukasi Antikorupsi (2023). Mengenal Pengertian Korupsi dan Antikorupsi. *Pusat Edukasi Antikorupsi KPK*. Accessed from: <https://aclc.kpk.go.id/aksi-informasi/Eksplorasi/20220411-mengenal-pengertian-korupsi-dan-antikorupsi>
- Sari, Erfrida Septiana. (2020, May 15). Era Revolusi Industri 4.0 Semakin Terdepan. *Harian Momentum*. Accessed from: <http://app.harianmomentum.com/read/24867/era-revolusi-industri-40-semakin-terdepan>
- Singh, Shishir Kant. (2020, May 28). How Blockchain Works. *Shishirkant*. Accessed from: <https://shishirkant.com/working-of-blockchain/>
- Snyder, Hannah. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*. 104. 333. Doi:10.1016/j.jbusres.2019.07.039
- Suharjito. (2022, July 18). Blockchain: Pengertian, Manfaat, dan Cara Kerjanya. *Binus University Online*. Accessed from: <https://onlinelearning.binus.ac.id/2022/07/18/pengertian-blockchain-serta-manfaat-dan-cara-kerjanya/>
- Suwastika, Niken. (2020). *Literature Review Pengaruh Senam Rematik terhadap Kemandirian Lansia dalam Melakukan Activity of Daily Living (ADL) di Panti Werdha*. (Thesis, Faculty of Health Sciences and Pharmacy, Muhammadiyah Kalimantan Timur University: Samarinda) Accessed from: <https://dspace.umkt.ac.id/handle/463.2017/2829>
- Syam, N. (2020). Penyebab Korupsi. *Uinsby.Ac.Id*. <http://nursyam.uinsby.ac.id/?p=526>
- Tanjung, Ahmad. (2023). Literatur Review Penerapan Teknologi Blockchain dalam Akuntansi Syariah. *Journal, Islamic Economics and Banking, Masyharif al-Syariah : Sumatera Utara*. Accessed from : <http://dx.doi.org/10.30651/jms.v8i2.19282>
- Transparency International. (2020). Corruption Perceptions Index. *Transparency.Org*. Accessed from : <https://ti.or.id/corruption-perceptions-index-2023/>
- Vasques, Geraldo. (2021, August). An Introduction to Blockchain What Does it Mean for the Accounting Profession? *CPA Journal*. Accessed from: <https://www.cpajournal.com/2021/08/18/an-introduction-to-blockchain/>