DEFINITION OF BLOCKCHAIN AND HOW TO IMPLEMENT IN GOVERNMENT ACCOUNTING SYSTEMS

Abstract

Blockchain technology has been widely recognized as a groundbreaking innovation with the potential to revolutionize various industries, including accounting. Its rapid development has raised the possibility of significant influence across different domains. In addition to enhancing operational efficiency and effectiveness within businesses, blockchain boasts several features that guarantee the reliability of information.

This research endeavor is aimed at elucidating the concept of blockchain and assessing its potential applicability within the field of accounting in Indonesia. Furthermore, it explores the practical aspects of implementing blockchain technology into government accounting systems. The research methodology employed is qualitative, utilizing a case study approach and employing strategies for explanatory analysis.

The findings of this study affirm that blockchain technology can be effectively deployed in Indonesia's context without necessitating the use of cryptocurrency as a payment instrument. The research underscores the capacity of blockchain to serve as a valuable component within the Accounting Information System. One compelling rationale behind this assertion is the inherent traceability feature of blockchain, which renders all accounting transactions amenable to tracking. The data stored within this technology is considered highly relevant, primarily due to its immutable and tamper-proof nature.

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However, it is essential to note that while blockchain serves as an invaluable database, the actual processing of data into actionable information still relies on the Accounting Information System. Blockchain, on its own, cannot autonomously transform data into the requisite accounting information. This research endeavor seeks to contribute to the body of knowledge surrounding blockchain as an accounting technology and represents an initial step in refining the concept of triple-entry accounting for practical utilization in Indonesia. This integration leverages Blockchain alongside other platforms like ERP, employing Tokens to represent assets or financial entities for recording transactions.

Keywords: Blockchain, revolutionary innovation, recording transactions, Accounting Information System

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I. INTRODUCTION

The evolution of blockchain technology is anticipated to bring about significant disruptions in well-established business processes and models. This technology holds the potential to enhance organizational operational efficiency and effectiveness, while also bolstering system security.

In recent times, numerous industries have initiated the integration of blockchain technology and embarked on research endeavors to explore its implementation within their respective domains. A survey involving 2,965 C-suite executives revealed that one-third of organizations have either actively adopted or contemplated the utilization of blockchain technology as a value-enhancing asset for their organizations (Lim and Kamaruddin, 2023).

Numerous studies have characterized blockchain as a technology with the potential for open collaboration and the exchange of various forms of information (Brender et al., 2023). It has the capacity to enhance the business value by transforming inter-organizational relationships and facilitating reliable information exchange. Current research endeavors are concentrated on identifying and enhancing the constraints associated with blockchain, particularly from the perspectives of privacy and security..

Blockchain technology has the potential to furnish formal assurances and record transaction particulars, encompassing product status, ownership, origin, and lineage. This proves valuable in enhancing transparency within the supply chain management process, establishing credibility in transactions without relying on trust in any single entity. This attribute is commonly denoted as "trustless trust" (Yavaprabhas, 2022).

Numerous operations, including those pertaining to taxes, passports, property registries, and other public services, are managed by the government sector. Blockchain technology is also being used by certain businesses, including the financial, real estate, legal, e-commerce, and digital platforms sectors.

Blockchain technology can link stakeholders to distributed data in the accounting sectors, just like it can in other businesses. Because all activities and choices in accounting should be backed by trustworthy financial and non-financial facts, data is the most powerful resource available.

According to estimates, the adoption of blockchain technology will significantly improve accounting and assurance services by safeguarding data integrity, facilitating the sharing of pertinent information, creating automatic and dependable control mechanisms, laying the groundwork for automatic assurance, and enabling an audit model that is more accurate and agile (Abdennadheret al., 2022). The advantages will be felt most keenly when integrating crucial accounting cycle functions like contract processing, document indexing, automatic payment processing, and invoice generation.

Due to the belief that it will provide some advantages for the accounting and assurance domains in the future digital era, particularly to boost its efficacy, efficiency, and security procedures through certain dependable and distributed methods, We hope to provide an answer to the question of whether blockchain technology has any possible applications in

the fields of accounting and government through this research. It is given by researching industry best practices that are documented in scholarly and trade journals.

II. LITERATURE REVIEW

1. What is a Blockchain?

A distributed database that is shared by all of the computer network's nodes is called a blockchain. A blockchain is a digital database that electronically stores data. The most well-known application of blockchains is in cryptocurrency systems, like Bitcoin, where they are essential for keeping a safe, decentralized record of transactions (Ahamad et al., 2022). The novel aspect of a blockchain is its ability to establish trust without requiring a reliable third party by ensuring the integrity and security of a data record. The blockchain system records data in a way that makes system modification, hacking, and cheating difficult or impossible.

Every block within the chain incorporates a set of transactions, and whenever a fresh transaction transpires within the blockchain, a record of said transaction gets appended to the ledger of each participant. This decentralized database, overseen by numerous participants, is referred to as Distributed Ledger Technology (DLT).

Blockchain is a specific form of DLT where transactions are documented using an unalterable cryptographic signature known as a hash. Consequently, any modification to a single block within a chain would be readily detectable as tampering. In the event that hackers aimed to compromise a blockchain system, they would need to alter each block within the entire chain across all distributed instances of the chain.
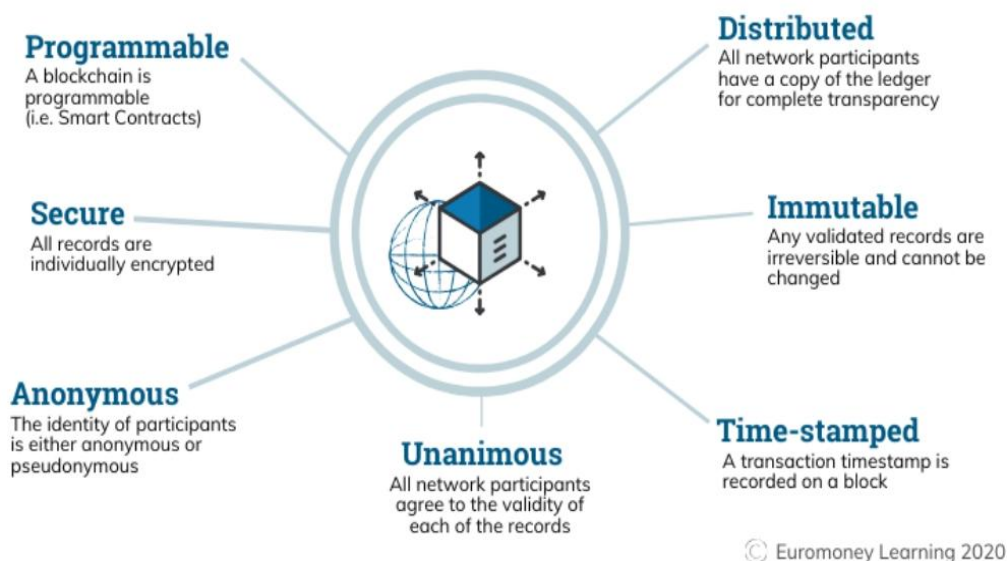

Figure 1

As the summary, Blockchain is:

- A Blockchain is a kind of shared database that keeps data in blocks that are connected together via encryption, which sets it apart from a regular database.
- New data is added to a new block when it becomes available. The data is chained together chronologically once each block is filled with data and is then chained onto the one before it.
- Digital assets are dispersed as opposed to copied or moved, resulting in an unchangeable record of the asset.
- Because the asset is decentralized, the public can access it in real time and can see it transparently.
- A blockchain can be used to store many kinds of data, but it has primarily been used as a ledger for transactions.
- .Maintaining the integrity of the document through an open ledger of changes fosters trust in the resource.
- Blockchain is a top technology for practically every industry because of its public ledger and built-in security features.

Blockchain is a particularly groundbreaking and promising technology since it eliminates fraud, lowers risk, and provides transparency in a scalable manner for a wide range of applications.

2. How Does Blockchain Work?

The entire purpose of utilizing a blockchain is to enable the safe, tamper-proof sharing of important data between individuals, especially those who lack mutual trust.

Blockchain consists of three important concepts: blocks, miners and nodes.

- **Blocks:** Each chain is made up of several blocks, and each block has three fundamental components:

  ➢ The block's contents.
  ➢ A nonce, which is a 32-bit whole number. When a block is constructed, a random nonce is generated, which in turn produces a block header hash.
  ➢ A 256-bit integer married to the nonce is the hash. It must begin with an enormous amount of zeros, meaning it must be incredibly small.

  The cryptographic hash is generated by a nonce at the creation of the first block in a chain. Until it is mined, the data in the block is forever linked to the nonce and hash and is regarded as signed.
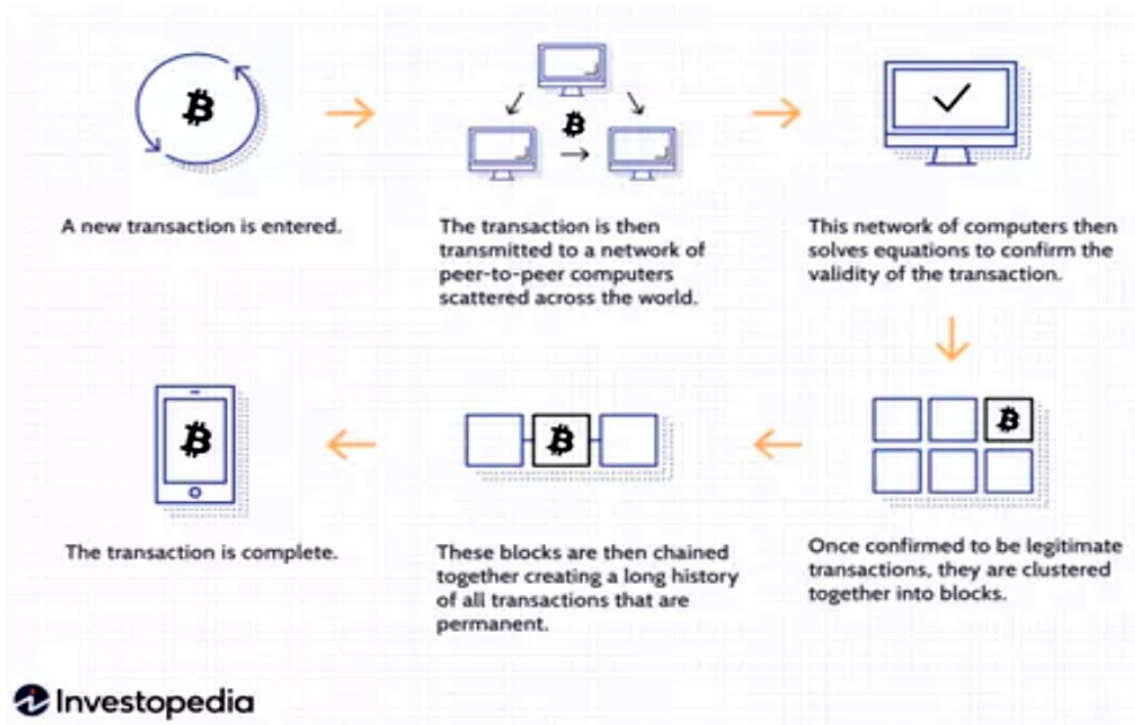
Figure 2

- **Miners:** Mining is the process by which miners add new blocks to the chain.Mining a block on a blockchain is difficult, especially on long chains, because each block has a unique nonce and hash and also refers to the hash of the block before it in the chain.

  The exceedingly difficult arithmetic challenge of locating a nonce that produces an approved hash is solved by miners using specialized software. There are about four billion possible nonce-hash combinations that must be mined before the correct one is identified because the nonce is just 32 bits and the hash is 256. Miners are considered to have discovered the "golden nonce" at that point, and their block is appended to the chain.

  Any block that has been modified earlier in the chain necessitates remining every block that follows it as well as the original block. This is the reason that working with blockchain technology is really challenging. Since obtaining golden nonces takes a significant amount of time and processing resources, consider it "safety in math."All of the network's nodes accept the change when a block is successfully mined, and the miner receives payment.

- **Nodes:** Decentralization is one of the key ideas in blockchain technology. A single computer or entity cannot be the owner of the chain. Rather, it functions as a distributed ledger across the chain's nodes. Any type of electronic equipment that saves copies of the blockchain and keeps the network running can be called a node.

  Each node has a copy of the blockchain, and in order for the chain to be updated, trusted, and validated, the network must algorithmically approve each newly

mined block. Every transaction in the ledger can be readily verified and observed since blockchains are transparent. A distinct alphanumeric identification number that displays each participant's transactions is provided.

By integrating open data with a check-and-balance mechanism, the blockchain is able to preserve its integrity and foster user confidence. In essence, blockchains are just the technological scalability of trust.

3. **Uses of Blockchain -- Cryptocurrencies: The Beginning of Blockchain's Technological Rise:** The most prominent application of blockchain technology, which is often both celebrated and contested, is in the realm of cryptocurrencies. Cryptocurrencies, such as Bitcoin, Ethereum, or Litecoin, are digital currencies or tokens that serve as a means of purchasing various goods and services. Similar to digital cash, cryptocurrencies enable the acquisition of items ranging from daily meals to future homes. However, unlike traditional cash, cryptocurrencies leverage blockchain technology to function as both a transparent public ledger and a robust cryptographic security system, ensuring that all online transactions are perpetually documented and safeguarded.

Cryptocurrencies are digital forms of currency that rely on blockchain technology to meticulously record and safeguard each transaction. Take Bitcoin, for instance, which serves as a prime example of a cryptocurrency. It can function as a digital equivalent of physical cash, permitting the payment for a wide range of items, from everyday necessities to substantial investments like automobiles and residences. Acquiring cryptocurrency involves using digital wallets or trading platforms, and when it's used to purchase something, the blockchain steps in to document the transaction and confirm the new owner. The allure of cryptocurrencies lies in the fact that all activities are meticulously logged within a public ledger and fortified through cryptographic means, resulting in an indisputable, time-stamped, and secure history of every financial transaction.

4. **Ethereum blockchain:** Initially conceived as the exceptionally transparent ledger system to underpin Bitcoin, blockchain technology has traditionally been closely linked with cryptocurrencies. However, its remarkable transparency and robust security measures have fueled its increasing adoption across various domains, with much credit attributed to the evolution of the Ethereum blockchain.

In the latter part of 2013, developer Vitalik Buterin, hailing from Russia and Canada, released a white paper outlining a platform that merged conventional blockchain capabilities with a notable departure: the ability to execute computer code. This marked the inception of the Ethereum Project. The Ethereum blockchain empowers developers to craft intricate programs capable of interacting with each other within the blockchain environment.

Tokens: Programmers using Ethereum can build tokens to represent any type of digital asset, track who owns it, and have them carry out specific functions based on a set of programming instructions.

The potential for blockchain technology to penetrate other industries, such as identity security, government, and media, has increased due to its newly discovered applications. Presently, many of businesses are investigating and creating products and ecosystems that are solely dependent on the emerging technology.

Blockchain is upending the status quo of innovation by enabling businesses to test-drive cutting-edge technologies like decentralized news media platforms and peer-to-peer energy delivery. The ledger system's applications will only change in tandem with technological advancements, much like the meaning of blockchain.

5. **Financial Tool:** Since cryptocurrency is a digital money that is used in blockchain, some people believe that if blockchain technology is employed, cryptocurrency must be used as a payment method. Blockchain has the benefit of not being constrained by cryptocurrencies.

Hyperledger Fabric is only one of many blockchains that function without the need for cryptocurrencies. A law in Indonesia forbids the use of cryptocurrencies as a form of payment. According to Informant 1, there are two approaches to enhance the blockchain-based accounting system without utilizing cryptocurrencies as a mode of payment;

- Recording transactions with the token serving as the Indonesian Rupiah's representation. The token that is employed by blockchain to record transactions as a payment method isn't a cryptocurrency, but rather a representation of material or monetary assets;

- Using blockchain more like a database, this method does not need cryptocurrency or token.

6. **Uses of Blockchain – Government Accounting Information Systems:** Blockchain is an accounting technology primarily focused on asset ownership transfer and the meticulous maintenance of a precise financial ledger. In the realm of accounting, the profession encompasses the evaluation and dissemination of financial data, along with its thorough analysis. A significant portion of this profession revolves around the determination or quantification of property rights and responsibilities, as well as devising optimal strategies for resource allocation. The utilization of blockchain technology by accountants offers enhanced transparency regarding asset ownership and the existence of obligations, potentially leading to substantial improvements in efficiency.

Blockchain technology holds the promise of revolutionizing the accounting profession through its capacity to minimize ledger maintenance and reconciliation expenses, while simultaneously ensuring unambiguous documentation of asset ownership and historical records. It has the potential to enable accountants to attain a deeper understanding of their organizations' available resources and commitments, liberating valuable resources that can be directed toward strategic planning and valuation activities rather than the meticulous task of record-keeping.

In conjunction with other automation trends like machine learning, blockchain technology is poised to drive a shift towards increased transactional-level accounting; however, these tasks won't necessarily be handled by accountants themselves. Instead, the accountants who thrive will be those who specialize in evaluating the genuine economic implications of blockchain records, aligning these records with economic realities and valuation. For instance, in the context of due diligence for mergers and acquisitions, the distributed consensus achieved through key figures grants more time for the assessment of critical areas and advisory services, ultimately expediting the entire process.

Through the elimination of reconciliation tasks and the assurance of transaction history, blockchain has the potential to expand the domain of accounting. It can encompass areas that are currently considered too complex or unreliable to quantify, like assessing the value of government-held data.

7. **Implement in Government Accounting Systems:** Because of its useful, The development of Blockchain in Indonesia attracts the government's interest to use this technology as well.

Public procurement is a business with important values that includes the purchase of goods and services as well as infrastructure projects including bridges, buildings, roads, hospitals, and universities. According to a 2016 report from The Organization of Economic Developed Countries (OECD), public procurement budgets in OECD member nations account for 15% of GDP on average.

This illustrates the enormous amount of money that needs to be allocated. In Indonesia, the State Budget (APBN) is made up of Rp. 2.080 trillion, or almost 30% of the budget for public procurement (Ministry of Finance, 2017). This position is thought to get 60% of all foreign aid (Transparency International, 2017). According to an OECD report from 2016, Indonesia's public procurement management is ineffective, opaque, and less accountable, costing the country over US $15 billion annually. According to data gathered by the Corruption Eradication Commission (KPK), the most frequent type of corruption in Indonesia over the period of July 1st to December 31st of 2015 was related to public procurement budget corruption. Economic development is hampered by corruption, which is why Indonesia experienced a financial crisis in 1997. (Dwi Asih & Yayan Nuryana, 2019) The implementation of an electronic procurement system is one of the numerous measures the government has taken to prevent corruption in public procurement. However, only 30% of the entire public procurement budget is controlled using an e-procurement system, which is why the adoption process is moving more slowly than anticipated (Transparency International, 2017).The Indonesian government created an e-catalog system in 2013 to combat the sluggish uptake.

The electronic ordering system is called e-cataloque. Over 66,000 (sixty-six thousand) different kinds of products have been registered on the system up to this point. Regretfully, there are still certain drawbacks with the government-prepared e-cataloque system. Transparency International Report (2017) lists the following benefits of an e-catalogue system that includes many items:

- Is unable to access certain crucial procurement documents, such as contract details, bidding documents, and so on;
- Data on tax revenues, budget allocations per organization, budget titles, and rural budget transfers are only provided at the account level and are not detailed until the transaction level.
- Data that is presented in various formats and isn't necessarily machine-readable;
- The government doesn't actively encourage public procurement data to be publicly available on the internet;
- Data supplied online do not give sufficient documentary evidence;
- Information that could explain the data's provenance is not available;
- There is no standard data format for publication purposes..

Moreover, according to Transparency International's 2017 report, there is currently no formal mechanism in place to provide official feedback on government-published data. This research is driven by the argument that Indonesia, as a supporter of the Sustainable Development Goals (SDGs), has a vested interest in improving the efficiency of government budget utilization, especially in public procurement funds. The consequences of corruption due to inefficient allocation of public procurement funds are substantial, estimated at approximately USD 15 billion per year (Transparency International, 2017). Misallocation of these funds runs counter to the SDGs 2030 objectives, which encompass critical areas like poverty reduction, food security, health, education, climate change mitigation, and various socio-economic and environmental sustainability goals. Developing countries like Indonesia require substantial investment in essential infrastructure, including roads, railways, ports, water, sanitation, electricity, food, health, and education facilities, amounting to an estimated $3.3 trillion to $4.5 trillion annually (United Nations Conference on Trade and Development/UNCTAD, 2014a). The role of the Public Sector is pivotal in achieving SDGs, making the implementation of good governance practices critically important. The sluggish implementation of good governance, coupled with weaknesses in rule of law enforcement and the judicial system, serves as a primary driver of corruption in Indonesia (Martini, 2012; World Bank, 2010). As reported by Transparency International in 2018, Indonesia's corruption ranking in 2017 was 96 out of 176 countries, with a score of 37 on a scale of 100.

Yermack proposed that blockchain technology could serve as a viable alternative in the battle against corruption. A significant advantage of blockchain lies in its potential to significantly reduce the occurrence of fraudulent activities. Within the blockchain system, creating fictitious assets becomes exceedingly challenging, backdating transactions is rendered impossible, illegal capitalization of operating costs is prevented, and so forth. By enabling real-time accounting transactions, blockchain technology ensures the integrity of the data it generates, reducing the criticality of auditing or adhering to financial reporting standards.

Because of this, the application of Blockchain technology in the field of financial accounting has the potential to address issues related to stakeholder trust, communication errors, and asymmetric accounting information. Asymmetric accounting information is one of the most frequent mistakes made when compiling and analyzing the economic-

financial data related to government performance. In a different recent theoretical study on the value of blockchain technology and its applicability to accounting, Demirkan, Demirkan, and McKee (2020) noted that transactions can be measured, verified, and classified using this system without the need for middlemen. Future cost reductions for the government will result from this, and stakeholders will naturally benefit from the highest level of transparency. Furthermore, the adoption of the Blockchain system in accounting necessitates a constant audit for each transaction and is directly tied to the credibility of the data provided by the government.

The OJK permits banks and financial institutions to employ blockchain technology due to its potential to enhance internal banking operations with minimal operational expenses, resulting in increased efficiency. Additionally, the adoption of blockchain technology within OnlinePajak was disclosed in 2018. This implementation aims to bolster tax transparency and simplify the tax payment process for taxpayers. The utilization of blockchain in OnlinePajak will enable interested parties to maintain a comprehensive record of each tax payment transaction.

8. **How to Implement Blockchain in Government Accounting System:** We employ the Third-Entry mechanism to integrate blockchain technology with the government accounting system. Thus, a Double-Entry system serves as the foundation for modern accounting (Sangster & Scataglinibelghitar, 2010). However, since there isn't actually a connection between the government ledgers, either one of them or both might corrupt the data, we cannot speak of an infallible system. The government was anticipated to share data with external users as a result of its development and operations, but there is no way to verify that the information is accurate, which is why auditors must be present.

The cost and amount of time needed for all of this should be taken into account by the auditor. That being said, double-entry bookkeeping is still relevant. Conversely, we understand its whole validity and transcendence. Users have to represent the real data.

Furthermore, as we have already noted, the Double-Entry approach has seen numerous revisions, the rise and development of new technologies, as well as the recent economic and financial crises.

We should highlight the current paradigm's emphasis on the cash flow of the company, which is demonstrated by the switch from Cash Flows Statements (CFS) to Annual Accounts in bookkeeping. It shows the changes over time in an entity's cash (cash and demand deposits) and cash equivalents. "Cash equivalents" refers to a class of current asset that is very easily convertible into cash and is highly liquid.

Lev, Siyi, and Sugiannis (2010) conducted a thorough empirical analysis and concluded that cash flows are a more reliable indicator of organizational performance than accounting profit alone. This is how important they are. The goal of CFS is to gather all transactions pertaining to the cash flow of the government. Consequently, it offers details about the source and utilization of current assets, specifically cash and cash equivalent movements categorized by activities and showing adjustments to net assets within the accounting year (Pascual, 2017).It draws attention to how the inflows and outflows from operating, investing, and financing activities affect the amount of cash

generated during a certain time period. CFS is helpful because it gives the economic entity and the person in charge of financial reporting a foundation for evaluating a company's capacity to produce cash and its equivalents as well as the requirements for using them in upper management and administration (Rivero, 2015). However, we do not currently have a common framework that unifies the creation of Cash Flow Statements because there are numerous procedures that have been developed based on the rules and norms included in the common Accounting Plan.

That being said, the Triple-Entry Method, also known as Triangular Accounting, involves adding a record to each entry and enabling the tracking of cash flows. For the flows, in addition to the debit and credit entries, a third item will be entered, resulting in three items rather than two. It is meant to be a logical progression, an addition to the current accounting, rather than a new accounting system or a different kind of accounting, according to Arjona (2012).

According to Ibanez (2018), cash flow reported in the journal entries represents changes in cash, which might be financing or investment flows rather than changes in cash that necessarily correlate to cash movements. This offers triple data and CFS preparation, presumably leading to an enhancement in dual accounting. Thus, as a systemic improvement, Triple-Entry bookkeeping aligns with Double-Entry bookkeeping, as if it were the emergence of a third accounting dimension that allows for the codification of a third, distinct from the two dimensions (Debit and Credit) that we have been using for over six centuries: the movement of flow (Arjona, 2015).

We assume that every user on Blockchain has a distinct, nontransferable digital signature because a receipt is signed using their digital signatures during the transaction process. We can thus conclude that this is an improvement over the current accounting system because the accounting entries produced by state-owned and government-owned businesses are cryptographically sealed by a "third entry" created by the network itself and are accessible to all parties concerned. The final receipt, or "third entry," bears the digital signatures of each party and is a highly significant record of the transaction.

Triple accounting, according to Ibanez (2018), is the direct link (P2P) between two operators and the proof record provided by the node network. Without the assistance of third parties, operations are automatically reconciled and documented, making everyone concurrently aware of the processes in decentralized registries.

As a result, it is no longer necessary for internal accountants, auditors, or outside specialists to provide documentary support (such as delivery notes and invoices) and confirm that the supports and the accounting entry system are consistent. Let's think about the next illustration. In the traditional approach, subject A logs in his or her Journal during a transaction to have sold a certain amount of commodities, and subject B logs in to have made a purchase. On the other hand, if we utilize blockchain, both parties will digitally sign a receipt attesting to the fact that the products were delivered in return for the agreed upon amount. Through Blockchain, the issued receipts A and B form an unchangeable, encrypted record of the transaction. The entries appear to be nearly impossible to manipulate because they are dispersed and cryptographically sealed. View the whole paper on the development of cryptographic functions by Preneel (2010).

Similar to this, Gonzalez (2018) asserts that if transactions are entered into both parties' ledgers, a third party—the chain of blocks—would eventually appear, creating a Triple-Entry system that will simplify and automate audit procedures. Triangular accounting, cryptography, and blockchain are methods of reaching a consensus on an objective reality. They are two components that describe a version of historical events made possible by an exportable system that can be independently verified and is easier for computers to handle. Just having the government use the Triple-Entry bookkeeping approach might have two notable effects right away. First off, this would greatly ease the burden on auditors, as most of the information in the financial accounts could be swiftly and readily verified. This would save a great deal of money and effort. This would enable them to concentrate their attention on the areas, like internal control, that carry the most control risk. Second, there would be more security and dependability in the government's yearly financial accounts and the data they contain. Remember that completed transactions cannot be forged since they need the counterpart's encrypted signature to be recognized as legitimate.

It is also necessary to consider the potential benefits for each government's internal accounting. Recorded transactions will be more dependable because they can be easily checked and will be the same for every person involved in the transaction because entries are made directly on the blockchain.

A nodal network simultaneously captures the same data on the blockchain as the first part of the transaction, the second part of the transaction, and the accounting entries of three groups of subjects are synchronized in automated Triple-Entry bookkeeping, according to Ibanez (2018). This is critical because it allows the company to save money on internal audits and countless conciliation fees that would otherwise be incurred by using a legal contract to carry out routine operations. Additionally, it enables the avoidance of those connected to outside advertisements and transaction records.

As a result, proving receipt of the parties' consideration for the purpose of a final mutual assessment and proving final knowledge of the actuality of the asset exchange are not required. This is a significant benefit because it means that the information in the network itself, rather than the parties' internal or external auditors or mutual control, now ensures the legitimacy of accounting entries.

We recognize the graphic and emotive nature of the Triple-Entry bookkeeping expression discussed before. Naturally, a transaction done through the new third entry, which is in line with Blockchain, will be more trustworthy than one made through the Double Entry system since it is evidence of a transaction between two interested parties.

We acknowledge, however, that referring to qualified or validated Double-Entry bookkeeping—where the Double-Entry matches for both parties—and the Blockchain transaction verification would be equally accurate.

By whatever term, we believe the DLT ecosystem to be clearly better to traditional accounting. One way is through the instantaneous access to accounting information stored in distributed records by authorized nodes. On the other hand, when they have economic content that needs to be legally documented, Tan & Low (2019)

describe how smart contracts built on the Blockchain are used as programs that initiate transaction orders. The program's actual execution is documented in the Blockchain, supporting, receiving, and providing evidence of the exchange that took place concurrently across all the computers of the parties involved and of any other parties permitted to communicate data across the network.

Taking everything into consideration, we can state that the Triple-Entry bookkeeping method has many benefits, including ease of auditing, openness, trust, and reconciliation. With the help of such a system, accountants and other relevant parties will be able to reconcile account balances, transactions, and reporting procedures, enabling government and state-owned businesses to fully trust their own journal books. Because Triple-Entry bookkeeping in Blockchain keeps an impartial record, it lowers these present hazards. The implementation of the Triple-Entry system could potentially enhance the position of smaller state-owned firms and facilitate their expansion by providing them with an affordable means of showcasing their operations to external stakeholders.

III. METHODS

This research involved a conceptual analysis approach, wherein an extensive exploration of scientific literature was carried out by examining eight references in the fields of accounting, technology, information systems, and government. The collection, extraction, classification, and interpretation of all secondary data from various manuscripts were rigorously conducted using systematic and scientific methodologies. The research was conducted over a period from December 20, 2021, to December 23, 2021. Throughout this research, a desk research methodology was employed, facilitating discussions and synthesis among researchers. The study was performed utilizing a Systematic Literature Review (SLR) approach, primarily for two key reasons: to maximize the quality of evidence and minimize the potential for bias, in line with previous research (Beecham et al., 2008; González et al., 2010; Kitchenham et al., 2007). The SLR approach comprised at least five key steps, which were applied as follows:

1. **Research Identification:** In this initial phase, we formulated a clear research objective and established our chosen research methodology. The overarching objective of our research is to impart knowledge regarding blockchain technology. The central research question addressed in this paper can be succinctly stated as follows: What exactly is blockchain, and how can it be effectively integrated into government accounting systems?

2. **Search Strategy/Study Selection:** Creating a study procedure, selecting a database journal or other relevant resource, and creating search logic for every database are all included in this phase. For the research methodology, we created various inclusion and exclusion criteria as well as word variants, synonyms, spelling variations, and plural-singular forms.The media of its resources consist of the magazine, white paper, and other professional publications.

3. **Data Extraction/Quality Assessment:** We were figuring out what the minimal requirement was for more in-depth understanding and analysis. We carried out the two-

step data extraction process using the above-mentioned searching method. The first stage is extracting the paper collection using the abstract and paper title. The paper is eliminated when it falls below the predetermined standard, and the second extraction process is then carried out when the paper is judged to be above the predetermined level. The entire text of the document is read in this last extract. We also created the reading list during this step using the information we discovered in the set primary manuscripts.

4. **Data Analysis:** To determine the given criteria, we carried out an internal peer review procedure. We addressed a number of the paper's issues and cross-checked each other's papers.

5. **Research Synthesis and Report Preparation:** Combining the data gathering and modifying it to fit the format of the study report. We generate a report written in this paper as well as the research synthesis during this process.

IV. RESULT AND DISCUSSION

1. **Result:** The outcome of this study supports the theory that blockchain represents an accounting technology that can be successfully employed in Indonesia without the necessity of utilizing cryptocurrency as a means of payment.

Blockchain has the potential to serve as a database engine for applications within the realm of accounting information systems, as these systems are computer-based methods designed to monitor a company's accounting and business activities.

Blockchain primarily serves the purpose of ensuring data security, while the actual process of transforming data into information remains the responsibility of the accounting information system. It's important to note that blockchain doesn't possess the capability to autonomously convert data into the required accounting information.

Another noteworthy implication of this study pertains to practical applications. The concept of triple-entry accounting, suitable for implementation in Indonesia, involves integrating blockchain with other platforms like ERP. This integration allows the triple-entry accounting model to incorporate tokens as representations of assets or financial items in transaction records.

This approach involves utilizing a private blockchain, which necessitates permission for participation within the network. Consequently, each company interested in adopting this technology can customize its blockchain model to align with its specific requirements. Notably, all accounting transactions have the potential to be traceable through blockchain.

The data within this technology can be regarded as highly relevant information due to blockchain's inherent characteristics of recording and preserving data in an unchangeable and tamper-proof manner. Therefore, blockchain serves as a database, while the processing of data into meaningful information continues to be executed by the Accounting Information System.

This study is anticipated to contribute to the advancement of the theory surrounding blockchain as one of the accounting technologies. It also represents an initial stride toward enhancing the applicability of the triple-entry accounting concept in Indonesia. This is achieved through the integration of Blockchain technology, with support from other platforms like ERP, and the utilization of Tokens as representations of assets.

2. **Discussion:** Financial frauds have been, are, and will continue to be intelligence crimes that have a detrimental impact on society, investors, the government's standing, and the economic and financial conditions of the nation in which they operate. While corruption in government is a major issue, it is estimated that public budget procurement monies are misused to the tune of USD 15 billion annually (Transparency International, 2017).

According to Transparency International's (2018) reports, the corruption index of the Indonesian government in 2017 was 37 out of 100, placing it 96th out of 176 countries. This indicates that blockchain technology is a good option for eminently countable data because it not only archives data but also dynamically settles and organizes it. They can also have economic content added to them and be visualized. It reduces operating expenses and makes the record public to all users after a transaction is completed (Catalini & Gans, 2016; Iansiti & Lakhani, 2017). According to Dolader, Bel, and Muñoz (2017), this suggests that transactions are transparent and cannot be changed or influenced afterwards.

González (2018) suggests that clarity and openness about accounting data creates new opportunities for cooperative compliance, both domestically and globally (Kwilinski, 2019). The goal of a blockchain ledger is to update and record every transaction that takes place with different counterparties both inside and outside the organization. However, this will only be carried out in the event that the transaction itself is the transaction input. In this scenario, all transactions will have to be made as "token" transfers within the blockchain—which are understood to be digital transfers of the company's FIAT money. This is only feasible if all parties have already implemented the blockchain system. Notwithstanding these benefits, it should be mentioned that the system can write and keep transactions that are exclusive to the organization while it is isolated, and that transactions might occasionally be hard to locate.

Despite all of its uses, blockchain is an excellent technology for accounting because it allows data to be dynamically settled, organized, displayed, and provided with economic content in addition to being archived. ts adoption in accounting will proceed in a manner akin to that of other technologies, which have developed from inception to adoption. A DLT with unique qualities is called a blockchain, however not all DLTs are blockchains. Simply put, a DLT is a decentralized database that is maintained by multiple parties. We believe that, because to its extensive and versatile nature, it would be a more suitable fit for accounting, the topic of our study, than Blockchain.

Analogously, we have demonstrated that the Blockchain, which powers the cryptocurrency Bitcoin, is not the best application for accounting. Other forms exist as well, such Quorum, which allows for both private transactions and the development of a semi-permissioned network where participation requires a request but public data

consumption is free. Furthermore, we attain increased agility by substituting another system that performs actions and transactions for the mining. One of the things we believe this study has contributed is that we have attempted to clarify some of the terminological misunderstanding that we have identified in the revised literature.

We are referring to the previously discussed misunderstanding between DLT and Blockchain. The ideas of double and triple entry bookkeeping, as well as double and triple entry bookkeeping, were also changed. particularly the analogy between Blockchain and ledger. One of the reasons we have argued that academic accounting research should collaborate with programmers and technicians to examine how Blockchain is being used in businesses both now and in the future is the aforementioned. A constant conversation between technology and accounting, to which we belong, would be ideal. We support the need for retraining for accountants so they can better grasp technology and use it, working together to develop Blockchain solutions. In order for businesses to embrace new technology and avoid creating a divide between small and large enterprises, their advisory role is crucial. They must approach accounting from the standpoint of the value the technology may bring to the company rather than the perspective of data and transactions. We believe that the function of accountants will evolve from that of simple bookkeepers to that of financial consultants.

Triple-entry bookkeeping records a third entry for cash flows in addition to debit and credit entries, resulting in three entries rather than two. Furthermore, it is ensured that the accounting entries made by stakeholders are same. Therefore, in order to ensure a final mutual verification of the reality of the asset exchange, it is not required to provide proof of receipt of the parties' consideration. Consequently, the information in the network itself ensures the authenticity of accounting entries rather than the mutual control between parties or their internal or external auditors (Schmitz & Leoni, 2019). The inability to alter accounting information will serve as a conflict-reduction tool and significantly boost stakeholder, investor, and societal trust.

Because openness fosters confidence in the veracity of records, we think that this study helped predict the early adoption of Blockchain in accounting. The enjoyment of real-time accounting information, cost savings, the advancement of analytical methods, and the battle against fraud and corruption should all be added to this. These benefits would be available to all businesses, regardless of size, not only big businesses. Among the drawbacks, it is important to highlight the paucity of study on the subject and the absence of comprehensive protocols outlining how blockchain may be used in accounting and auditing.

After doing so, we think it would be crucial for the government, regulators, accountants, and auditors to reach an understanding. Regarding future research directions, we eagerly await the start of blockchain's implementation in accounting and auditing within organizations, conducting a case study and evaluating the benefits that result from its application. Up until it reaches maturity, blockchain technology will continue to develop through a process of technological modification and development (Fullana & Ruiz, 2021). It will surely keep integrating with other technologies, including cloud computing and artificial intelligence, and it will also support research in fields like bookkeeping where it can have the most positive effects.

V. CONCLUSION

Numerous advantages of blockchain technology include decentralization, persistency, auditability, and anonymity. Applications for blockchain technology are numerous and include public and social services, risk management, financial services, cryptocurrencies, and the internet of things (IoT).

For any type of asset registry, inventory, and exchange, including every aspect of finance, economics, and money, block chain is a comprehensive information technology with tiered technical levels and multiple classes of applications: hard assets (physical property, such as homes and cars) and intangible assets (votes, ideas, reputation, intention, health data, information, etc.). However, the blockchain idea is much more than that. It represents a novel paradigm shift in organizing that might enable the coordination of human activities on a far greater scale than previously feasible as well as the discovery, pricing, and transfer of any quanta (discrete units) of anything.

Accounting, and Accounting Information Systems in particular, can benefit from blockchain technology. The Accounting Information System will be improved in the future by recording transaction data that has been previously approved by network nodes before the data is placed into the blockchain. Blockchain databases make it easier for Accounting Information Systems to browse pertinent data, which may then be organized into financial reports by using the data as a reference.

The accounting profession is still required to evaluate and arrange financial reports based on the data extracted from the blockchain, despite the fact that blockchain is a set of data structures used in technology and that it can automate transaction records by using smart contracts. Later on, Indonesia can apply the triple-entry accounting concept by using blockchain as a way to record transactions in other platforms, such ERP. This application of blockchain seeks to prevent data modification by attaching a timestamp to each transaction.

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