APPLICATION OF TRIPLE-ENTRY BOOKKEEPING WITH BLOCKCHAIN TECHNOLOGY AS AN EFFORT TO PREVENT ACCOUNTING FRAUD

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ABSTRACT

This study aims to find out how blockchain technology which is very popular in the world of cryptocurrencies can be applied to accounting as an effort to prevent accounting fraud. Where blockchain technology is packaged as a triple-entry recording system so that the level of security of recording transactions becomes more transparent and makes audit trails easier. The research method in this study is by descriptive and qualitative analysis methods, namely by collecting, presenting and analyzing the information / data obtained so that a fairly clear picture of the problem discussed can be obtained. The results of this study show that the application of triple-entry bookkeeping with blockchain technology offers the benefits of traceability, punctuality, protection against manipulation and high transparency. Triple-entry bookkeeping is a solution to solve transparency issues and fraud activity problems that have not been completely resolved so far.

Keywords: Triple-entry Bookkeeping, Blockchain, Accounting

INTRODUCTION

The world of accounting and finance has always been haunted by the threat of fraud. Although various efforts and many methods of preventing fraud have been carried out over the years, the threat of fraud is still the biggest concern in running a business. According to a report from The Association of Certified Fraud Examiners (ACFE), in 2018 the number of losses suffered by a company for fraud was estimated at around 5% of the company's gross revenue. Not only that, this act of fraud usually involves not only commissions on the scheme itself, but also various other commissions as an effort to hide mistakes. (ACFE, 2018).

One of the most effective methods of fraud prevention is to make fraud itself very difficult to hide; namely by increasing the transparency of accounting information. The IFRS standard, which is the basis of the financial reporting system, aims to bring transparency and accountability to financial markets, promoting financial confidence, growth, and stability in the global economy (IFRS, 2019). Transparency of accounting information plays an important role in decision making for stakeholders, especially investors. Until now, various efforts to increase financial transparency have been carried out. Various systems have been designed to be able to increase transparency and accountability of financial statements to minimize the occurrence of fraud, but in practice it is very difficult to be able to apply the principle of massive transparency of accounting information. Because until now there is no effective way to be able to make financial information truly transparent.

It is undeniable that the practice of fraud has developed and been rampant for centuries and until now the intensity of the practice of fraud is still very high and cannot be eradicated to its roots. For more than 600 years, modern financial accounting has implemented a double-entry recording system to minimize fraud. This double-entry recording system facilitates the creation of accurate financial reports and reduces fraud activities. Double-entry accounting allows fraud or fraud to be

detected early and recording errors can be checked and corrected easily (A, 2021).

The double-entry bookkeeping system is one of the most significant breakthroughs in enterprise and trading. Double-entry bookkeeping is a revolution of the single-entry system which contains many disadvantages. The single-entry system relies on a simple list of assets in which assets are entered and as they enter and exit the company it is crossed out. The constraints of such a system are quite obvious because errors are almost imperceptible, making fraudulent activities very easy. The double-entry bookkeeping system leaves a trace for each transaction because assets and liabilities must be balanced and the transactions that occur must be matched which results in the double-entry system not being as easy to manipulate as easily as a single-entry system. However, on the other hand, there are issues that arise and still cannot be resolved regarding this recording system, namely the issue of trust, and transparency from outside the company, especially investors. Until now, the double-entry recording system has not been able to guarantee that trust and transparency will be fulfilled.

As we know that the role of auditors is very important in order to mediate trust and transparency for parties outside the company. Auditors have the task of ensuring the integrity of the company's financial information. But as is well known, auditing activities are costly, require a lot of labor, and especially take a lot of time (Cai, 2019). Based on the results of a survey from the Association of Certified Fraud Examiners (ACFE) Indonesia in 2019 which corresponds to auditors in uncovering fraud, it is stated that the majority of types of fraud take 12 months to be able to detect fraud, be it corruption, asset misuse or financial statement fraud. The following is a presentation of data about the timing of fraud detection:

Jangka Waktu Fraud bisa Terdeteksi	Korupsi	Fraud Laporan Keuangan	Penyalahgunaan Aset/Kekayaan Negara & Perusahaan
0-12 Bulan	84,1%	93,7%	91,2%
13-18 Bulan	2,1%	1,3%	1,7%
19-24 Bulan	9,6%	3,3%	4,2%
25-30 Bulan	0,4%	0,8%	
31-36 Bulan	2,5%	0,5%	0,8%
>36 Bulan	1,3%	0,4%	2,1%

Source : 2019 Indonesian Fraud Survey by ACFE Indonesia
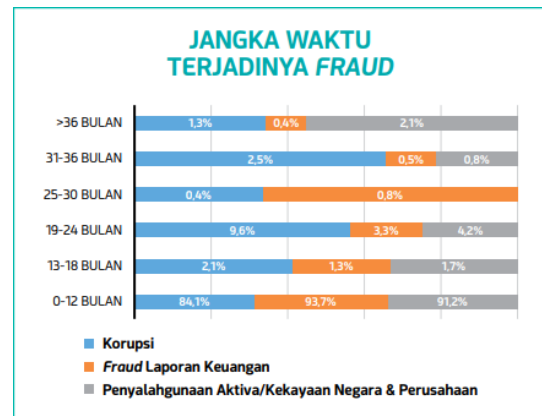
Source : 2019 Indonesian Fraud Survey by ACFE Indonesia

Therefore, a new breakthrough is needed as a preventive measure in preventing fraud as early as possible. The importance of eradicating fraud to its roots gave rise to a new idea in the accounting recording system, namely triple-entry bookkeeping or a three-time entry bookkeeping system.

THEORETICAL BASIS

Triple-entry bookkeeping

Triple-entry bookkeeping is an extension of the double-entry system that has been used since the 16th century. Departing from the weaknesses of the double entry bookkeeping system, the idea of triple-entry bookkeeping was initiated by Ian Grigg (2005), a cryptographer, who proposed a solution to deal with recording errors and fraudulent activities in the field of accounting, where two transacting parties would be confirmed by a third party as the third entry registrar. Grigg argued that the company should not be the sole registrar of business transactions.

In this third entry the recording of transactions is supported by a "receipt" signed with digital cryptography by both parties to the transaction. (Cai, 2019). This receipt can be seen by interested parties to the receipt to avoid transaction fraud and reduce redundancy in internal records. This triple-entry recording concept allows every transaction data to be tracked for its validity and provides strong evidentiary power when talking about the issue of accounting information transparency. Ian Grigg (2005) proposes major conceptual advances for business recording systems with triple-entry bookkeeping systems that are decentralized, irreversible, secure and transaction validation more difficult to argue with. The concept of Ian Grigg is what allows triple-entry bookkeeping to be applied with blockchain technology which is currently used as a recording system for cryptocurrencies.

Blockchain and Accounting

The idea of blockchain first emerged in 2008 as a technology to support cryptocurrencies. Blockchain is a distributed ledger technology that utilizes a decentralized network of nodes that provides a level of trust to verify transactions without the involvement of intermediaries. (Linh Phan, 2019). Blockchain is designed as a peer-to-peer network that uses cryptography. Yli-Huumo (2016) said that by providing a decentralized and tamper-proof system, blockchain is believed to improve the security, data integrity, and transparency of information or assets without the need for centralized authority.

So how does blockchain work? If the traditional system requires an intermediary such as a bank or payment processing company to verify transactions when one party wants to transfer money to another party, with peer-to-peer blockchain technology, transactions can take place in the absence of a third party as a verifier. Each owner has a pair of keys, one public key and one private key, which are used to digitally sign and confirm the authenticity of the transaction. The private key is used by the owner's digital wallet to sign every transaction they initiate. The public key, which is visible to all nodes in the network, is used to confirm the authenticity of each transaction. (Linh Phan, 2019). Blockchain technology allows transactions to be verified in about 10 minutes and written into "blocks" with other transactions. (Alessio Faccia, 2019) .

Each block has a hash bound to it that is the result of all previous transactions. The result is that a change to any transaction on the chain will change the block hash in such a way that it requires the majority of nodes to adopt this change in order to be implemented. A hash can be compared to a digital fingerprint of a block because it serves as a unique identifier of each block. When a transaction is written into a block, this new block will be chained to the previous block with the hash previously used in the new hash (Alessio Faccia, 2019). Data immutability and data security features are guaranteed because no single node can change transactions without getting support from the majority of all other nodes in the network. (Linh Phan, 2019). Because every login with two keys and any transaction is cryptographically right and simultaneously maintained in the distributed ledger of each Node, which makes this almost impossible to hack. (Alessio Faccia, 2019) .
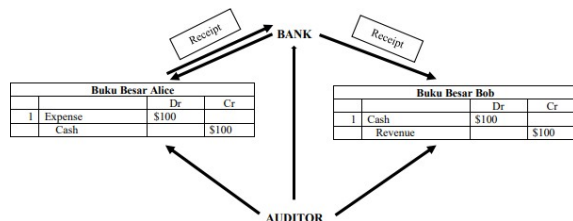
METHOD

The analysis method used in writing is a descriptive and qualitative analysis method, namely by collecting, presenting and analyzing the information / data obtained so that a clear enough picture of the problem can be obtained, then compiled, studied and further analyzed to then a conclusion can be drawn that explains and solves the problem in the actual conditions.

RESULTS AND DISCUSSION

The concept proposed by Ian Grigg (2005) became quite possible with the

presence of Blockchain. The triple-entry recording system where there is a third party in charge of entering additional transactions recorded in a decentralized ledger with a blockchain layer, allows both entities to see any updates that occur within this ledger. When there is a record of a transaction or even a change in ownership of an asset, the ledger will be updated and distributed to all interested parties. Ideally, there is no need to conduct audits and reconciliations with other parties such as banks and counterparties, since all transactions have been recorded in the third ledger.

Receipt receipt initiated by Ian Grigg (2005) is a common thread in implementing a triple-entry recording system. This receipt receipt is processed through a contract called a Smart Contract. A Smart Contract is a digital contract whose terms are agreed upon by both parties and programmed into a blockchain. Once programmed into the blockchain, neither party can manipulate these requirements due to the immutable features of the blockchain. (Brown, 2015).

	Buku Besar Alice					Buku Besar Bob		
		Dr	Cr				Dr	Cr
1	Expense	$100			1	Cash	$100	
	Cash		$100			Revenue		$100

The third ledger integrated with the smart contract acts on the basis of a predetermined 'program code', it can carry out the transmission of information, the recording of information, and the execution of transactions. (Cai, 2019).

Implementation of Triple-entry Bookkeeping System

As a parable, let's illustrate the transaction of payment of services from Alice to Bob. Let's assume the price for Bob's services is $100. Alice will transfer $100 to Bob's account for the services he has provided. In the traditional accounting system, Bob would debit his cash account by $100 and Alice would credit his cash account for $100. At the time of auditing,

the auditor needs to verify the transaction information to the relevant party, for the transaction that has been recorded by the entity, namely Alice. The auditor will contact the bank for the transaction that Alice has made to Bob to confirm the correctness of the recording in Alice's ledger. Because it could be that Alice recorded $200 in her ledger because of a misrepresentation or intentional factor. On the other hand, if Alice pays Bob in cash without a bank statement, then the auditor needs to check the original documents of the transaction, and verify the documents with the documents of the opposite party, namely Bob. As illustrated in the following image.

This double entry recording system allows the transacting party to manipulate or "mark up" in its books because there is a lot of room for cheating and fraud. The information in this recording system is not transparent enough because either party can change the information, and verification from the auditor is required to ensure that the party records the information correctly. On the other hand, malicious activities can occur in this double-entry system such as recording fake purchases, confessions of receivables that should not have been recognized, and even other frauds that can lead to the crime of corruption.

In contrast, within the framework of the triple-entry recording system, through mutually agreed smart contract rules, Alice will pay Bob $100 for the services Bob has provided. The two will sign the contract digitally, then the smart contract will verify the contract and connect it to the blockchain, then the computer program will send $100 to Bob. These transactions will be recorded in the blockchain ledger. Payments are made in the form of traditional bank-mediated tokens (Cai, 2019).

Payment transactions are recorded in chronological order and records are permanent without being changed. These records are also not managed by a central

server, so security threats are reduced. These records are made connected to Alice and Bob's internal records so that logging errors and fraudulent activities become less likely. Moreover, these records can be verified, and create an easy audit trail.
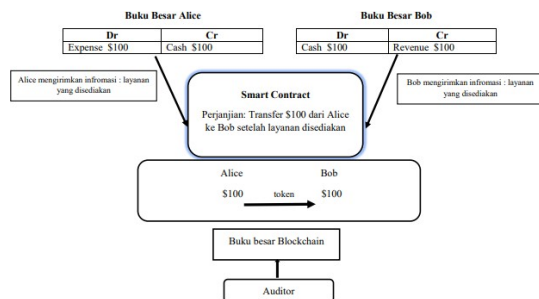
This triple-entry recording system can solve the fundamental trust and transparency problems that plague the current accounting system. The blockchain ledger records and validates information in a decentralized way, and the overall process does not require an authority intermediary, and the technology guarantees the information to be transparent, secure, tamper-proof and reliable through distributed ledger technology. So this system has great potential to increase trust between market participants. The use of blockchain technology in triple-entry bookkeeping offers the benefits of traceability, punctuality, protection against manipulation and high transparency when compared to the double-entry recording method. Significantly, triple-entry records with blockchain can reduce internal fraud and improve the efficiency of a company's operations.

The role of the auditor in mediating the trust or trust of outside parties of the company is still very necessary to provide audit opinions. Blockchain technology makes audit trails easier to verify, as various information will be accessible through a third ledger in a more efficient and efficient way. The need for requests and confirmations can be eliminated and substantive testing in the audit process is no longer necessary. (Linh Phan, 2019). On the contrary, the audit process will focus more on comprehensive controls to prevent fraud activities.

CONCLUSION

The application of triple-entry bookkeeping with blockchain technology offers the benefits of traceability, punctuality, protection against manipulation and high transparency. Triple-entry bookkeeping is a solution to solve transparency issues and fraud activity problems that have not been completely resolved so far. This triple-entry recording concept allows every transaction data to be tracked and validated for authenticity through smart contracts integrated with the blockchain ledger. The decentralized blockchain ledger will distribute transaction records to related parties so that accounting information becomes more transparent and the intensity of fraud activities can be minimized.

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