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Can blockchain replace auditors?

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ABSTRACT

Blockchain technology is a modern application of the 4.0 industrial revolution, applied in many fields; auditing is not exempt from its influence. Blockchain is a general ledger that records all transactions of parties participating in the system. With Blockchain, double-entry has been moved to a completely new era - Triple-entry. All parties can view and check information on the Blocks. With automatic recording and checking of transactions, Blockchain will reduce a large amount of work for accountants. At the same time, with the advantage of high accuracy, the difficulty in falsifying information will significantly reduce the sample size in the detailed testing of auditors. The article summarizes the development process and operation of Blockchain in general and Blockchain for accounting records, studies the transformation of accounting from single entry to double entry and develops into Triple entry under Blockchain technology conditions. From there, the article analyzes and evaluates the impacts and challenges on auditing work.

1. Problem statement

The modern accounting method of "triple entry" can only be effective when combined with blockchain technology, creating a distributed ledger system that all participants in the system can access, check, and confirm information. At that time, the role and testing of auditing will change; will auditing work be reduced with the development of blockchain technology and triple-entry?

2. Content

To complete the research, the author collected available sources, used synthesis and comparison methods to clarify the nature and operating principles of blockchain, and analyzed the impact of this technology on accounting, specifically the triple-entry method. From there, evaluate and present the advantages of blockchain and triple-entry, and analyze the new challenges posed to auditing work.

2.1. Blockchain Operation

- *Blockchain Operation:*

The blockchain system operates from a combination of technologies: *Cryptography* - Using cryptographic keys and mathematical functions (hash functions) to ensure transparency, integrity and security; *Peer to peer network* - Each node in the network (each computer - node) is considered a client and also a server to store copies of information; *Game rules* - All nodes (players) participating in the system must comply with the consensus rules and are driven by economic incentives.

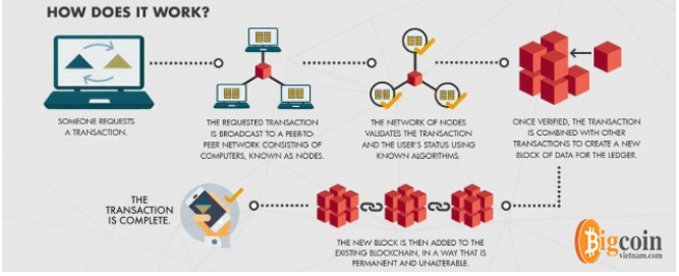

Figure 1. Blockchain operation diagram.
(Source: https://bigcoinvietnam.com/ban-da-biet-phan-biet-public-blockchain-va-private-blockchain-chua)

- *Advantages of blockchain:*

Blockchain technology is superior and is increasingly widely applied in many sectors of the economy due to its advantages:

+ Irreversible: Once a transaction has been confirmed by computers and stored on the blockchain, the information of that transaction cannot be deleted or changed. Because the blocks in the ledger are connected to each other to form a chain, each block ID cumulatively records all transactions from the beginning of the chain to that block. Information in the blockchain cannot be changed and can only be added with the consensus of all nodes in the system.

+ Anonymity: All information about the subjects participating in the system is encrypted. Therefore, company names, addresses, etc., are all anonymous in the system.

+ High security and safety: Each block is created based on a cryptographic system and mathematical functions, so if a hacker wants to penetrate and access information from a block, they must pass the protection barrier of the entire chain, including many blocks in the system. Blockchain is very reliable and safe because transactions are confirmed to create blocks, and records are checked many times and in

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many layers. At the same time, with the fact that a change in the system must be agreed upon by all participants, blockchain is a highly secure system against the possibility of data theft. Even if a part of the blockchain system collapses, other computers and nodes will continue to protect information and keep the network running. The globally distributed computing system also makes blockchain safe from hackers and virus attacks.

+ Fast and global: All transactions are processed in a very short time, by a large number of nodes present all over the world. Moreover, with the reward mechanism, computers (diggers) are often online to search and confirm information, so the transaction processing speed in the blockchain is very fast.

With a tight operating mechanism and many advantages, blockchain is one of the breakthrough technologies of the 4.0 industrial revolution that has, is, and will have many practical applications.

2.2. Development of accounting methods

In the history of accounting, there have been three breakthrough developments that all mankind must acknowledge. They are single-entry accounting, double-entry accounting, and triple-entry accounting.

Single-entry accounting first appeared about 5000 years ago with the Sumerian records. Single-entry accounting is the recording and reflecting on each separate accounting account, without any corresponding relationship with other accounts. The Sumerians used single-entry accounting to record debts receivable from buyers and debts payable to sellers. Single-entry accounting existed for a very long time, until the 1400s, when trade increased, the records of merchants on ledgers gradually became chaotic and impossible to track. It was the merchants in Venice, Italy, who developed a new method of tracking their financial situation and business results - that is, double-entry accounting. Previously, with single-entry accounting, merchants summarized the cash balance at the end of each day and recorded the transactions related to the change in that cash balance. However, single-entry accounting increasingly revealed weaknesses when cash inflows and outflows could not provide complete information about all business activities. Double-entry accounting was born with a more complete recognition of both sides of a transaction, with the total debits must equal the total credits, requiring accountants to always fully determine the effects of a business transaction.

Double-entry accounting is the recording and tracking of accounting accounts that have objective relationships and between different accounting objects according to the corresponding relationship of accounting accounts with each other to record the economic activities of the enterprise. In the double-entry accounting method, a transaction between two parties is recorded in the accounting books of both parties with the corresponding Debit and Credit accounts. The double-entry bookkeeping mechanism was first known by Luca Pacioli in 1494 and continues to develop to this day.

Reality shows that there are many scandals of large enterprises in the economy. If only stopping at double-entry accounting, all transactions recorded within the unit are difficult to control. Enron (US 2007) is a typical example with billions of dollars in debt. If Enron operated in the era of triple-entry accounting and blockchain, it would be difficult to create such fraud on financial statements.

The concept of triple entry first appeared in 1989 in a publication by Professor Yuji Ijiri (Carnegie Mellon University). But triple-entry accounting was actually recorded in 2007, a year after Bitcoin and Blockchain were born, and had a great impact on the world economy. The development of triple-entry accounting, associated with blockchain and distributed ledgers, is mentioned by Grigg (2005). A transaction between units is not only recorded as a double entry in each unit's internal accounting book but also recorded on the general ledger. Parties can simultaneously access and check information on this distributed ledger. An example that clearly shows the benefits of triple entry is in a money transfer transaction between X and Y. Instead of Y having to wait for the money to be transferred to the account, or asking X to take a photo of the bank transfer receipt showing that there has been a money transfer transaction from account X to Y. With distributed ledger technology, you can check and see this money transfer transaction with absolute accuracy, compared to depending on and waiting for a third party (bank).

Thus, it can be seen that triple entry and blockchain are the perfect combination for accounting work in the context of opening up and integrating the global economy.

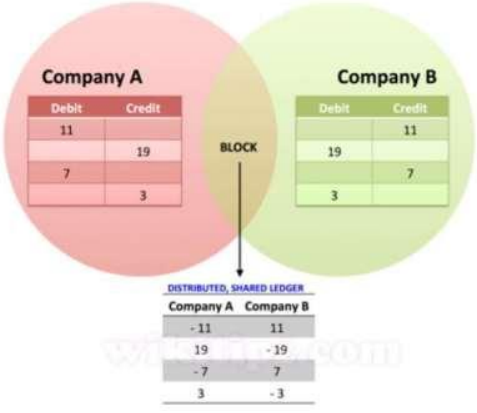

Figure 2. Triple entry in a distributed ledger with a Blockchain system. *(Source: https://wikitipz.com/khoa-hoc-cong-nghe/ly-thuyet-ke-toan-tam-phan-triple-entry-accounting-va-cong-nghe-blockchain-dinh-dam/)*

2.3. Blockchain - triple entry and impact on auditing

Blockchain technology is closely associated with the emergence and development of virtual currencies, including Bitcoin, Ethereum, and other cryptocurrencies. Due to the outstanding advantages of this technology, Blockchain has the potential to be applied in various fields and professions. Accounting is a typical example; if blockchain triple-

entry is successfully combined and widely used in the world, this will be a breakthrough, bringing triple-entry into reality to replace double-entry accounting, a long-standing, effective tool of accounting.

In the future, when blockchain technology and triple-entry accounting replace double-entry accounting, how will the work of financial statement auditors be impacted?

With the risk-based approach, the audit procedures to be performed when auditing financial statements include: Assessing business risks (potential risks - risks of material misstatements at the financial statement level); Assessing control risks; Performing general analytical procedures; Detailed inspection (Document inspection; Inventory; Confirmation; Observation; Interview; Detailed analysis; Calculation).

For techniques that require subjective judgment by the auditor, such as Business risk assessment, control risk assessment, observation, inventory, interview, and calculation, technology will have less impact. These audit procedures still require auditors to possess high professional qualifications, extensive knowledge, a thorough understanding of the client's specific business activities, and considerable experience in auditing.

When performing triple-entry accounting on a blockchain system, auditors can reduce the procedure for verifying detailed documents, especially when the recording is automated and all original documents are stored digitally. With blockchain, all transactions that arise continuously related to an original transaction are stored in the last block, all of which are strung together. For example, a transaction to purchase goods from the time of the smart contract is recorded in the chain on a block, until the receipt of goods, recording of payables, and payment of money are still recorded in the chain on other blocks. Still, all transactions that arise over time are related to each other and are shown in the last block of the transaction in the chain. Therefore, the procedure for checking the recording is very easy. Transactions that arise after the closing date are also clearly and promptly shown in real time on the blockchain, so checking the correctness is also much simpler.

The technique of sending letters confirming deposit and loan balances to banks, confirming receivable or payable balances to customers and suppliers, is also not necessary in the blockchain technology environment, because auditors, when having an ID and password to access the audit client's system, can directly check these figures. Blockchain reduces auditing procedures, at the same time reduces the lack of independence between third parties and customers, leading to dishonest confirmation figures, greatly reducing the time and effort of comparing figures between parties, and reducing the time to collect audit evidence.

3. Recommendations

From the above analysis, it can be seen that preparing high-quality human resources for accounting and auditing to meet the requirements of the 4.0 Industrial Revolution requires the core role of universities and training institutions. Specifically:

- Support training of human resources specializing in accounting and auditing in the direction of information technology applications.
- It is necessary to promptly and comprehensively reform the training program, with priority given to in-depth information technology training for the accounting and auditing majors to help equip them with knowledge to create a foundation for cognitive capacity and good adaptation to the 4.0 Industrial Revolution.
- It is necessary to apply virtual accounting and auditing models of economic activities, both simulating and providing skills for students to practice. When software, electronic documents, electronic signatures, calculations, circulation, and recording of information on forms have been programmed and automated, it is necessary to gradually abandon the method of teaching accounting and auditing according to the regime, as well as the manual processing of operations.
- For graduates (working in businesses or accounting and financial auditing service companies), professional associations can support education and training on Industry 4.0 by creating pressure for training institutions and universities to add to their curriculum to help graduating students have information connections and digital skills.
- Professional associations can partner with companies and training institutions to offer courses that cover topics such as coding and managing information on shared platforms like cloud computing.

4. Conclusion

The number of auditors in an audit for a specific client may change in a downward direction, but not in the near future, because it depends on the process and speed of applying blockchain in the accounting work of enterprises. At that time, the level of knowledge, and especially the capacity for information technology, are increasingly required of auditors. Whether they are state auditors, independent auditors, or internal auditors, it is necessary for the audit team to have a deep understanding of the business characteristics of the client unit, from which they can make risk judgments. These assessments cannot be performed by any software. Especially for items that require high subjective judgment of accountants, it is still necessary for the audit team to include auditors with the capacity and experience to make professional judgments and perform appropriate audit tests to give an assessment opinion.

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