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A Review of Research on the Impact of Blockchain on Financial Reporting

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Abstract: With the rapid development of the Internet, blockchain technology is developing and maturing daily. This paper compares the positive impact of blockchain on three aspects: accounting bookkeeping, accounting information quality and digital financial information. Blockchain, with its distributed bookkeeping and timestamp technologies, can effectively improve accounting bookkeeping procedures and solve the problems of traditional bookkeeping, which is time-consuming and easy to tamper with. Its digital signature technology, timestamp, and real-time data transmission technology can enhance the timeliness, security, and reliability of enterprise financial information. Innovative contract technology can make inter-enterprise transaction procedures completed automatically and recorded in real-time to realize the digitization of financial data and achieve the goal of enterprise economic integration. This paper also finds that, due to the incomplete development of existing technologies, most of the scholars' research remains in the theoretical stage; they are mostly optimistic about the widespread application of blockchain in practice and less consider the problems that will arise during the practical application. This paper also presents some outlooks for the future of financial reporting based on existing literature and research, where enterprise financial management systems will be reshaped, and financial reporting will be more intelligent, secure, and personalized.

1. Introduction

We should take blockchain as an important breakthrough in independent innovation of core technology, clarify the main direction, increase investment, focus on conquering several key core technologies, and accelerate the development of blockchain technology and industrial innovation." There are still many problems with traditional bookkeeping procedures. Accounting reports are not generated promptly, accounting information is easily tampered with, not easily monitored, and not easily traceable, basic transaction information does not fully correspond to book news, the integration of trades and finance is not complete, and other problems are more prominent. The application of blockchain technology can effectively solve some of the above issues. Blockchain, with its decentralised and non-tamperable features, can effectively improve the informationization and intelligence of accounting bookkeeping and greatly enhance the quality of enterprise financial reports. This paper composes the impact of blockchain technology on financial information processing

procedures by many scholars, systematically summarises the positive effects of blockchain on financial reporting, and puts forward some prospects.

2. Blockchain's optimization of the accounting bookkeeping process

2.1 Changes to accounting assumptions

Accounting assumptions are the prerequisites for accounting to perform accounting transactions. With the continuous development of Internet technology, the economic environment is moving toward the era of the digital economy. Blockchain, with its advantages of distributed ledger, decentralised transaction structure, and full disclosure of account information, will further replace the traditional accounting bookkeeping model, and the conventional accounting assumptions will be transformed as a result.

Blockchain's distributed bookkeeping model allows users to compile a shared ledger jointly, and the strict definition of accounting subjects will no longer be needed. And because financial data can be transmitted and integrated in real-time, accounting instalments can be flexibly changed according to the needs of different enterprises. According to Hao Wang [1], the accounting bookkeeping stage has experienced the development of manual accounting to computerised accounting. With the continuous improvement of blockchain, big data, cloud computing and other technologies, the accounting bookkeeping model will step into the shared finance stage. The accounting subject will be changed under the all-employee shared bookkeeping model created by blockchain technology.You Jing and Zhong Ling [2] focus on the transformation of this subject, and they argue that the concept of "for whom the bookkeeping" will be diluted under the influence of blockchain technology, and the bookkeeping process will focus more on the transaction chain in which the subject is located, and the accounting subject will be returned to the business subject. Bingchun Feng and Xiaoxia Wu [3] explained the impact of blockchain on accounting procedures from the digital economy perspective. Under the digital economy, enterprises will be more flexible, adaptable and volatile; accounting subjects will be newly defined, the uncertainty of business activities will increase, and the assumption of going concerned will be challenged; real-time information transmission and real-time report generation will be realised, and the assumption of accounting phasing will no longer be necessary. Ouyang Wenle and Wang Ting [4] believe that the accounting staging assumption will still exist in the blockchain model. With the robust data processing procedures of blockchain, accounting information will be aggregated and processed more rapidly to generate the required information by accounting information users, which is more convenient and efficient for meeting people's needs. The virtual currency unique to blockchain technology can establish a more stable monetary system. The coins of different countries can be converted in real-time at current exchange rates, avoiding losses due to exchange rate changes during payments. According to Guo, Xinlin, and Tang, Ling[5], blockchain can ensure the stability of currency value , and the cryptographic virtual currency technology of blockchain can realise a fixed conversion relationship between virtual currency and real currency so that accounting accounts can be reflected by the same measurement means, and virtual money and other assets are transferred back and forth in the blockchain at a fixed or determined exchange rate, avoiding the need to issue separate statements between different countries and use the exchange rate conversion relationship. It avoids the time cost of giving independent reports and calculations between other countries using the exchange rate conversion relationship and improves efficiency.

Research scholars generally believe that the introduction of blockchain technology will reshape the theory of accounting assumptions. The accounting subject assumption will no longer be applicable, blockchain can track every transaction, and financial bookkeeping will focus more on the business than the accounting subject. Blockchain's distributed ledger and decentralized technology will break the barrier of information asymmetry, the business operation can be accurately and reasonably

predicted, and the going concern assumption will be diluted. Blockchain can consolidate accounts quickly and timely, financial reports can be generated at any time, and accounting staging will no longer be required. The use of virtual currencies in blockchain can be more accurately valued and maintain a stable currency value, effectively avoiding exchange rate losses.

2.2 Optimization of accounting functions

The application of blockchain technology enhances the transparency of financial information through real-time sharing of financial information, which in effect strengthens the external supervision of management and users of financial data, and increases the cost of fraudulent tampering and other activities, thus improving the quality of financial information. Blockchain's shared ledger will create a more reasonable accounting system. As the bookkeeping subjects are all under one transparent bookkeeping system, information barriers will be broken, and the book amounts will be fairer. Real-time data transmission can ensure the rapid generation of report data, which brings great convenience to users of accounting information.

The current accounting basis for accounting recognition in enterprises is mainly accrual-based, which cannot fully align accounting records with the actual business and cannot achieve subsequent business tracking. The later accounting treatment of depreciation and apportionment is mainly dependent on humans. Han [6] analysed the financial fraud of Ruixing Coffee, which led to financial fraud because the enterprise could not complete the full supervision of the business. Blockchain's all-node authentication technology within the federated chain can guarantee the reliability and security of the sales chain. Smart contracts combined with IoT technology can reliably confirm revenue and reduce the possibility of artificial profit manipulation. Blockchain can track the cash inflow status of the business in real-time after the introduction of the settlement platform, reducing labour costs and improving transaction efficiency. Blockchain's adequate supervision of layers of business processes and account processing can significantly reduce the possibility of financial falsification. Chen Yilong and Shen Hong [7] argue that the introduction of blockchain technology will make accounting information disclosure will change from passive exposure to automatic exposure, which significantly avoids the risk of human manipulation. The bookkeeping process will be free from reliance on financial data centres, and it will no longer be necessary to confirm and centrally endorse the quality of accounting information. Auditing will gradually be unnecessary for the credit verification of financial information, and "self-auditing" will become the mainstream of the auditing industry.

In terms of accounting measurement, Guo Xin and Zhao Liqin et al. [8] sorted out the optimization of blockchain in fair value and historical cost measurement. In the blockchain system, the input of each transaction information requires verifying and reviewing all nodes, which can eliminate the influence of individual subjective guesses and make fair value recognition more reasonable. The unique timestamp technology of blockchain can directly trace the actual cost paid at any point in time on the chain structure, and enterprises can transmit the information saved on each node through the mapping method to obtain the actual value at a certain point in time. Historical cost measurement will be more reasonable.

The core purpose of the continuous reform of accounting records can be summarised in two points: first, to increase the error correction ability of accounting information and avoid accounting fraud; second, to improve the dimensionality and breadth of accounting information and to make financial data more closely integrated with economic operations. Cui Huimin [9] proposed a "dual-chain integration system" of blockchain and value chains. According to her, "Traditional value chain has the problems of contract forgery, time-consuming process, and high error rate. Introducing blockchain into the enterprise value chain can reduce personnel fraud, help enterprises record real transactions, and effectively solve the problems of missing information, pairing failure, and difficulty in auditing

between enterprises and partners. The use of smart contracts can quickly screen suppliers and sign transactions and many other business matters, helping enterprises to improve productivity."

The key to reshaping accounting presentations with blockchain technology is providing technical support to achieve a comprehensive, multi-dimensional, reliable real-time accounting presentation. Applying blockchain technology to the accounting presentation link to create an accounting presentation system based on economic behaviour can realise the timeliness and comprehensibility of accounting information disclosure, promote a new change in the accounting reporting model, and make it easier and more efficient for relevant stakeholders inside and outside the enterprise to obtain corporate information.

Summary, the current optimisation of accounting function by blockchain is mainly the following three points: the timestamp technology of blockchain can realise the one-to-one correspondence between book information and accurate transactions, enable tracking of subsequent transactions, and create a time-oriented real-time ledger. The distributed bookkeeping and decentralised technology of blockchain can solve the problem of information asymmetry between enterprises, and the accuracy of accounting measurement and records is continuously improved. With its fast and efficient processing procedures, blockchain technology can generate accounting reports in real-time, and the real-time feature of words can be improved. However, the above conclusions are only at the theoretical stage, and there is no case in the literature where blockchain technology is fully applied to actual enterprise bookkeeping, so the practicality and feasibility of the theory still need to be examined and further studied.

3. Blockchain's optimization of accounting information quality

3.1 Enhance the reliability of accounting information

The reliability of accounting information is mainly reflected in the fact that the data can truthfully reflect each accounting information that meets the requirements of recognition and measurement and ensure the reliability and integrity of its content. The current investigation and research of scholars mainly focus on the security, accuracy and understandability of blockchain on accounting information and explain blockchain's positive significance in enhancing the reliability of accounting information.

Liu Guangqiang and Gan Shengdao et al. [10] analysed from the perspective of the accounting model, information generation path and bookkeeping mechanism. The digital signature technology of blockchain ensures the security of accounting information, solves the problem of singular authentication of information users, and strictly limits the degree of public information for different types of users. Timestamps give accounting information temporality, making human tampering more difficult and enhancing the authenticity of accounting information. Blockchain can provide unstructured data and use visual presentation technology to generate personalised accounting reports, which enhances the comprehensibility of accounting information. Xueyun Zeng and Bin Ma et al. [11] argue that distributed bookkeeping under blockchain technology makes accounting information decentralised, de-trusted, anonymously transacted, and irreversible. De-trusting can fundamentally eliminate the reliance on third-party institutions; decentralisation removes the need to set up manual management authority, and machines are more reliable and efficient than manual approvals, making accounting information records more authentic and accurate; irreversibility makes fraudulent acts such as tampering, erasure, deletion, and fictitious transactions more technically tricky than before.

3.2 Enhance the timeliness of accounting information

The general view of academia is that the consensus algorithm mechanism and intelligent contract mechanism in blockchain technology can set the conditions of accounting records through the logical

rules of the algorithm. For some simple and repetitive economic operations, after meeting the economic behaviour trigger rules and the process conditions of other related platforms on the application layer of blockchain architecture, the financial forum on the blockchain can realise autonomous bookkeeping without manual work and broadcast the updated books to each node within the blockchain network through consensus protocol, which significantly improves the transaction speed, shrinks the business process, and improves the timeliness of accounting information. Hu Qilei [12] takes international transactions as the research background, and he argues that blockchain's digital payment system with virtual currency can eliminate federal boundary restrictions, maintain a stable monetary measurement system, eliminate exchange rate changes and data conversion differences between different measurement models, and reduce financial risks. The distributed ledger technology of blockchain possesses identity uniqueness and a collaborative sharing platform processing mechanism, which can realise real-time collection, upload and release of information flow among multinational companies, effectively improve the efficiency of financial information collection and transmission, and realise the integration of financial transactions.

3.3 Enhance the security of accounting information

The information security guarantee mechanism of blockchain has the following two main points: firstly, cryptography is used for identity verification, and different users are given additional access rights. Secondly, the decentralised network system makes it much more difficult to invade the system.

Linhui Wang [13] analysed the causes of the phenomenon of financial fraud in domestic enterprises and collated and collected current scholars' opinions to propose the construction of a trustworthiness guarantee mechanism for accounting information systems with blockchain theory. In terms of security, blockchain adopts cryptographic technology for the whole transaction process and data reading, which requires public and private keys to identify and interpret. Its decentralised feature can ensure that an attack on one central point will not lead to the collapse of the whole system, and data security can be guaranteed. Zhiguo Li [14] analysed the Deloitte Rubix platform using blockchain technology using the SWOT matrix. He concluded that blockchain has excellent advantages in data storage. Its distributed encrypted storage ensures that only people authenticated by the platform can view the ledger, initiate transactions, and record data. The security of its encryption technology can ensure that hackers do not easily crack the database, and the distributed audit mechanism avoids false data entry and ensures data security-cum-transparency.

Scholars in academia are mostly positive in the view that blockchain can optimise the quality of accounting information. Still, most of them do not consider this factor to discuss the existing defects of blockchain. Blockchain technology is in development and has not fully reached the technical maturity stage. There are still significant problems in the practical application of blockchain technology, such as high cost, high energy consumption, and extremely high requirements for equipment. Although blockchain has specific security mechanisms, once these security mechanisms fail, the consequences are pretty severe. A large amount of transaction information will be stolen, some confidential information will be leaked, and the process of transaction business may be tampered with, leading to enormous losses for enterprises. While we see the positive significance of blockchain, we should also consider the technology's negative side and consider how to compensate for the disadvantages and maximise the benefits.

4. Blockchain technology accelerates the digital transformation of financial information

4.1 Financial work from a self-contained system to the integration of business and finance change

The existing accounting bookkeeping model still has a lag. After a financial transaction occurs, it has to be recorded according to the vouchers obtained afterwards, which significantly increases the processing time of accounts. The inability to share the account information of each enterprise leads to a single reconciliation accounting method, which is time-consuming and laborious. The real-time data transmission of blockchain technology can improve the speed of account processing, and the shared ledger can give the accountants more paths to verify whether the transactions really and accurately occurred. According to Jing Hu [15], the account information sharing model and distributed ledger model in blockchain can realise the transformation from general-purpose financial reporting to dedicated financial reporting, single accounting model to multiple accounting models, post-event financial reporting to real-time financial reporting, and reactive financial reporting to independent financial reporting. Xueyun Zeng and Bin Ma et al. [11] argue that blockchain technology will reshape the concept of independent enterprise management. Blockchain technology can significantly reduce the work of financial personnel in bookkeeping and accounting. Finance personnel can obtain data and analysis results directly from the information system and use them for value management. According to Zhiguo Li [14], blockchain financial system has significant advantages in solving the problems such as numerous processing steps, long overall time consuming and high financial risks in the traditional accounting business. Using a blockchain platform can realise real-time automated auditing, learn pre-warning to prevent problems before they occur, and supervise during the process to reduce risks.

4.2 Financial analysis moves from small data to big data

Rongsheng Qin [16] predicted that after using big data technology and blockchain technology, ex-ante risk analysis, ex-post data analysis, and ex-post performance analysis would become the new content of financial analysis. Financial analysts have access to many unstructured and semi-structured data, enabling an economic analysis to achieve quantitative to qualitative transformation. Zhang Qinglong [17] clarified the necessity of digital transformation from the overall perspective, efficiency perspective, and data value perspective analysis, respectively. He believes that the mission of digital transformation of financial shared services is to realise the connection and collaboration of internal and external data of enterprises, and the decentralised and non-tamperable features of blockchain can enable the formation of an internal and external collaborative settlement ecology within enterprises and make an open financial ecosystem among enterprises. According to Su Heng [18], with the technical support of blockchain, enterprises can obtain all the information of the internal operation platform, account processing platform, and capital operation platform to achieve a complete takeover of the enterprise and improve the level of internal control of the enterprise. Moreover, blockchain technology makes it possible to share credit data, and its non-tamperable feature can significantly enhance the creditworthiness of enterprises and reduce the difficulty of enterprise financing.

The current research of many scholars shows that blockchain has a strong positive effect on the digital transformation of financial information and the goal of achieving the integration of industry and finance. On the one hand, blockchain technology can support the digital recording and storage of financial information, and the acquisition and analysis of financial information data will become more straightforward and flexible. Financial personnel can carry out financial analysis, performance evaluation and risk assessment of enterprises more scientifically and effectively. On the other hand, the information-sharing mechanism of blockchain can effectively eliminate the problem of

information asymmetry among enterprises, open up the financial information transmission between various departments, and make enterprises' internal and external supervision more effective.

5. Conclusion and Outlook

The optimisation of financial reporting by blockchain technology can be summarized in the following aspects: First, blockchain makes accounting information open and transparent, and reliability is enhanced. The distributed bookkeeping model and shared book system reduce the possibility of fraud and forgery. As all share one book, information exchange between enterprises and within enterprises is easier, breaking down information barriers and facilitating the supervision of internal and external environments. Under the unified bookkeeping system, the fair value will be determined more reasonably, and the importance of virtual currency will be more stable than real money. Second, blockchain can ensure real-time tracking of the transaction process, and the bookkeeping information can complete correspondence with the transaction process. Every time an economic activity occurs, data is recorded, and the data is given a time stamp, which makes it more difficult to tamper with the books and ensures that each transaction can be traced back later, making it convenient for enterprises to verify. Innovative contract technology can simplify the transaction process and improve transaction efficiency. Third, the cryptography and distributed structure of blockchain ensure the security of the bookkeeping system, ensuring that critical financial information is not leaked. Fourth, blockchain can provide a broader range of accounting information in real-time, which can be used by accounting information users to make better economic decisions and promote the digitalisation of enterprise financial information and the development goal of financial integration.

With the continuous development of Internet technology, financial reports will continue to change their form and content, innovate and better serve the users of financial statements. The automation of the whole process of recording accounting information and the generation of personalized financial reports will become the future development trend of financial reporting. With the technical support of big data, cloud computing and blockchain, the prospective financial information system of enterprises are expected to be reshaped, and the three parties of finance, management and taxation are expected to be organically integrated, realising the whole administration from budget to tax filing to account closing. In 2021, Shenzhen's mobile taxation platform will newly launch the function of "Invoicing Easy", and the issuance of blockchain electronic invoices can be completed online.It can be predicted that shortly, blockchain electronic invoices will be further developed and widely used. The future financial report is expected to achieve real-time monitoring of the transaction process and tracking of future events, uploading financial data in real-time, breaking the situation of human bookkeeping and human-generated financial reports, further strengthening the position of accounting informatisation, intelligence and integration of business and finance, minimising the space for human manipulation of books and reducing the risk of fraud. The company's financial staff will focus more on value creation, management, strategy formulation and other aspects.

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