REVIEW

by the Doctor of Economics, Associate Professor, Professor of the Department of Accounting and Taxation of the West Ukrainian National University

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on the PhD dissertation of Liu Chengyu

«Accounting using blockchain technology»

in the field of study 07 «Management and Administration»,

specialty 071 «Accounting and Taxation»

Relevance of the dissertation topic and its connection with scientific programs, plans, topics

The current stage of digital technology development is marked by the active integration of innovative solutions in economics, finance, and management, which drives the transformation of traditional approaches to accounting. One of the most promising technologies capable of significantly reshaping accounting processes is blockchain. It provides a high level of transparency, reliability, and security of accounting information, which is critically important for effective managerial decision-making and strengthening stakeholder trust. At the same time, this new form of accounting-information system requires adaptation to the conditions of the digital economy and compliance with standards for information security, timeliness, and analytical capacity. In particular, the methodological foundations for blockchain implementation in accounting practice require substantiation, including automation of transaction recording, changes in data verification and storage approaches, and the transformation of accounting functions within decentralized environments. Therefore, the development of theoretical and practical principles for blockchain use in accounting represents a crucial step toward improving financial control efficiency, business process transparency, and digital transformation of the accounting profession.

Liu Chengyu's dissertation is devoted to developing and theoretically justifying new approaches to solving scientific and practical issues in improving the

methodological, organizational, and practical foundations of accounting in the context of blockchain technology. The results of the study provide a basis for further clarification of accounting theory in the digital economy. The core methodological contributions may be applied in the operations of modern enterprises utilizing blockchain. Notably, the author's proposals regarding the digitalization of electronic settlements with counterparties using cryptographic assets, integration of blockchain with cloud-based accounting, and the implementation of complete electronic document workflow are of particular interest for practical application.

The research was conducted in accordance with the research plans of the Department of Accounting and Taxation at Western Ukrainian National University, within the framework of the scientific project: «Digitalization of Accounting to Ensure Economic and Cybersecurity of the Enterprise» (state registration number 0125U001067). Within this project, the author improved the accounting methodology in the context of blockchain technology usage.

The degree of validity and reliability of scientific statements, conclusions and recommendations

The scientific provisions, conclusions, and recommendations formulated in the dissertation are well-substantiated, logical, and reliable. The research was carried out by the author in accordance with the set goal and consists of defining the functional capabilities of blockchain technology in processing accounting information, with an emphasis on improving the methodology and organization of accounting in the digital economy, in order to ensure informational completeness, transparency, cybersecurity, and effective enterprise management. To achieve this goal, the author formulated a number of scientific and practical tasks, the main of which are: studying the impact of using information technologies on accounting in the digital economy; systematizing the transformative capabilities of blockchain technology in accounting; improving the methodology of accounting using blockchain technology. The achievement of these tasks was made possible through the use of a specific methodological framework that covers a wide range of both general scientific and special methods. In particular, methods of theoretical

generalization were used to clarify the essence and content of the main concepts; methods of cause-and-effect relationship, abstract-logical, and grouping were used to study the classification of costs, their accounting and analysis at the stages of data collection and storage, and the formation of financial transaction reports; the analysis of financial service providers or resource strategy was carried out using methods of comparison and economic-mathematical modeling.

The dissertation research substantiates the need to use blockchain technology for accounting purposes. In particular, the possibilities of integrating blockchain technology into enterprise accounting systems have been identified to solve the problems of information asymmetry, reduce the risks of financial fraud, and ensure the reliability of reported data. It is proven that an accounting system based on decentralized ledgers contributes to the authenticity and integrity of financial indicators, increases the level of information security, and serves as the basis for full-scale digitalization of accounting processes.

Within the framework of the research, the importance of integrating blockchain technology with cloud services is highlighted, which allows for increased efficiency, information security, and transparency of accounting processes through the use of decentralized block-chain data structuring. The author established that the combination of blockchain with cloud technologies creates a new organizational model of accounting that involves delegating accounting functions to third-party providers while ensuring data integrity and protection (p. 96-106). As a result of the implementation of this model, operating costs are reduced, the speed of information exchange increases, and scalability of its implementation in enterprises with different organizational and legal forms and structural features is achieved.

The dissertation formulates recommendations for applying blockchain technology to automate document management, including the creation of electronic primary documents and accounting records in real-time, which minimizes the probability of fraudulent actions (p. 80-95). The author confirms that the structure of blockchain as a distributed database contributes to increased efficiency of internal and external communication while preserving confidential information about the business entity.

Special attention is paid in the work to cryptocurrencies as new accounting objects, which are considered in the context of accounting theory as potential assets. Approaches to their monetary valuation, recording in accounting, and reflection in financial statements are refined.

In particular, the author developed a conceptual model for accounting for electronic transactions, which includes automated documentation, processing, and reporting for cryptocurrency operations (p. 127-129).

The research also allowed for the development of mechanisms for improving accounting settlements with counterparties through the use of smart contracts, which contributed to an increase in the efficiency of monetary operations. The author proposed a new architecture for a blockchain system that allows for the substantiation of a consensus mechanism for recording monetary transactions in accounting (p. 130-161). It is certified that blockchain technologies optimize transactional processes, reduce costs, increase the speed of operation processing, and contribute to the growth of transparency of financial flows, especially in the context of international settlements.

The validity, reliability, and argumentation of the conclusions and recommendations presented in the qualification work are confirmed by a detailed analysis of specialized scientific literature. The theoretical and methodological basis of the study was the scientific works of leading economists, monographs, scientific articles, legislative acts on the digitalization of accounting processes, internet publications, statistical data, and analytical materials from international resources.

Scientific novelty of the dissertation results

Among the key findings that demonstrate scientific novelty, the following should be highlighted:

- the improvement of the methodology for electronic documentation and document flow based on blockchain-based database structuring principles, which determines the order of fragmentation and recombination of accounting information at both internal and external levels of electronic communications, as well as the development of a methodology for information isolation in favor of open document

management in terms of preserving the commercial confidentiality of enterprises, in accordance with the informational needs of users and their classification within the enterprise management system;

- the development of a procedure for integrating blockchain technology with cloud services to ensure efficiency, security, and transparency of accounting processes, based on the capabilities of blockchain data structuring aimed at decentralization and cybersecurity. Its implementation will make it possible to minimize operational costs, improve the efficiency of information processes, and ensure the scalability of implementation within the activities of dynamic enterprises;

- the construction of an informational framework for accounting electronic transactions, which includes documentation of operations, inventory, valuation, and reflection of cryptocurrencies in accounting records and financial reporting. This includes their recognition as cash, cash equivalents, financial instruments, or intangible assets, thereby enabling the generation of original documents in electronic format, automated invoice creation, continuous accounting, and control of electronic transactions;

- the generalization of the impact of innovative information technologies (big data, blockchain, artificial intelligence, mobile internet, cloud computing, Internet of Things) on accounting in the digital economy, with emphasis on enhancing connectivity, automation, data-driven decision-making, innovation, scalability, user orientation, transparency, security, integration, and sustainability in the processing of accounting information. This substantiates the gradual evolution of the accounting system from informatization to intellectualization;

- the implementation of the positioning of three types of blockchain technologies (public chains, consortium chains, and private chains), each characterized by specific architectural features, which will allow for the transformation of the methodology and organization of accounting in the context of decentralization, trusted interaction technologies, smart contracts, coordinated exchange mechanisms, new measurement models, and timestamping. This will result in enhanced data security, reduced fraud risks, and increased efficiency of accounting operations;

- the improving of a procedure for applying blockchain technology in accounting for settlements with counterparties, which will significantly enhance the efficiency and security of transactional settlements by separating consensus from the transaction process, thereby improving system performance and reliability. It will also reduce costs, accelerate transaction processing, and enhance data security.

Theoretical and practical significance of the results

The theoretical results of the dissertation research lie in the disclosure of the theoretical and methodological foundations for improving the accounting of financial activities as a set of processes for recording, storing, and reflecting in reporting data on on financial operations using blockchain technology.

The practical significance of the dissertation lies in the possibility of using its main results and developments in the practical activities of enterprises that use blockchain technologies to digitize accounting.

Completeness of the dissertation materials in publications

The dissertation work of Liu Chengyu is an independent, comprehensive, and complete scientific work.

The main provisions and results of the dissertation are set out in 8 scientific publications, including: 4 scientific publications that reflect the main scientific results, including an article in a scientific periodical, which is indexed in the Web of Science and Scopus databases (Q1), 3 articles in scientific professional publications of Ukraine; 4 scientific publications that additionally reflect the scientific results of the dissertation. The total volume of published works is 5.2 printed sheets, the author personally owns 2.8 printed sheets, among them: scientific works that highlight the main results of scientific research on the topic of the dissertation - 2 printed sheets; scientific works that additionally reflect the scientific results of the dissertation - 0.8 printed pages.

Personal contribution of the author and adherence to the principles of integrity

All results were obtained by the author independently. Joint publications use only ideas developed by Liu Chengyu.

Plagiarism check (Turnitin Similarity) confirmed the absence of violations of academic integrity. The text of Liu Chengyu dissertation does not contain borrowings without proper reference to the source and complies with the principles of academic integrity. All available references to the source are made in compliance with the norms of the legislation on copyright and related rights.

Assessment of the structure, language and style of presentation

The content of the dissertation corresponds to the defined goal and objectives of the research, reveals the topic of the work and testifies to its integrity and completeness. The dissertation is well structured, written in business English, the material is presented using scientific professional terminology.

Comments on the dissertation and its discussion points

Liu Chengyu dissertation research formulates and substantiates a number of new scientific propositions and conclusions, some of which are debatable or require additional explanations:

1. The dissertation insufficiently addresses the practical implementation of the obtained results using real-life examples of specific enterprises. Accordingly, the practical orientation of the dissertation could be enhanced by incorporating more company-specific data and by developing practice-oriented recommendations for improving financial and economic processes within enterprises.

2. In the course of examining the formation of electronic accounting documents using blockchain technology (Section 2.1), it would be appropriate to conduct a more in-depth analysis of the regulatory and legal harmonization of automated electronic document management in international practice. In particular, attention should be paid to the legal recognition of electronic documents created in different countries, including requirements for mandatory attributes, standardization of document

formats, and language requirements. Such analysis is essential for ensuring the legitimacy, compatibility, and legal validity of electronic documents in cross-border circulation.

3. The use of cryptocurrency payments in the execution of international electronic transactions (Section 3.1) remains a somewhat controversial and debated issue. The core problem lies in the absence of a unified legal approach to the regulation of virtual currencies across different jurisdictions. In particular, in some countries, including China, cryptocurrencies lack official status as a payment instrument, as national legislation either does not provide legal norms for their use or explicitly prohibits their circulation. This legal uncertainty significantly complicates the integration of cryptocurrency mechanisms into international payment systems, introduces additional risks for market participants, and hinders the global development of digital financial instruments.

4. To enhance the theoretical substantiation and practical relevance of the dissertation research, it would be advisable to include a comprehensive analysis of potential risks associated with the implementation of blockchain technology in accounting systems. Particular attention should be given to issues of information security, encompassing both potential threats of unauthorized access to financial data and the risks of data distortion or loss. In this context, it would be appropriate to introduce a separate section dedicated to assessing modern methods and tools of information protection that can be integrated into blockchain architecture to ensure the integrity, reliability, and confidentiality of accounting data. Such an approach would enable the development of a systematic understanding of both the advantages and limitations of applying blockchain technologies in accounting practice and would support the adoption of informed managerial decisions regarding their implementation.

However, the above comments and discussion points do not affect the overall high assessment of the dissertation work and can serve as a basis for scientific discussion and the author's continuation of scientific research in the chosen direction.

General conclusion

Liu Chengyu dissertation work «Accounting using blockchain technology» is an independent, completed, reasoned, scientific research carried out on a relevant topic. The theoretical and practical results obtained are characterized by scientific novelty, are substantiated and contribute to solving the problem of accounting digitalization in the context of using blockchain technology.

The dissertation meets the requirements of the «Procedure for Awarding the Degree of Doctor of Philosophy and Cancellation of the Decision of the One-Time Specialized Academic Council of an Institution of Higher Education, a Scientific Institution on Awarding the Degree of Doctor of Philosophy», approved by the Resolution of the Cabinet of Ministers of Ukraine dated January 12, 2022 No. 44, and its author - Liu Chengyu deserves to be awarded the degree of Doctor of Philosophy in the field of study 07 «Management and Administration» in the specialty 071 «Accounting and Taxation».

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