

## **REVIEW**

### **of the official opponent**

Candidate of Economic Sciences, Associate Professor

**Maryna PRAVDIUK**

on the dissertation of **Liu Chengyu on topic: «Accounting using blockchain technology»**

submitted for the degree of Doctor of Philosophy in the specialty

071 «Accounting and Taxation» in the field of knowledge

07 «Management and Administration»

**Relevance of the research topic.** The digitalization of the economy has intensified the use of innovative information technologies, among which blockchain holds a leading position. Most modern information processing technologies are based on the principles of blockchain structuring of data arrays. The blockchain concept is radically transforming the socio-economic processes of companies. Decentralization, distribution, irreversibility, and chronological ordering of information in economic systems have enabled a transition to a new level of economic relations between counterparties and institutions.

At the same time, blockchain technology enables the operation of new virtual (cryptographic) assets of enterprises, the use of which in electronic settlements creates new business opportunities for companies. Electronic transactions are becoming the foundation of modern business processes within the digital environment of economic interaction, where promptness, cybersecurity, reliability, quality, and relevance are the key criteria for effective business management.

Since management is based on accounting information, blockchain technology is fundamentally reshaping both the theory and practice of accounting. In the digital economy, classical accounting and management tools are being transformed into innovative methods for interpreting accounting information. The organization of accounting based on blockchain principles shifts the focus from centralized

accounting functions to decentralized processing of accounting data, which creates the prerequisites for efficient and reliable operation of enterprises.

The importance of scientific research and applied developments related to the transformation of accounting theory, methodology, organization, and practice under the influence of blockchain technology determines the relevance of the dissertation topic selected by Liu Chengyu, as well as the accuracy of positioning the subject and object, goals, and objectives of the dissertation research.

**Connection of work with scientific programs, plans, topics.** The dissertation research was carried out in accordance with the research plans of the Department of Accounting and Taxation at West Ukrainian National University within the framework of the research project titled «Digitalization of Accounting to Ensure Economic and Cybernetic Security of the Enterprise» (state registration number 0125U001067). In this project, the author has improved the accounting methodology in the context of using blockchain technology.

**Personal contribution to the obtained scientific results.** The dissertation is an independent scientific study conducted by the applicant, in which the theoretical and methodological provisions have been improved and practical recommendations have been presented for enhancing accounting under the conditions of blockchain technology implementation. The scientific ideas, theoretical developments and generalizations, selection of research methods, conclusions and recommendations, as well as the practical implementation of the scientific research results, belong to the applicant. The applicant's contribution to co-authored publications is clearly specified in the list of publications; only those ideas that belong personally to the author have been used in the dissertation. The author's personal contribution is sufficient for this type of dissertation work.

**Degree of validity of the scientific provisions, conclusions, and recommendations.** The dissertation is characterized by a logical structure, the credibility, and the well-grounded nature of the formulated conclusions and recommendations. The reliability and substantiation of the proposals presented in the dissertation are based on the use of a wide range of information sources. The author's

use of information sources is essential for confirming the reliability of the formulated scientific hypotheses and for solving the applied tasks of the research.

The research objective corresponds to the topic of the dissertation. The defined object and subject of the study are sufficiently disclosed in the structure and content of the dissertation. The validity and reliability of the obtained scientific results, conclusions, and recommendations are confirmed by a substantial list of publications on the topic of the dissertation in academic journals, as well as by the discussion of the results at international and national scientific and practical conferences. The author's scientific publications adequately reflect her personal contribution to addressing theoretical and applied issues in the development of accounting under the application of blockchain technology.

Thus, the content and structure of the dissertation are fully consistent with its title, objectives, and research tasks. The scientific provisions are presented in a coherent and logical manner; the conclusions and recommendations are based on the author's research results, which have been properly tested and are grounded in diverse information sources.

**Degree of scientific novelty of the dissertation research results.** The most significant results that reflect the personal contribution of the author to the development of the researched topic and characterize the scientific novelty lie in a set of interrelated scientific developments and proposals. A review of the content of Liu Chengyu's dissertation, along with her primary scientific publications, has made it possible to identify the key theoretical and methodological provisions, conclusions, and recommendations that demonstrate the scientific novelty and reflect the author's contribution to solving the scientific problem of substantiating theoretical and methodological principles and developing practical recommendations for optimizing accounting in the context of blockchain technology implementation.

In accordance with the aim of the dissertation research – which is to identify the functional capabilities of blockchain technology in the processing of accounting information with a focus on improving accounting methodology and organization within the digital economy – the applicant formulated a number of scientific and

practical tasks. Their implementation led to the achievement of results presented in the author's proposals and recommendations, which contain scientific novelty and possess practical relevance. These results were made possible through the use of a broad set of scientific and methodological tools, which allowed for the well-founded formulation of the dissertation's conclusions and confirmed their applicability in both future academic research and practical implementation.

The following scientific results, which are aimed at improving theoretical and methodological foundations and developing applied recommendations for enhancing accounting under blockchain technology, should be highlighted:

1. The methodology for electronic documentation and document circulation based on the principles of blockchain data structuring, which involves the fragmentation and recombination of accounting information at both internal and external levels of electronic communication. In contrast to current isolated practices, this approach ensures transparency in document flow while maintaining the commercial confidentiality of the enterprise, tailored to the information needs of users according to their classification within the enterprise management system.

2. The procedure for integrating blockchain technology with cloud services to ensure the efficiency, security, and transparency of accounting processes. This is based on the capabilities of blockchain data structuring in terms of decentralization and cybersecurity. Unlike existing cloud-based accounting systems, this approach can: overcome the functional limitations of blockchain technology; offer effective managerial decisions for financial management; accumulate accounting information for both tactical and strategic purposes; organize robust cybersecurity; and as a result, minimize operational costs, increase the speed of information processing, and provide scalability for implementation across a variety of enterprises.

3. An information framework for accounting electronic transactions, which includes digitized documentation, inventory, valuation, and representation of cryptocurrencies in accounting records and financial reporting. It recognizes cryptocurrencies as cash, cash equivalents, financial instruments, or intangible assets within the context of their evolutionary development in the digital economy. This

framework enables the generation of primary documents exclusively in electronic format, the automatic creation of accounting records, continuous monitoring of electronic transactions, and remote management of enterprise operations.

4. The dissertation generalizes the impact of innovative information technologies (such as Big Data, blockchain, artificial intelligence, mobile Internet, cloud computing, and the Internet of Things) on accounting. It identifies three types of blockchain technology (public chains, consortium chains, and private chains) and systematizes the transformational impact of blockchain on accounting across various dimensions: accounting objects, going concern, reporting period, monetary measurement, accounting recognition, valuation, financial reporting, and others.

Thus, the core scientific provisions, results, and conclusions of Liu Chengyu's dissertation demonstrate substantial scientific novelty and a sufficient degree of substantiation, the reliability of which has been proven.

**Completeness of publication of the main provisions of the dissertation.** Liu Chengyu's dissertation 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.

The provisions of the dissertation research, which constitute scientific novelty, have been fully covered and discussed at 4 international and all-Ukrainian scientific and practical conferences. The dissertation work is an independently performed scientific research, in which the author personally developed theoretical and methodological foundations and practical recommendations for improving accounting

in the conditions of using blockchain technology. The applicant personally owns the scientific ideas of the work, theoretical developments and generalizations, conclusions and recommendations that are submitted for defense and contained in her publications.

**Theoretical and practical significance of the obtained results and recommendations for their use.** The theoretical studies conducted in this research form a methodological foundation for further refinement of accounting theory in the digital economy. The main theoretical provisions of the dissertation have been developed to the level of methodological guidelines, which can be applied in the activities of modern enterprises that utilize blockchain technology.

The practical significance lies in the proposals for: the digitalization of accounting for electronic settlements with counterparties using cryptographic assets, and the analysis of enterprise performance following the implementation of blockchain technology. At the same time, improving the practical applicability of the dissertation results requires the implementation of the author's recommendations and developments into the operations of enterprises and institutions.

**Assessment of the dissertation structure.** The structure of Liu Chengyu's dissertation is coherent, logical, and comprehensive. All chapters are interconnected, which ensures a holistic understanding of the research problem and enables the identification of the candidate's scientific contribution and the degree to which the defined tasks have been addressed in accordance with the topic, aim, and objectives of the study. The formatting and presentation of the dissertation fully comply with the requirements of the Order of the Ministry of Education and Science of Ukraine dated January 12, 2017, No. 40 «On the Approval of Requirements for Dissertation Formatting».

The dissertation consists of an introduction, three chapters, conclusions, a list of sources used and appendices. The full volume of the dissertation is 212 pages of printed text. The volume of the main text is 154 pages of printed text. The dissertation contains 19 tables and 22 figures (of which 1 table occupies a separate

page), 5 appendices on 6 pages. The list of sources used has 240 names and is located on 27 pages.

From a substantive point of view, the work is a completed scientific work, and its results are scientifically significant and practically significant. The conclusions, proposals, and recommendations formulated by the applicant based on the results of the dissertation research contain elements of scientific novelty and are valuable for the development of theoretical, methodological provisions and accounting practice using blockchain technology.

**Language and style of presentation.** Liu Chengyu's dissertation is written in formal business English, grounded in general scientific and economic terminology. The writing style is academic, characterized by linguistic conciseness, logical coherence in the presentation of the content of paragraphs and chapters, unambiguous interpretation of definitions and categories, semantic interconnectedness of research tasks, scientific novelty, final provisions and conclusions, objective comparison of the conducted scientific studies, and the formation of the author's position in the field of accounting.

**Compliance of the dissertation with the official specialty profile.** In terms of both content and formatting, Liu Chengyu's dissertation – considering its interdisciplinary nature – on the topic «Accounting using blockchain technology» generally meets the established requirements of the Ministry of Education and Science of Ukraine and corresponds to the specialty profile 071 – «Accounting and Taxation», within the field of knowledge 07 – «Management and Administration».

**Remarks on the dissertation.** Alongside the important scientific achievements and the overall positive assessment of the content and structure of the dissertation, the following are the most significant comments and discussion points:

1. The proposal to implement open electronic document circulation in enterprise accounting based on blockchain technology (Subsection 2.2) is debatable, as it may pose threats to the cybersecurity of the information environment due to the potential exposure of confidential information to third parties and increased attention

from malicious actors seeking vulnerabilities in the information security systems of enterprises.

2. In the accounting of cryptocurrency usage during electronic transactions with counterparties (Subsection 3.2), insufficient attention is paid to various types of cryptographic assets (including NFTs, tokens, and stablecoins), which may be identified in different ways from the standpoint of accounting and may have differentiated impacts on the methodology and organization of accounting information processing.

3. Subsection 3.2, in the part concerning international electronic settlements, inadequately addresses national accounting specifics and the legal regulation of operations involving cryptographic (virtual) assets, which raises risks related to their legalization in different countries and their recognition as accounting objects.

4. Subsection 3.3 lacks detailed justification for the appropriateness of using the DuPont Model compared to other analytical methods when assessing the effectiveness of blockchain technology implementation in modern enterprises. This limits the ability to fully reveal the constraints and prospects for further digitalization of accounting.

These remarks and suggestions do not diminish the overall positive evaluation of the dissertation.

**Overall evaluation of the dissertation and its compliance with established requirements.** The dissertation by Liu Chengyu on topic «Accounting using blockchain technology», submitted for the degree of Doctor of Philosophy, is a completed independent research study that presents new scientifically substantiated theoretical and applied results in the field of accounting under conditions of blockchain technology application. The results obtained by the applicant, along with the proposed new solutions, recommendations, and conclusions, are reliable and comprehensively justified. The dissertation is executed at a high professional level, and its content fully corresponds to the selected research topic, with the research objective being thoroughly disclosed.



In terms of scientific novelty, theoretical and practical significance of the obtained results, structure, language, and style of presentation, Liu Chengyu's dissertation on topic «Accounting using blockchain technology» meets the requirements set forth in the «Procedure for Awarding the Doctor of Philosophy Degree and Revoking the Decision of the One-Time Specialized Academic Council of a Higher Education Institution or Research Institution on Awarding the Doctor of Philosophy Degree», approved by the Resolution of the Cabinet of Ministers of Ukraine dated January 12, 2022, No. 44, as well as the requirements of the Order of the Ministry of Education and Science of Ukraine «On Approval of the Requirements for Dissertation Formatting» No. 40 dated January 12, 2017 (with amendments and additions). Therefore, its author, Liu Chengyu, deserves to be awarded the academic degree of Doctor of Philosophy in the specialty 071 «Accounting and Taxation», within the field of knowledge 07 «Management and Administration».

**Opponent:**

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**Особистий підпис  
засвідчую**

*Заст. наг в/к*



*Трасносецьське*