

DOI: <https://doi.org/10.30525/978-9934-26-495-5-5>

INTERDISCIPLINARY APPROACH TO THE STUDY OF BLOCKCHAIN TECHNOLOGY

Blockchain technology is a relatively new phenomenon that has rapidly garnered the attention of the academic community due to its potential to transform various sectors of the economy, society, and public administration. At the core of this technology is a distributed ledger that ensures decentralization, security, and data transparency, making it highly relevant for scientific study from multiple perspectives. Consequently, the exploration of diverse approaches to studying this technology across various disciplines is particularly pertinent. Blockchain is most studied within the fields of economics, engineering, and law, as this technology simultaneously impacts economic models, technical innovations, and regulatory frameworks. Each of these disciplines brings its own approaches, objectives, and methodologies to the study of blockchain, enabling a comprehensive overview of both its advantages and challenges.

Researchers studying blockchain approach its technical features from various perspectives but agree on its defining characteristic: a system of digital records combined into blocks. W. Mougayar emphasizes that blockchain's complexity stems not only from its technical aspects but also from its philosophical, cultural, and ideological dimensions, describing it as a decentralized, encrypted, and immutable ledger [1]. Don and Alex Tapscott compare blockchain to a reliable public digital ledger that tracks valuable assets [2]. P. Vigna views it as a digital ledger managed by a decentralized network, eliminating centralized control [3], while C. Skinner sees it as a social authentication tool that transparently logs all transactions in an open domain [4].

In general, technical studies focus on the architecture and technological aspects of blockchain, including consensus mechanisms, data security, and algorithm development, such as smart contracts. Key attention is given to testing, optimizing, and ensuring the resilience of blockchain networks. This multifaceted approach reveals both the potential benefits and challenges of blockchain technology.

The development of blockchain technology is a highly relevant topic in the context of its applications in the modern economy and the formation of a new business culture, with researchers playing a growing role in its adaptation for societal needs. Harvard Business School experts, M. Iansiti and K. Lakhani, suggest that blockchain is not disruptive in the conventional sense but rather a foundational technology with the potential to establish new frameworks for existing economic and social systems. However, despite its anticipated impact, they believe it may take a decade to fully integrate into the economic and social infrastructure [5]. Chen Y. and Bellavitis C. highlight blockchain's impact on traditional business models, particularly in decentralized finance, showing how blockchain could transform financial institutions and broaden financial service access [6].

Researchers like R. Owen et al. explore blockchain's potential in entrepreneurial financing, examining its impact on entrepreneurship policy by enhancing transparency and efficiency in financial transactions [7]. Meanwhile, V. Kavetsky suggests that blockchain could drive future global finance, reshaping payment systems among individuals and institutions, and possibly becoming a universal payment method [8].

In accounting and auditing, Yaroshchuk O. and Belova I. argue that blockchain enables real-time registration of transactions by both parties, eliminating the need for traditional double-entry bookkeeping [9]. Scholars from Taras Shevchenko University, including H. Kupalova, N. Korenieva, and N. Honcharenko, have analyzed organizational aspects of blockchain in entrepreneurship, identifying its strengths and limitations, which could enhance decision-making and support the technology's development among Ukrainian entrepreneurs [10].

Thus, economic studies focus on blockchain's effects on processes such as transaction costs, business models, and operational efficiency, employing econometric and quantitative methods to assess the benefits of blockchain in business.

Discussions continue among experts regarding the reliability of blockchain for regulating legal relationships and addressing challenges in its legislative regulation. Blockchain's applications span financial services, supply chain management, healthcare, intellectual property protection, and real estate transactions, all of which necessitate legal frameworks that account for the technology's unique characteristics. As blockchain operates without centralized control and data is simultaneously stored across all users, no single participant holds full authority. This decentralized

structure, highlighted by both Western and Ukrainian researchers, influences how legal accountability is approached.

For instance, V. Mougayar views blockchain as a transaction verifier that makes traditional regulatory bodies redundant [1]. Early uses of blockchain have revealed complex legal questions, such as V. Vasko's focus on defining liability boundaries for open-source developers and network users, an issue he considers unresolved [11]. Scholars have also examined blockchain in electronic voting, reviewing international experiences and envisioning its application in Ukraine. This exploration underscores that blockchain's legal challenges converge on two key areas: jurisdiction, particularly for international projects, and data protection [12]. Ultimately, establishing legal accountability for blockchain-based actions remains a priority; solving these issues could pave the way for blockchain's acceptance at a legislative level, facilitating its integration into various sectors for societal benefit.

Thus, legal research encompasses regulatory aspects of blockchain use, the legitimacy of smart contracts, asset tokenization, and data privacy protection. It focuses on analyzing blockchain's alignment with existing laws and developing new regulations to effectively govern blockchain technologies.

Despite the unique advantages offered by each individual approach, a multidisciplinary perspective is essential to fully harness the potential of blockchain technology. While economic, legal, and technical studies each contribute valuable insights, they only reveal parts of the broader picture. By applying a multidisciplinary approach, we can integrate these diverse insights to develop a holistic understanding of blockchain's capabilities and constraints. This comprehensive perspective allows us to address blockchain's challenges more effectively and leverage its benefits across economic, social, and business domains, laying a stronger foundation for its implementation in the modern world.

References:

1. Mougayar, William. «Бізнес-блокчейн: обіцянка, практика та застосування наступної інтернет технології» 1-е вид. Wiley. 2016.
2. Tepsokott Don, Tepsokott Aleks (2019) Blokchein-revoliutsiia. Yak tekhnolohiia, shcho lezhyt v osnovi bitkoina ta inshykh kryptovaliut, zminiue svit [The Blockchain Revolution. How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World]. Lviv, pp. 32–36.
3. Paul Vigna, Michael J. Casey (2018) The Truth Machine: The Blockchain and the Future of Everything. NY: St. Martin's Publishing Group, pp. 57–61.

4. Skinner Chris (2016) ValueWeb: How Fintech Firms are Using Bitcoin Blockchain and Mobile Technologies to Create the Internet of Value. Singapore: Marshall Cavendish International, pp. 109–110.
5. Iansiti M., Lakhani K. (2017). The Truth About Blockchain. *Harvard Business Review*. Is. January – February, pp. 118–127.
6. Chen Y., Bellavitis C. (2020) Blockchain disruption and decentralized Finance: The rise of decentralized business models. *Journal of Business Venturing Insights*, no. 13, p. 00151.
7. Owen, R. Bhaird, M.C. Hussain, J. and Botelho, T. (2019), Blockchain and other innovations in entrepreneurial finance: Implications for future policy. *Strategic Change*, vol. 28 (1), pp. 5–8.
8. Kavetskyi V.Ya. (2018) Zastosuvannia blokchein-systemy u finansovii sferi [Application of blockchain systems in the financial sector]. *Sotsialno-ekonomichni problemy suchasnoho periodu Ukrainy*, vol. 2, pp. 14–18.
9. Yaroshchuk O., Belova I. (2020) Tekhnolohiia blokchein v bukhholderskomu obliku i audyti [Blockchain technology in accounting and auditing]. *Instytut bukhholderskoho obliku, kontrol ta analiz v umovakh hlobalizatsii*, vol. 3–4, pp. 28–44.
10. Kupalova H., Korenieva N., Honcharenko N. (2022) Teoretyko-orhanizatsiini aspekty zastosuvannia tekhnolohii blokchein u pidpriemnytstvi [Theoretical and organizational aspects of the application of blockchain technology in entrepreneurship]. *Modeling the development of the economic systems*, no. 2 (4), p. 123.
11. Vasko V.A. (2020) Problema vyznachennia zmistu yurydychnoi vidpovidalnosti rozrobnykiv vidkrytoho vykhidnoho prohramnoho kodu blokchein-proiektiv [The problem of determining the content of the legal liability of developers of open source software code of blockchain projects]. *Sotsialna i tsyfrova transformatsiia: teoretychni ta praktychni problemy pravovoho rehuliuвання* : mat. nauk.-prakt. konf. Kyiv, pp. 160–166.
12. Terliuk O.I. (2024) Pravove rehuliuвання blokchein-tekhnolohii u publichnomu upravlinni: aspekty mizhnarodnoho ta ukraïnskoho dosvidu vykorystannia [Legal regulation of blockchain technology in public administration: aspects of international and Ukrainian experience of use]. Lviv : Rastr-7, 260 p.