DOI: https://doi.org/10.32782/2308-1988/2026-59-129
UDC 336.76:004.738.5

Veronika Hanusych
Candidate of Economic Sciences, Associate Professor,
Associate Professor at the Department of Accounting and Auditing,
Ferenc Rakoczi II Transcarpathian Hungarian University
ORCID: https://orcid.org/0000-0001-6902-6303

Ганусич Вероніка Олександрівна
Закарпатський угорський університет імені Ференца Ракоці II

CONCEPTUAL FOUNDATIONS OF ON-CHAIN ANALYSIS OF DIGITAL ASSET MARKETS

КОНЦЕПТУАЛЬНІ ОСНОВИ ОНЧЕЙН АНАЛІЗУ РИНКУ ЦИФРОВИХ АКТИВІВ

Summary. The growing transparency of blockchain infrastructures has created new methodological conditions for analysing cryptocurrency markets using transaction-level data. The aim of the study is to clarify the conceptual foundations, analytical functions and structural role of on-chain analysis within the system of financial market research. The study systematises the principal types of on-chain analytical procedures and proposes a hierarchical classification based on micro-, meso- and macro-level analytical dimensions. The results demonstrate that on-chain analysis represents an independent methodological component complementing fundamental and technical analysis and improving interpretation of capital flows, behavioural transformations and network-level economic activity in decentralised digital asset ecosystems.
Keywords: on-chain analysis, cryptocurrency markets, capital flows, behavioural analysis of market participants, decentralised finance.

Анотація. Зростання ролі цифрових активів у сучасній фінансовій системі та підвищення рівня прозорості блокчейн-інфраструктур зумовлюють необхідність формування нових методологічних підходів до аналізу криптовалютних ринків. Метою статті є узагальнення теоретичних засад ончейн аналізу, визначення його ролі, функцій і сфери застосування в системі сучасного фінансового аналізу, а також обґрунтування його методологічного місця в єдиній системі із фундаментальним і технічним аналізом. У статті сформульовано авторське трактування ончейн аналізу як спеціалізованого методологічного підходу до дослідження криптовалютних ринків, що ґрунтується на системній інтерпретації даних блокчейн-транзакцій з метою виявлення закономірностей мережевої активності, поведінкових характеристик учасників ринку та напрямів руху капіталу в цифрових фінансових екосистемах. Систематизовано основні функції ончейн аналізу, серед яких виділено моніторинг транзакційної активності, ідентифікацію процесів накопичення та розподілу активів, виявлення поведінкових змін учасників ринку, оцінювання економічної активності мережевого рівня та інтерпретацію структурних параметрів ринку поза межами цінових індикаторів. Обґрунтовано місце ончейн аналізу в системі методів дослідження фінансових ринків шляхом порівняння його інформаційної бази, аналітичної спрямованості та пояснювального потенціалу з фундаментальним і технічним аналізом. Запропоновано структуровану класифікацію основних типів ончейн аналізу за рівнями дослідження, що включає мікрорівневий, мезорівневий та макрорівневий підходи до інтерпретації блокчейн-даних. Встановлено, що багаторівнева організація аналітичних процедур забезпечує комплексне дослідження руху капіталу, структури володіння активами та трансформацій мережевої взаємодії в децентралізованих фінансових системах. Наукова новизна отриманих результатів полягає в комплексному теоретичному узагальненні ончейн аналізу як самостійного методологічного компонента системи дослідження криптовалютних ринків та цифрових активів. Застосування ончейн аналізу у прийнятті інвестиційних рішень сприятиме підвищенню якості інтерпретації транзакційних даних, розширення інформаційної бази оцінювання структурних процесів у цифрових фінансових екосистемах.
Ключові слова: ончейн аналіз, криптовалютні ринки, рух капіталу, поведінковий аналіз учасників ринку, децентралізовані фінанси.

Problem statement. The rapid expansion of cryptocurrency markets has significantly transformed the methodological foundations of financial asset analysis. Unlike traditional financial instruments, digital assets operate within decentralised blockchain systems that provide publicly accessible information about transactions, network activity and investor behaviour. This technological transparency has

enabled the emergence of a new analytical approach known as on-chain analysis, which relies on blockchain data to evaluate market structure, capital flows and behavioural dynamics within digital asset ecosystems.

The growing institutional participation in cryptocurrency markets and the increasing integration of blockchain technologies into global financial infrastructure have strengthened the importance of analytical methods capable of interpreting network-level economic activity. Under these conditions, on-chain analysis is becoming an important component of modern financial research, complementing traditional approaches to market evaluation and expanding the information base available to investors and analysts.

Traditionally, financial market analysis has been based primarily on two methodological frameworks: technical analysis, focused on price movements and trading dynamics, and fundamental analysis, aimed at assessing the intrinsic value and macroeconomic environment of financial assets. However, the transparency of blockchain systems introduces a qualitatively new analytical dimension that allows direct observation of transaction flows and structural changes within decentralised networks, thereby extending the analytical capabilities of conventional methods.

Despite the increasing practical application of on-chain indicators in investment decision-making and academic research, the conceptual foundations, analytical functions and methodological role of on-chain analysis remain insufficiently systematised. In particular, its position within the general system of financial market analysis requires further clarification.

Analysis of recent research and publications. Recent academic research demonstrates increasing attention to the analytical use of blockchain transaction data for studying cryptocurrency markets, decentralised finance ecosystems and behavioural dynamics of digital asset participants. In particular, on-chain indicators are increasingly applied to investigate capital distribution structures, transaction networks and determinants of cryptocurrency price formation.

Several studies focus on the empirical interpretation of blockchain-based economic activity. In particular, Celig T. and Ockenga T. A. [1] analyse the distribution of Ether supply using on-chain data and demonstrate the importance of address-level indicators for assessing ownership concentration within decentralised networks. Similarly, Ciaian P., Kancs d'Artis and Rajcaniova M. [2] examine the interaction between on-chain and off-chain demand and supply factors influencing Bitcoin price dynamics, highlighting the explanatory role of blockchain-derived indicators in cryptocurrency valuation processes. Network-based analytical approaches are further developed by Xia L. et al. [3], who propose a transaction-network methodology for identifying behavioural relationships between blockchain addresses.

Another group of studies investigates the functioning of decentralised finance ecosystems as an institutional environment supporting blockchain-based financial activity. In particular, Chowdhury M. A. F. et al. [4] analyse volatility dynamics across DeFi-related digital assets, while Metelski D. and Sobieraj J. [5] examine performance indicators used in the valuation of DeFi protocols. Technological aspects of decentralised financial infrastructures, including the reliability of oracle mechanisms, are considered by Zhao Y. et al. [6].

Theoretical foundations of decentralised finance as a new form of financial intermediation are examined in the works of Schär F. [7], Grassi L. et al. [8], Jensen J. R. et al. [9] and Schueffel P. [11], where blockchain-based financial architectures are interpreted as alternative mechanisms of capital allocation within digital markets. Complementing these contributions, Kitzler S. et al. [10] analyse structural interactions between DeFi protocols and demonstrate the growing complexity of decentralised financial ecosystems.

Despite the expanding body of research devoted to blockchain-based financial environments and decentralised finance systems, the conceptual foundations, analytical functions and methodological role of on-chain analysis within the general system of cryptocurrency market research remain insufficiently systematised. This confirms the relevance of further theoretical clarification of on-chain analysis as an independent analytical framework for studying structural transformations in digital asset markets.

The aim of the study is to develop a conceptual interpretation of on-chain analysis as a methodological component of cryptocurrency market research and to determine its analytical role, functions and scope of application within the system of contemporary financial market analysis. Particular attention is devoted to clarifying the structural relationship between on-chain analysis and traditional analytical approaches, including fundamental and technical analysis, as well as to systematising the principal types of on-chain analytical procedures based on blockchain transaction data. The study also seeks to substantiate the multi-level analytical architecture of on-chain analysis and to identify its contribution to improving the transparency and interpretability of capital flow dynamics within decentralised digital asset ecosystems.

Summary of the main research material. The emergence of blockchain technology has created fundamentally new conditions for analysing financial markets by introducing an unprecedented level of transparency into transaction infrastructures.

Unlike traditional financial systems, where access to information about capital movements is typically limited and mediated by financial institutions, decentralised blockchain networks provide publicly verifiable records of economic activity that can be examined in real time. This structural characteristic has enabled the formation of a distinct analytical approach focused on interpreting transaction flows, network participation dynamics and behavioural patterns of market agents directly at the protocol level.

In this context, on-chain analysis has gradually evolved from a technical instrument used primarily within specialised blockchain research communities into an independent methodological direction within the broader system of cryptocurrency market analysis. Its analytical significance is determined not only by the availability of large volumes of structured transactional data but also by the possibility of observing relationships between network activity and market behaviour without relying exclusively on price-based indicators. As a result, on-chain analysis expands the traditional informational boundaries of financial research by incorporating indicators derived from distributed ledger structures into the process of evaluating digital asset ecosystems.

At the same time, the growing use of blockchain data in investment practice has led to the widespread application of individual on-chain indicators without sufficient conceptual clarification of their methodological status within the system of financial analysis. In many applied studies, on-chain metrics are interpreted primarily as auxiliary signals supporting trading decisions rather than as elements of a coherent analytical framework capable of explaining structural transformations in decentralised markets. This situation indicates the need to reconsider on-chain analysis not merely as a set of technical measurement tools but as a structured analytical methodology with its own object of observation, informational base and functional purpose.

From a theoretical perspective, the distinctive feature of on-chain analysis lies in its orientation towards the direct examination of economic interactions recorded within blockchain networks. These interactions reflect changes in transaction intensity, asset distribution among participants, capital concentration patterns and behavioural responses of different categories of market actors to evolving market conditions. Consequently, the analytical value of blockchain data extends beyond descriptive monitoring of network activity and becomes an important source of information about the internal dynamics of decentralised financial systems.

In view of these considerations, on-chain analysis may be defined as a specialised methodological approach to cryptocurrency market research based on the systematic interpretation of publicly available blockchain transaction data in order to identify structural patterns of network activity, behavioural characteristics of market participants and underlying trends in capital movement within decentralised digital asset ecosystems (Table 1).

Within the methodological structure of cryptocurrency market analysis, on-chain analysis performs a set of analytical functions (Fig. 1) that distinguish it from traditional approaches based exclusively on price dynamics or macroeconomic indicators. These functions reflect its ability to interpret blockchain transaction data as a direct source of information about the internal organisation of decentralised financial systems and the behaviour of market participants.

An essential function of on-chain analysis consists in monitoring transaction activity within blockchain networks. Unlike conventional financial markets, where information about capital movements is often fragmented or delayed, blockchain infrastructures provide continuous and publicly verifiable records of transactions. The interpretation of these records enables researchers to evaluate the intensity of network usage, identify shifts in transactional behaviour and detect periods of increased or reduced economic interaction between participants. As a result, transaction activity becomes an important indicator of structural changes in market dynamics

Table1 – Core theoretical elements of on-chain analysis

Element	Content
Conceptual essence	On-chain analysis represents a methodological approach based on the interpretation of blockchain transaction data to identify structural patterns of network activity and behavioural characteristics of market participants.
Role in financial analysis	Serves as an intermediate analytical layer between price-based market signals and fundamental characteristics of digital asset ecosystems, enabling direct observation of capital flows within decentralised networks.
Functions	Provides monitoring of transaction dynamics, identification of accumulation and distribution processes, detection of behavioural changes among market participants, and assessment of network-level economic activity.
Scope of application	Applied in cryptocurrency market research, investment decision support, risk assessment, evaluation of market cycles, and analysis of structural transformations within decentralised financial environments.

Source: developed by the author

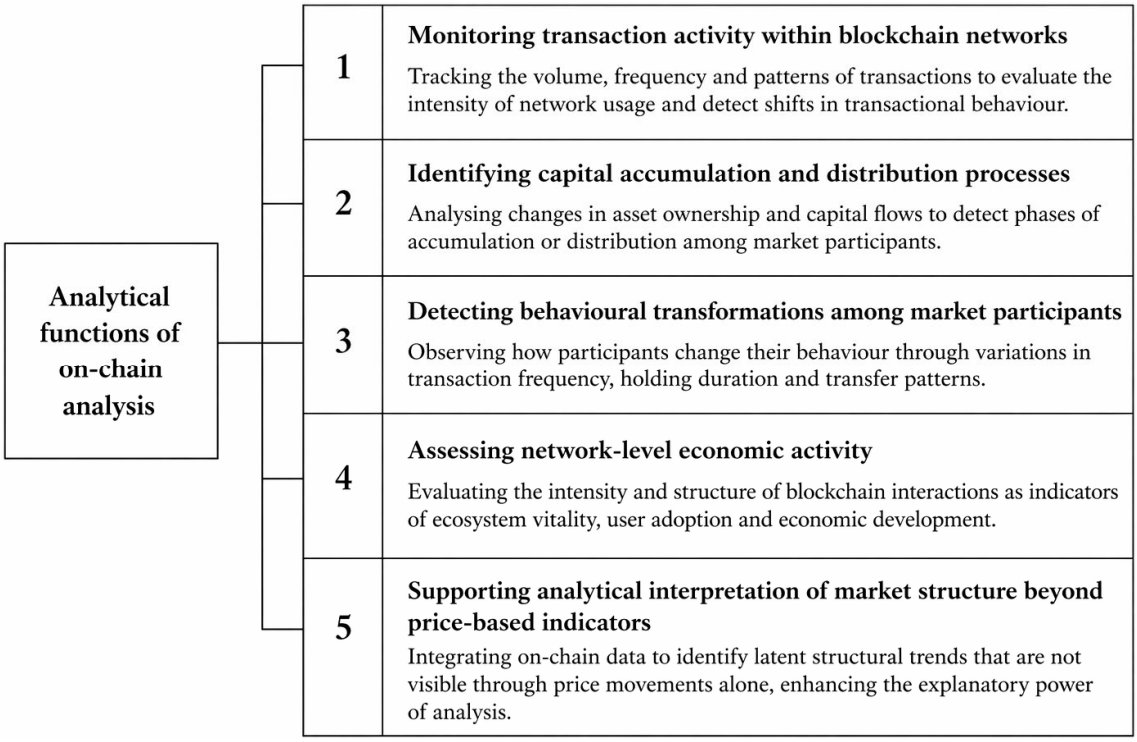

Figure 1 – Mane functions of on-chain analysis

Source: developed by the author

rather than merely a technical characteristic of network functioning.

On-chain analysis performs the function of identifying capital accumulation and distribution processes within digital asset ecosystems. Since blockchain networks allow observation of asset transfers between addresses and categories of holders, they provide opportunities to assess changes in ownership concentration and capital allocation across different groups of market participants. This function is particularly important for detecting phases of strategic accumulation or distribution that may precede significant market movements and therefore contribute to a deeper understanding of cyclical transformations in cryptocurrency markets.

Another important function involves detecting behavioural transformations among market participants. Blockchain data make it possible to observe how different categories of actors respond to changing market conditions through variations in transaction frequency, holding duration and transfer patterns. Such behavioural signals cannot be derived directly from price dynamics alone and therefore provide an additional analytical dimension for interpreting market expectations, sentiment formation and investor positioning within decentralised financial environments.

In addition, on-chain analysis performs the function of assessing network-level economic activity as a reflection of the underlying vitality of digital asset ecosystems. The intensity and structure of blockchain interactions may indicate the degree of participation in decentralised financial processes, the expansion of user adoption and the evolution of economic relationships within blockchain-based infrastructures. From this perspective, network activity represents not only a technical parameter but also an economic indicator characterising the development stage of a cryptocurrency system.

An integrative function of on-chain analysis lies in supporting analytical interpretation of market structure beyond price-based indicators. By combining information about transaction flows, distribution of assets and behavioural dynamics of participants, on-chain analysis contributes to the identification of latent structural trends that remain invisible within traditional technical or fundamental analytical frameworks. In this sense, it operates as a complementary methodological instrument that enhances the explanatory capacity of cryptocurrency market research and strengthens the analytical reliability of investment-related conclusions.

The analytical functions discussed above demonstrate that on-chain analysis extends the informational boundaries of cryptocurrency market research by enabling direct observation of transaction structures, capital redistribution processes and behavioural transformations within decentralised networks. At the same time, a clearer understanding of its methodological significance requires positioning this approach within the broader system of financial

market analysis alongside traditional analytical frameworks.

Fundamental and technical analysis represent two established methodological directions that interpret market dynamics from different perspectives: the former focuses on economic determinants of asset value, while the latter concentrates on price movements and trading behaviour. In contrast, on-chain analysis relies on blockchain-based transaction data reflecting network-level economic activity and therefore introduces an additional analytical dimension that complements conventional approaches.

Fundamental, technical and on-chain analysis differ primarily in their analytical object, informational base and explanatory orientation. Fundamental analysis interprets value formation through economic and institutional factors, whereas technical analysis identifies patterns in market behaviour reflected in price dynamics. On-chain analysis, in turn, provides access to transaction-level evidence describing the internal structure of decentralised financial systems and the movement of capital between categories of network participants.

Such a methodological position allows on-chain analysis to function as a complementary analytical layer linking valuation-based interpretations with behavioural signals derived from market data. As a result, it contributes to a more comprehensive understanding of cryptocurrency market structure and strengthens the analytical framework required for interpreting financial performance and investment processes within blockchain-based environments. Multidimensional comparison of fundamental, technical and on-chain analysis makes it possible to identify the specific analytical niche occupied by on-chain analysis within the system of cryptocurrency market research and to clarify its relationship with established approaches to financial market evaluation. A structured comparative matrix reflecting these analytical parameters is presented in Table 2.

As illustrated in Table 2, the three analytical approaches differ not only in their informational base but also in their methodological orientation and interpretative potential with respect to market dynamics. The key difference and main advantage of on-chain analysis is that it is based on objective, real-time data.

The analytical functions of on-chain analysis discussed above are implemented through a set of specialised research directions that differ in their object of observation, analytical scale and informational sources. In practical cryptocurrency market research, these directions form a structured system of analytical procedures aimed at interpreting

Table 2 – Comparative matrix of fundamental analysis, technical analysis and on-chain analysis in financial market research

Analytical criterion	Fundamental analysis	Technical analysis	On-chain analysis
Object of analysis	Economic fundamentals of assets, financial performance indicators, macroeconomic and industry conditions	Price dynamics, trading volume, market trends and chart patterns	Blockchain transaction flows, address activity, asset distribution and network interaction structure
Primary data sources	Financial statements, economic indicators, project documentation, regulatory environment	Historical price series, trading volume, technical indicators	Public blockchain ledgers, transaction histories, wallet activity and network-level datasets
Analytical focus	Intrinsic value assessment and long-term sustainability of assets	Identification of market trends and short-term price movements	Structural dynamics of capital flows and behavioural activity of network participants
Type of indicators used	Financial ratios, macroeconomic variables, project fundamentals	Moving averages, oscillators, support and resistance levels, volatility indicators	Transaction volume metrics, holding behaviour indicators, address-based activity measures
Behavioural interpretation	Indirect, inferred through macroeconomic expectations and corporate performance	Derived from price reactions and market sentiment reflected in charts	Direct observation of behavioural transformations through transaction patterns and capital movement
Market transparency level	Limited by availability and periodicity of disclosed information	Based on publicly observable price data	Based on fully transparent and continuously updated blockchain records
Analytical role in cryptocurrency markets	Evaluates technological, economic and institutional foundations of digital assets	Identifies trading signals and market timing opportunities	Explores internal network structure and capital redistribution processes within decentralised ecosystems
Methodological contribution	Explains why asset value changes	Explains when price movements occur	Explains how capital moves within blockchain-based markets

Source: developed by the author

transaction behaviour, capital redistribution patterns and network interaction dynamics within blockchain environments. Their classification makes it possible to clarify the internal structure of on-chain analysis as a methodological framework and to identify the principal empirical datasets supporting its application in financial research.

In order to systematise the main analytical directions of on-chain analysis and to demonstrate their relationship with available blockchain data infrastructures, the principal types of on-chain analysis and their corresponding analytical data sources are presented in Table 3.

As shown in Table 3, the identified types of on-chain analysis differ not only in their analytical focus but also in the level of market structure at which they operate. Some approaches concentrate on the behaviour of individual addresses and entities, others examine interactions within blockchain ecosystems and protocols, while another group of analytical procedures evaluates aggregate indicators reflecting network-wide economic activity. Such differentiation indicates the existence of a multi-level analytical architecture within on-chain research.

From a methodological perspective, the systematisation of these analytical directions allows their integration into a hierarchical framework reflecting micro-, meso- and macro-level dimensions of cryptocurrency market analysis. This classification provides a clearer understanding of how individual analytical procedures contribute to the interpretation of structural transformations within decentralised financial systems. The corresponding analytical structure of on-chain analysis by research level is presented in Fig. 2.

The classification presented in Fig. 2 demonstrates that on-chain analysis represents a multi-level analytical framework integrating address-level observations, ecosystem-level interactions and network-wide structural indicators into a coherent system of cryptocurrency market research. Such a hierarchical organisation makes it possible to interpret blockchain data not only as isolated transaction records but as interconnected elements reflecting behavioural, institutional and macrostructural transformations within decentralised financial environments. The combined application of micro-, meso- and macro-level analytical procedures ensures a more comprehensive interpretation of capital flows, ownership structures and network activity dynamics, thereby strengthening the explanatory capacity of contemporary financial market analysis in the context of digital asset ecosystems. In this regard, on-chain analysis may be considered an independent methodological component of the analytical toolkit used for studying cryptocurrency markets, complementing traditional approaches to financial research and expanding the informational basis for evaluating market structure and investment processes.

Conclusions. On-chain analysis occupies a distinct methodological position within the system of cryptocurrency market research as an analytical approach based on the interpretation of blockchain transaction data reflecting capital flows, ownership

Table 3 – Main types of on-chain analysis and their analytical data sources

Type of on-chain analysis	Analytical interpretation	Sources for research
Wallet holdings analysis	Examination of balances, portfolio structure and historical accumulation of cryptoassets across individual addresses or entities in order to identify concentration of ownership and investment behaviour patterns	Arkham Intelligence, Glassnode, Nansen, Etherscan
Transaction flow analysis	Tracking transfers between blockchain addresses to identify capital movement, trading intentions and structural shifts in asset distribution	Arkham Intelligence, Blockchain.com Explorer, Etherscan, Blockchair
Exchange flow analysis	Assessment of inflows to and outflows from exchange wallets used to interpret potential selling pressure or accumulation dynamics	CryptoQuant, Glassnode, Arkham Intelligence
Large holder (whale) activity analysis	Monitoring behaviour of major token holders whose transactions may influence liquidity conditions and market expectations	Whale Alert, Nansen, Arkham Intelligence
Token distribution structure analysis	Identification of ownership concentration and relative dominance of institutional or insider participants within a token ecosystem	Etherscan Token Holders, Arkham Intelligence, Bubblemaps
Multichain activity analysis	Evaluation of cross-network capital transfers and user interaction across different blockchain ecosystems	Arkham Intelligence, DeFiLlama, Dune Analytics
Network-level activity analysis	Analysis of macro indicators such as active addresses, transaction volume, adoption dynamics and protocol utilisation	Glassnode, CoinMetrics, IntoTheBlock

Source: compiled on the basis of [12]

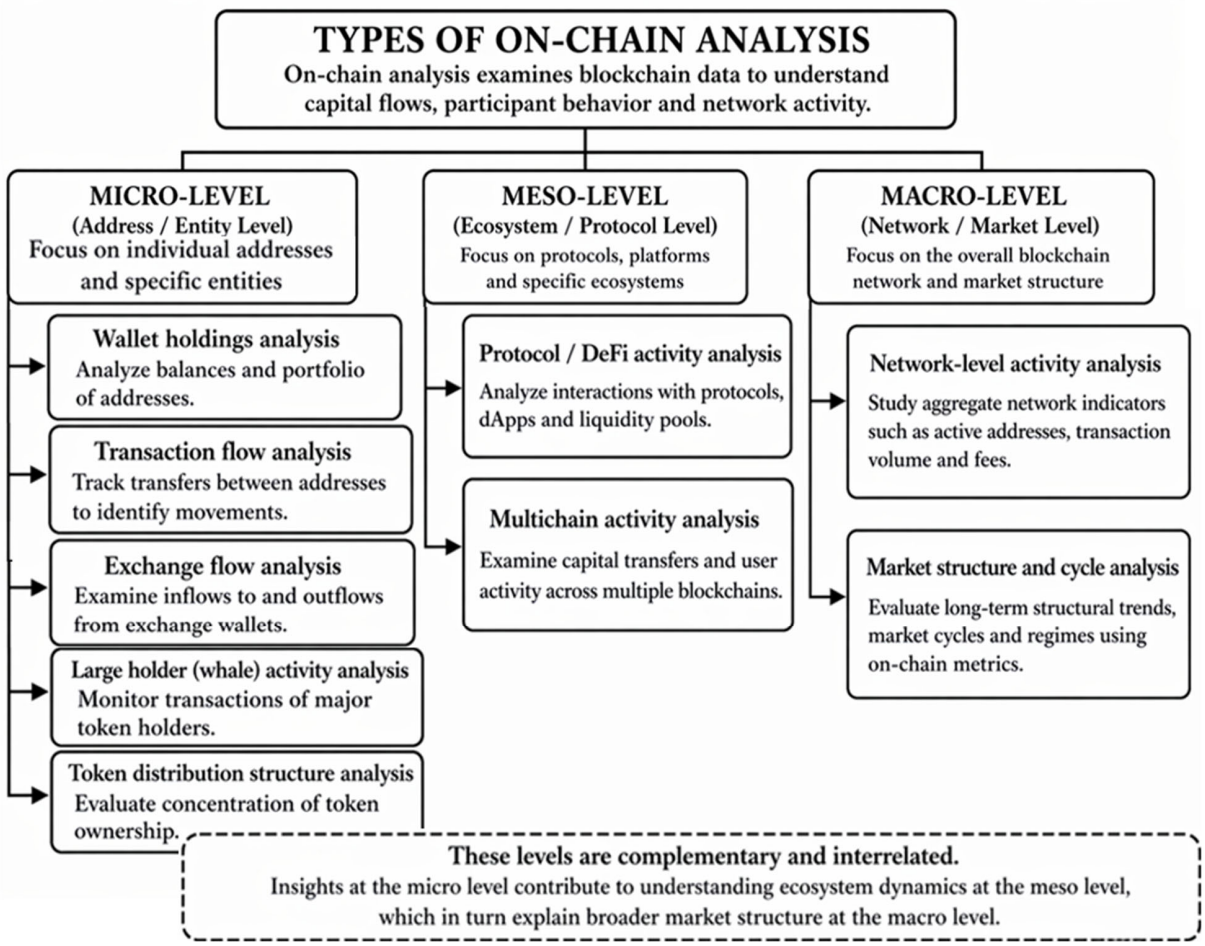

Figure 2 – Classification of on-chain analysis types by analytical level

Source: developed by the author

structures and behavioural dynamics of market participants. Its conceptual differentiation from technical and fundamental analysis confirms the formation of an additional analytical dimension that enables direct observation of structural processes within decentralised financial environments. The analytical functions of on-chain analysis include monitoring transaction activity, identifying accumulation and distribution processes, detecting behavioural transformations among market participants, assessing network-level economic activity and supporting interpretation of market structure beyond price-based indicators. The integration of these functions expands the informational basis of financial analysis and strengthens the interpretative capacity of research focused on digital asset ecosystems.

Comparative assessment of fundamental, technical and on-chain analysis demonstrates differences in analytical object, data sources and explanatory orientation, while confirming their complementary role within the overall framework of cryptocurrency market evaluation. Fundamental analysis explains value formation through economic determinants, technical analysis identifies patterns in price behaviour, whereas on-chain analysis reveals mechanisms of capital movement within blockchain-based markets.

Systematisation of the main types of on-chain analysis clarifies their analytical structure and empirical foundation through the identification of address-level, transaction-level and network-level research directions supported by specialised blockchain data platforms. The proposed classification of on-chain analysis by micro-, meso- and macro-level analytical dimensions establishes a hierarchical framework linking individual transaction behaviour with ecosystem interactions and aggregate indicators of market structure.

The presented conceptual interpretation of on-chain analysis as a multi-level analytical system contributes to the development of methodological approaches to cryptocurrency market research and strengthens the theoretical basis for integrating blockchain data into financial analysis. Further research may focus on empirical evaluation of on-chain indicators within investment modelling frameworks and on assessing their predictive capacity in relation to market cycle dynamics.

References:

1. Celig, T., Ockenga, T. A., & Schoder, D. (2025) Distributional equality in ethereum? on-chain analysis of Ether Supply Distribution and Supply Dynamics. *Humanities and Social Sciences Communications*, vol. 12(1). DOI: https://doi.org/10.1057/s41599-025-04728-9

2. Ciaian, P., Kancs, d'Artis, & Rajcaniova, M. (2026) On- and off-chain demand and supply drivers of Bitcoin Price. *Economics*, vol. 20(1). DOI: https://doi.org/10.1515/econ-2025-0169

3. Xia, L., Zhu, T., Jing, Z., Wang, Q., Ma, Z., Huang, Z., & Yin, Z. (2025). A two-layer transaction network-based method for virtual currency address identity recognition. *Cryptography*, vol. 9(4). DOI: https://doi.org/10.3390/cryptography9040065

4. Chowdhury, M. A. F., Abdullah, M., Alam M., Abedin, M. Z. & Shi, B. (2023) NFTs, DeFi, and other assets efficiency and volatility dynamics: An asymmetric multifractality analysis. *International Review of Financial Analysis*, vol. 87. DOI: https://doi.org/10.1016/j.irfa.2023.102642

5. Metelsk,i D. & Sobieraj, J. (2022) Decentralized Finance (DeFi) Projects: A Study of Key Performance Indicators in Terms of DeFi Protocols' Valuations. International *Journal of Financial Studies*, vol. 10(4). DOI: https://doi.org/10.3390/ijfs10040108

6. Zhao, Y., Kang, X., Li, T., Chu, C. K. & Wang, H. (2022) Toward Trustworthy DeFi Oracles: Past, Present, and Future. *IEEE Access*, vol. 10. pp. 60914–60928. DOI: https://doi.org/10.1109/ACCESS.2022.3179374

7. Schär, F. (2022). Decentralized finance: on blockchain-and smart contract-based financial markets. *Federal Reserve Bank of St. Louis Review*, vol. 103(2), pp. 153–174. DOI: https://doi.org/10.20955/r.103.153-74

8. Grassi, L., Lanfranchi, D., Faes, A. & Renga, F. M. (2022) Do we still need financial intermediation? The case of decentralized finance – DeFi. *Qualitative Research in Accounting and Management*, vol. 19(3), pp. 323–347. DOI: https://doi.org/10.1108/QRAM-03-2021-0051

9. Jensen, J. R., von Wachter, V. & Ross, O. (2021) An Introduction to Decentralized Finance - DeFi. *Complex Systems Informatics and Modeling Quarterly*, vol. 26, pp. 46–54. DOI: https://doi.org/10.7250/csimq.2021-26.03

10. Kitzler, S., Victor, F., Saggese, P. & Haslhofer, B. (2023). Disentangling Decentralized Finance (DeFi) Compositions. *ACM Transactions on the Web*, vol. 17(2). DOI: https://doi.org/10.1145/3532857

11. Schueffel, P. (2021) DeFi: Decentralized Finance - An Introduction and Overview. *Journal of Innovation Management. Universidade do Porto - Faculdade de Engenharia*. DOI: https://doi.org/10.24840/2183-0606_009.003_0001

12. Arkham. (2026) A Complete Guide to On-Chain Analysis. Available at: https://info.arkm.com/research/on-chain-analysis-guide#author

Список використаних джерел:

1. Celig T., Ockenga T. A., Schoder D. Distributional equality in ethereum? on-chain analysis of Ether Supply Distribution and Supply Dynamics. *Humanities and Social Sciences Communications*. 2025. vol. 12(1). DOI: https://doi.org/10.1057/s41599-025-04728-9

2. Ciaian P., Kancs d'Artis, Rajcaniova M. On- and off-chain demand and supply drivers of Bitcoin Price. *Economics*. 2026. vol. 20(1). DOI: https://doi.org/10.1515/econ-2025-0169

3. Xia L., Zhu T., Jing Z., Wang Q., Ma Z., Huang Z., & Yin Z. A two-layer transaction network-based method for virtual currency address identity recognition. *Cryptography*. 2025. vol. 9(4). DOI: https://doi.org/10.3390/cryptography9040065

4. Chowdhury M. A. F., Abdullah M., Alam M., Abedin M. Z., Shi, B. NFTs, DeFi, and other assets efficiency and volatility dynamics: An asymmetric multifractality analysis. *International Review of Financial Analysis*. 2023. vol. 87. DOI: https://doi.org/10.1016/j.irfa.2023.102642

5. Metelski D., Sobieraj J. Decentralized Finance (DeFi) Projects: A Study of Key Performance Indicators in Terms of DeFi Protocols' Valuations. *International Journal of Financial Studies*. 2022. vol. 10(4). DOI: https://doi.org/10.3390/ijfs10040108

6. Zhao Y., Kang X., Li, T., Chu C. K., Wang H. Toward Trustworthy DeFi Oracles: Past, Present, and Future. *IEEE Access*. 2022. vol. 10. pp. 60914–60928. DOI: https://doi.org/10.1109/ACCESS.2022.3179374

7. Schär F. Decentralized finance: on blockchain-and smart contract-based financial markets. *Federal Reserve Bank of St. Louis Review*. 2022. vol.103(2), pp. 153–174. DOI: https://doi.org/10.20955/r.103.153-74

8. Grassi L., Lanfranchi D., Faes A., Renga F. M. Do we still need financial intermediation? The case of decentralized finance – DeFi. *Qualitative Research in Accounting and Management*. 2022. vol. 19(3), pp. 323–347. DOI: https://doi.org/10.1108/QRAM-03-2021-0051

9. Jensen J. R., von Wachter V., Ross O. An Introduction to Decentralized Finance - DeFi. *Complex Systems Informatics and Modeling Quarterly*. 2021 vol. (26), p. 46–54. DOI: https://doi.org/10.7250/csimq.2021-26.03

10. Kitzler S., Victor F., Saggese P., Haslhofer B. Disentangling Decentralized Finance (DeFi) Compositions. *ACM Transactions on the Web*. 2023. vol. 17(2). DOI: https://doi.org/10.1145/3532857

11. Schueffel P. DeFi: Decentralized Finance - An Introduction and Overview. *Journal of Innovation Management. Universidade do Porto - Faculdade de Engenharia*. 2021. DOI: https://doi.org/10.24840/2183-0606_009.003_0001

12. A Complete Guide to On-Chain Analysis. Arkham. 2026. URL: https://info.arkm.com/research/on-chain-analysis-guide#author

Дата надходження статті: 16.04.2026
Дата прийняття статті: 07.05.2026
Дата публікації статті: 25.05.2026