

A Bibliometric Analysis of Research Trends on Blockchain in Finance: Insights into Transparency, Security, and Collaboration Networks

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Abstract

Introduction: Blockchain technology has emerged as a transformative innovation in the financial sector by enhancing transparency, security, and operational efficiency. As academic interest in blockchain applications continues to grow, understanding the development, structure, and direction of research in this field has become increasingly important. **Novelty:** Although previous studies have examined blockchain broadly, limited research has specifically mapped the intellectual structure, thematic evolution, and collaboration patterns of blockchain research in finance, particularly regarding transparency and security. To address this gap, the present study provides a comprehensive bibliometric mapping of blockchain research in finance from the perspectives of transparency and security. **Methods:** This study applies a bibliometric analysis approach to 256 Scopus-indexed publications related to blockchain in finance. Data were analyzed using the Bibliometrix package in R to examine annual scientific production, keyword co-occurrence, thematic development, historiographic structure, and collaboration networks among authors, institutions, and countries. **Results:** The findings reveal a significant increase in blockchain-related publications, particularly after 2021, indicating growing scholarly attention. Major research themes include blockchain foundations, security and privacy, decentralized finance, regulation, and cross-sector applications. The analysis also demonstrates increasingly interconnected global collaboration networks led by several productive countries. **Conclusion:** Overall, the findings indicate that blockchain has become an increasingly prominent research domain within financial studies. This study contributes by providing a comprehensive mapping of research trends and offering insights for future studies and policy development related to transparency and security in digital financial systems.

KEYWORDS

blockchain; finance; transparency; security.

Introduction

In recent years, blockchain technology has attracted growing attention across multiple sectors, particularly within the financial industry, due to its potential to improve transparency, data security, and operational efficiency (Gurzhi et al., 2022; Monrat et al., 2019). Initially introduced as the underlying technology of Bitcoin, blockchain has subsequently expanded beyond cryptocurrency applications into broader financial uses, such as cross-border payments, smart contracts for automated transaction execution, digital auditing systems and various fintech service innovations (Huang & Lo, 2023; Renduchintala et al., 2022). Its decentralized and immutable characteristics have been discussed in the literature as features that may enhance trust, reduce reliance on traditional intermediaries, and support wider access to financial services under certain institutional conditions (Saqib & AL-Talla, 2023).

Furthermore, the technology's distributed ledger structure enables permanent and tamper-proof transaction recording, facilitates decentralized verification, providing real-time access for authorized parties and significantly increasing accountability and trust in financial systems (Anthony, 2023; Huang & Lo, 2023). Through advanced cryptography and decentralized consensus mechanisms like Proof of Work (PoW) and Proof of Stake (PoS), blockchain offers a robust defense against cyberattacks and data manipulation (Maftei et al., 2023). As financial institutions and central banks actively explore blockchain adoption including the development of Central Bank Digital Currencies (CBDC) the future of the financial industry is expected to increasingly depend on blockchain-based solutions that reshape the global financial structure (Teng, 2021).

Given its transformative potential, blockchain in finance has attracted substantial academic attention. Several previous bibliometric and review studies have explored blockchain research from perspectives such as supply chains, accounting, fintech, blockchain taxonomy, and general blockchain development (Alamsyah & Syahrir, 2023; Firdaus et al., 2019; Kuzior & Sira, 2022; Lardo et al., 2022; Shoaib et al., 2023). However, limited studies have specifically examined the intellectual structure, thematic evolution, and collaboration patterns of blockchain research in finance with particular emphasis on transparency and security issues. Therefore, this study focuses on analyzing academic literature related to blockchain technology in the financial sector through a bibliometric approach to provide a more focused mapping of research trends, thematic development, and scholarly collaboration associated with transparency and security in digital financial systems. The research seeks to address three main questions: (1) How have blockchain research trends in finance evolved over time? (2) What key topics have been explored in academic literature regarding blockchain for financial transparency and security? and (3) How are collaboration patterns formed among researchers and institutions in this field?

The objectives of this study are to analyze publication trends on blockchain in finance, identify major research themes related to transparency and security, and map collaboration networks among researchers, institutions, and countries. Theoretically, this study contributes to the literature by mapping the intellectual structure and thematic development of blockchain research in finance, thereby enriching discussions on innovation diffusion, trust mechanisms, and governance in digital financial systems. The bibliometric evidence also helps clarify how transparency, security, and blockchain-enabled trust mechanisms have evolved as central themes within the scholarly debate (Schmidhuber et al., 2023). Practically, the findings provide useful insights for academics in identifying future research directions, for financial institutions in prioritizing blockchain applications such as cross-border payments and auditing systems, and for policymakers in designing regulatory frameworks that support secure and transparent blockchain-based financial ecosystems.

Methods

Research Type

This study employs a bibliometric research design to analyze the development of scholarly publications related to blockchain in finance. Bibliometric analysis was selected to identify publication trends, thematic evolution, citation structures, and collaboration networks within the literature. The PRISMA protocol was used solely as a transparent and systematic screening framework to identify, filter, and select relevant Scopus-indexed documents for analysis, thereby

improving the rigor and replicability of the data collection process (Haddaway et al., 2022; Page et al., 2021).

Figure 1 presents the systematic document selection process used in this study. Data were retrieved from the Scopus database using keywords related to blockchain, finance, transparency, and security. The initial search identified 422 records. After limiting the results to relevant subject areas, 372 records remained. In the screening stage, duplicate records, non-English publications, conference papers, book chapters, and documents not directly related to the study topic were excluded, resulting in 300 records. During the eligibility stage, records with incomplete bibliographic information, early access documents, and non-final publications were removed. The final dataset consisted of 256 journal articles that met all inclusion criteria. This selection procedure ensured a reliable dataset for analyzing publication trends, thematic development, citation structures, and collaboration networks.

Population and Sample

The population of this study consisted of academic publications related to blockchain, finance, transparency, and security indexed in the Scopus database. The final sample included 256 documents selected through a multi-stage filtering process based on topic relevance, subject area, document type, language, source type, and publication stage.

Research Location

The study focused on global academic literature indexed in the Scopus database, representing research contributions from various countries and institutions.

Instrumentation or Tools

The main tools used in this study were the Scopus database for data retrieval and the Bibliometrix package implemented in the R programming environment, which provides comprehensive functions for bibliometric performance analysis and science mapping (Aria & Cuccurullo, 2017). These tools were subsequently used to examine publication trends, keyword patterns, conceptual structures, historiographic development, and collaboration networks.

Data Collection Procedures

Data were collected from the Scopus database on March 4, 2025 (see Table 1). The search query used was: TITLE-ABS-KEY ("finance" AND "blockchain" AND "transparency" AND "security"). The search was limited to subject areas related to Business, Management and Accounting, Economics, Econometrics and Finance, Computer Science, and Social Sciences. Additional filters were applied to include only journal articles written in English, published in final publication stage, and indexed in Scopus. The initial search produced 422 records, which were subsequently screened and refined following the PRISMA framework to ensure the relevance and consistency of the dataset used in the bibliometric analysis.

Data Analysis

The data were analyzed using the Bibliometrix package in R, which is widely used for bibliometric performance analysis and science mapping across various research domains (Aria & Cuccurullo, 2017). The analytical procedure consisted of four main dimensions, following commonly adopted bibliometric performance and science-mapping approaches in blockchain-related literature (Lardo et al., 2022). First, descriptive performance analysis was conducted to examine annual publication growth, leading authors, productive journals, institutions, and citation patterns. Second, conceptual structure analysis was performed using keyword co-occurrence and thematic mapping to identify dominant research themes and topic evolution. Third, intellectual structure analysis was applied through citation, co-citation, and historiographic

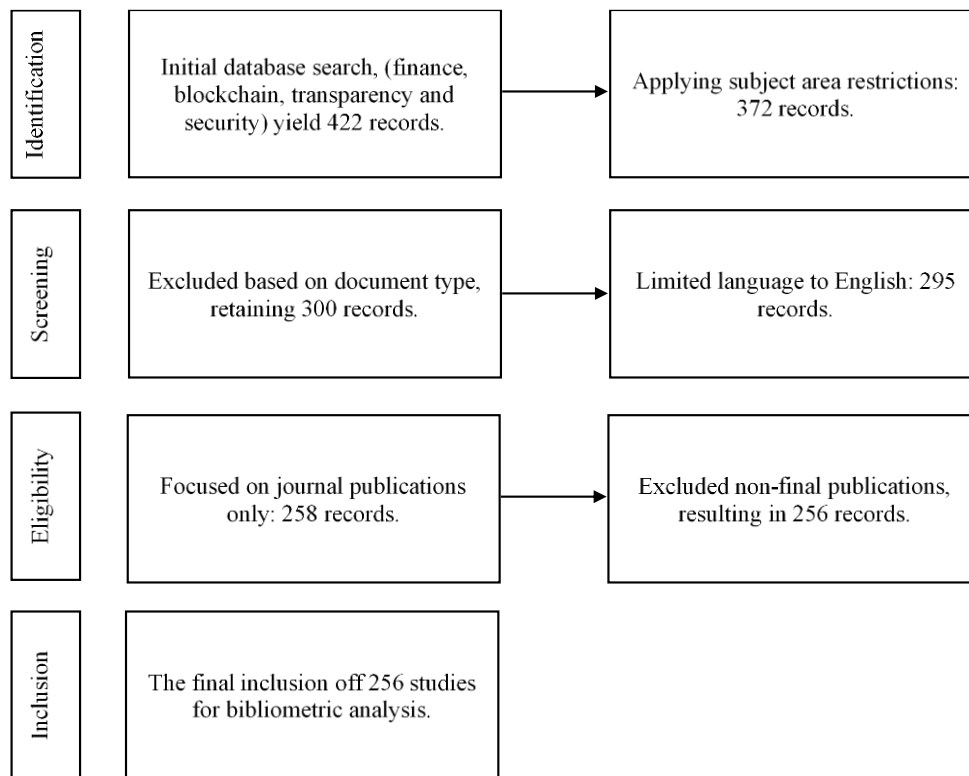


Figure 1. The Prisma Diagram

Source: Processed Data from R Studio, 2025

Table 1. Data Collection Criteria

Scopus Category	Collection Criteria	No. of Article
Topic	finance, blockchain, transparency and security	422
Subject area	Computer science, Business management and accounting, Economics, and Finance	372
Document type	Conference paper, Article	300
Language	English	295
Source type	Conference Proceedings, Journal	258
Publication stage	Final	256

Source: Scopus Database

mapping to explore the knowledge base of the field. Fourth, social structure analysis was used to evaluate collaboration networks among authors, institutions, and countries. A co-authorship network was generated using the Bibliometrix package in R based on author co-publication relationships within the selected dataset. Nodes represent authors, while links indicate collaboration through co-authored publications. Cluster colors represent groups of closely connected researchers. Network metrics, including Betweenness

Centrality, Closeness Centrality, and PageRank, were generated using the Bibliometrix package in R to examine authors' relative positions and connectivity within the collaboration network. These metrics were interpreted descriptively to identify patterns of collaboration and network structure among researchers in blockchain-related financial studies. Interpretations were derived from the bibliometric indicators and visual maps generated through the software.

Result and Discussion

Source

Temporal trends in scientific production show the evolution of interest in Blockchain research in finance for transparency and security.

According to Figure 2, between 2018 and 2020, the number of blockchain-related publications in finance showed a steady increase from four to nine articles, marking the initial phase of increased academic interest. A more significant increase occurred in 2021–2022, in line with the increasing adoption of digital technology, the expansion of blockchain applications in financial services, and the decentralization of financial systems (Alamsyah & Syahrir, 2023). The sharp increase in publications in 2023–2024 indicates a significant expansion in research, driven by technological advances and a growing focus on the transparency and security of blockchain-based finance. The sharp decline in 2025 is likely due to delayed indexing or incomplete data reporting, rather than a genuine decline in research interest.

Documents

This section presents key visualizations of major trends in publications related to blockchain in finance, with particular attention to transparency and security themes. The analysis includes a WordCloud, word frequency trends over time, and emerging research topics, as illustrated in Figures 3 and 4.

Figure 3 illustrates the results of the analysis of the most dominant keywords in the literature related to the use of blockchain technology in the financial sector. The terms "blockchain" and "block-chain" occupy a central position in the research network, demonstrating their fundamental role as key links between topics. The dominance of these two terms confirms that the primary focus of research lies in the application of blockchain as a means of increasing transparency, security, and efficiency in modern financial systems.

Furthermore, the term "smart contract" emerged as a

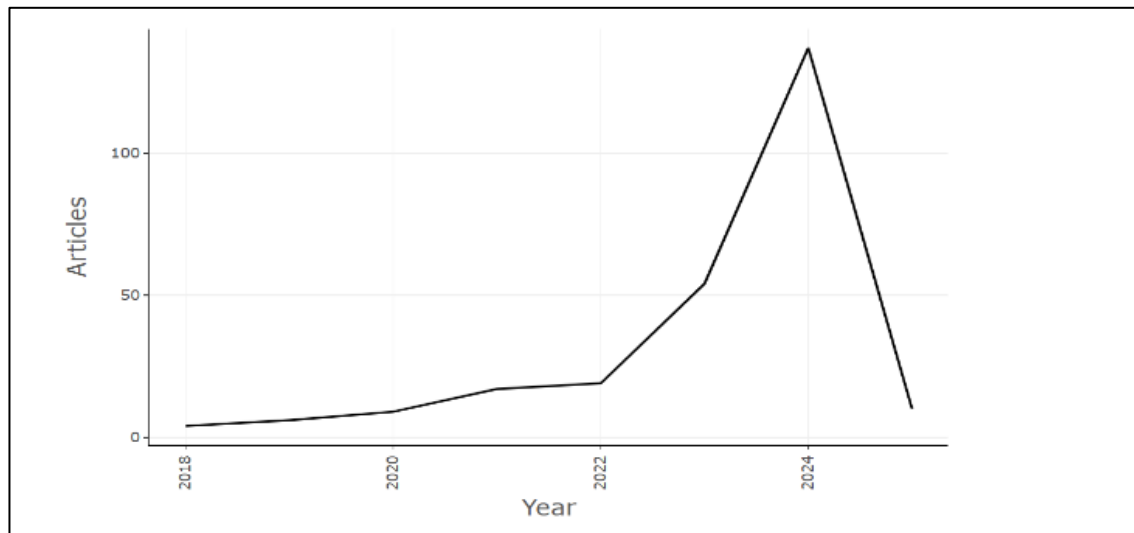


Figure 2. Annual Scientific Production

Source: Processed Data From R-Studio, 2025

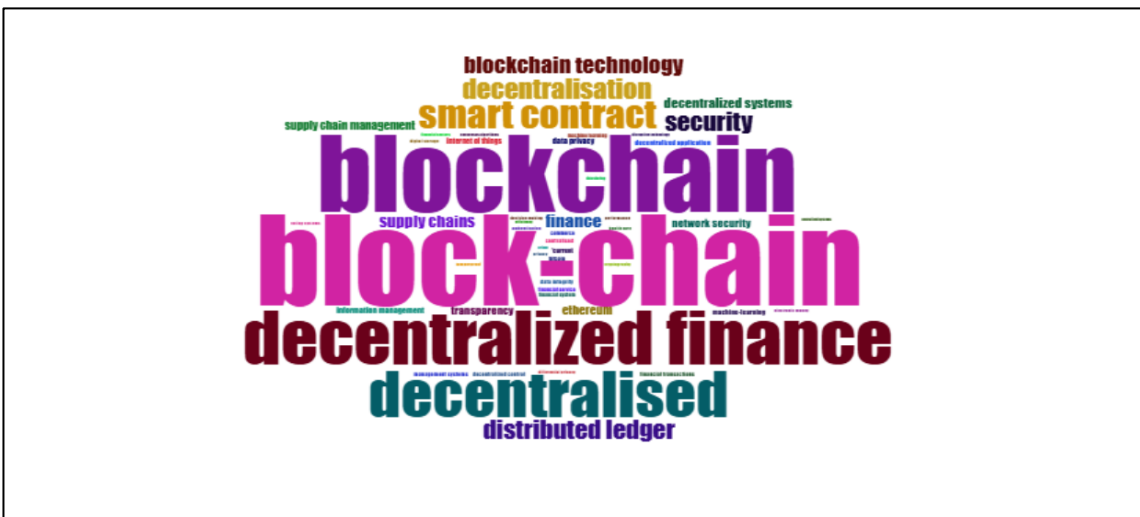


Figure 3. WordCloud

Source: Processed Data From R-Studio, 2025

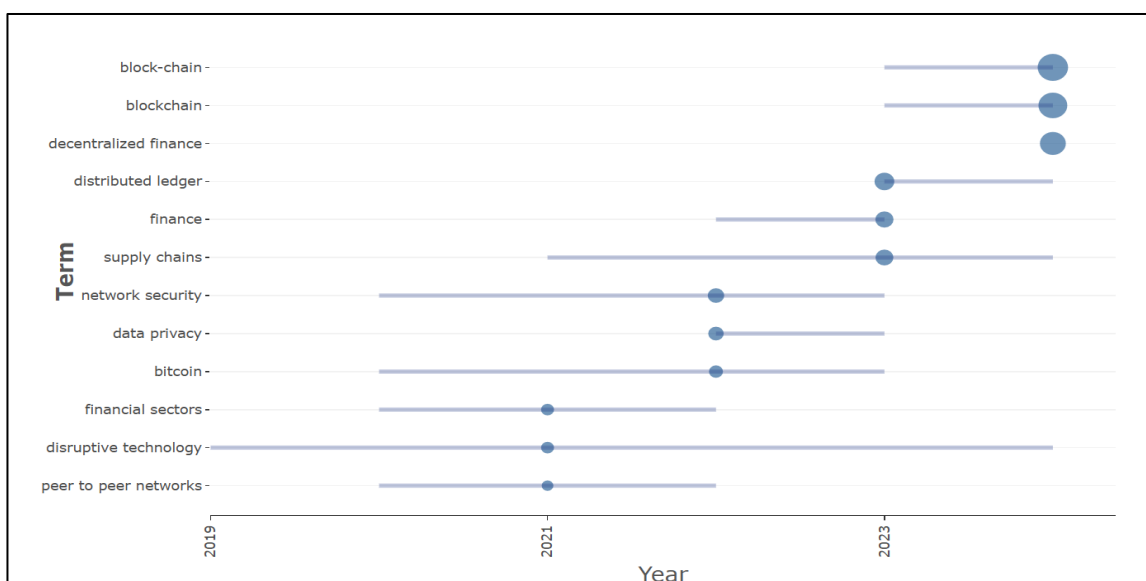


Figure 4. Trend Topics

Source: Processed Data From R-Studio, 2025

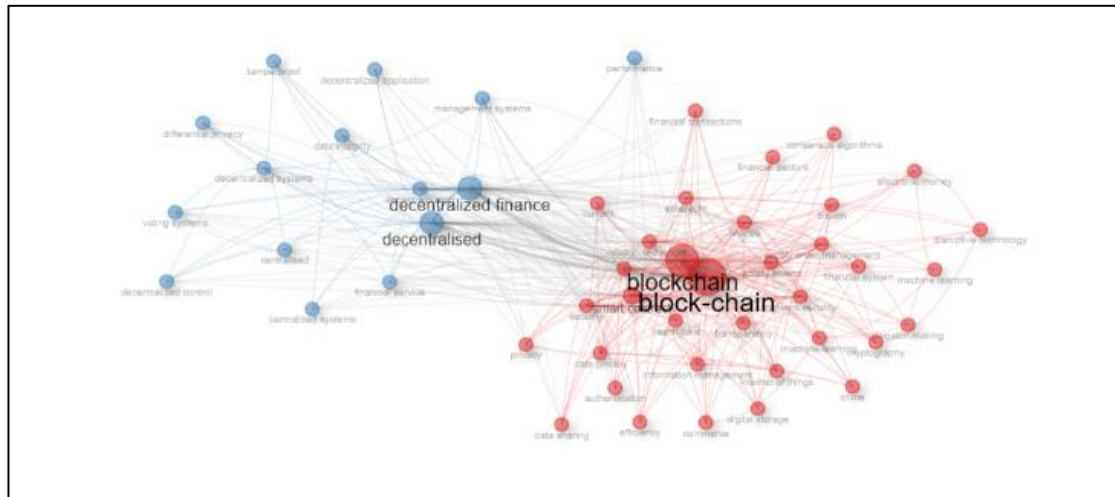


Figure 5. Co-occurrence Network

Source: Processed Data From R-Studio, 2025

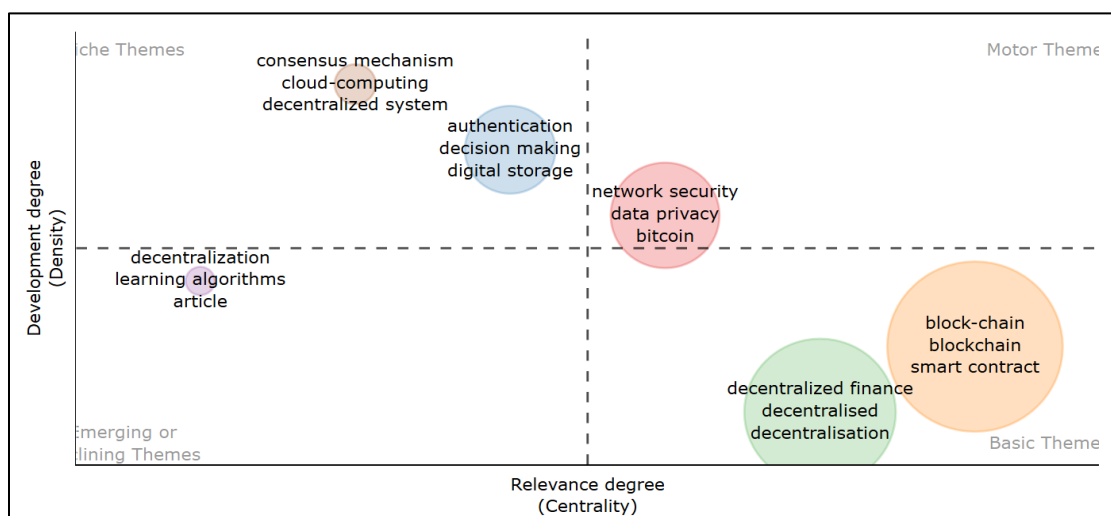


Figure 6. Thematic Map

Source: Processed Data From R-Studio, 2025

significant theme, reflecting the significant attention paid to transaction automation and the reliability of decentralized financial systems. Meanwhile, "distributed ledger" serves as a key element in ensuring secure and transparent data recording across the digital financial ecosystem. This finding is consistent with previous studies highlighting distributed ledger technology as the technological foundation supporting blockchain-enabled financial services (Anthony, 2023). The high connectivity and influence of these terms indicate that research in this area remains focused on the development and application of blockchain as a foundation for innovation in digital transformation, both in the financial sector and other industrial sectors.

Figure 4 illustrates the evolution of research themes over time in the field of blockchain in finance. Early discussions were associated with broader themes such as disruptive technology and peer-to-peer networks. In more recent years, research attention has shifted toward blockchain-specific topics, including decentralized finance, distributed ledger systems, and blockchain applications in financial sectors. Security-related themes such as network security and data privacy also appear prominently, indicating growing concern for trust, protection, and transparency in digital financial systems. This increasing emphasis on security-related themes is consistent with previous studies highlighting the

importance of secure smart contract analysis and vulnerability detection in blockchain-based systems (Kushwaha et al., 2022).

The digitalization of the financial system has shown significant growth since 2020, supported by the development of fintech, blockchain-based transactions, and peer-to-peer models that strengthen transparency and decentralization of global finance. Research activity peaked in 2021–2022, as the accelerated adoption of digital technologies expanded the value of the innovation-based economy.

Meanwhile, cybersecurity emerged as the most prominent topic since 2020 and continued to rise through 2023, in line with increasing cyber threats and the need for stronger data protection. Research in this area highlights the implementation of encryption, AI-based threat detection, and increasingly stringent global data protection policies.

Overall, the theme evolution indicates a notable increase in research attention to blockchain-related topics in finance since 2021, particularly concerning network security, financial digitalization, and transparency-related issues. The persistence of these themes through 2024 suggests continuing scholarly interest in the role of blockchain technology in supporting secure and transparent financial systems. The trend-topic analysis also highlights the growing integration of security and regulatory concerns within blockchain-based financial research.

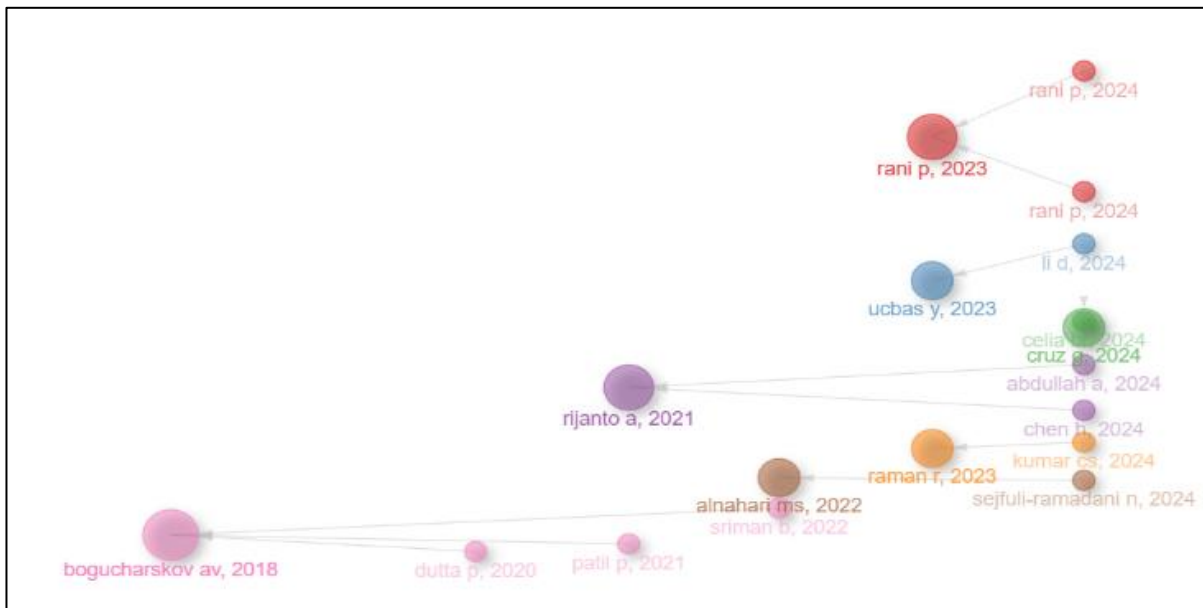


Figure 7. Historiograph

Source: Processed Data From R-Studio, 2025

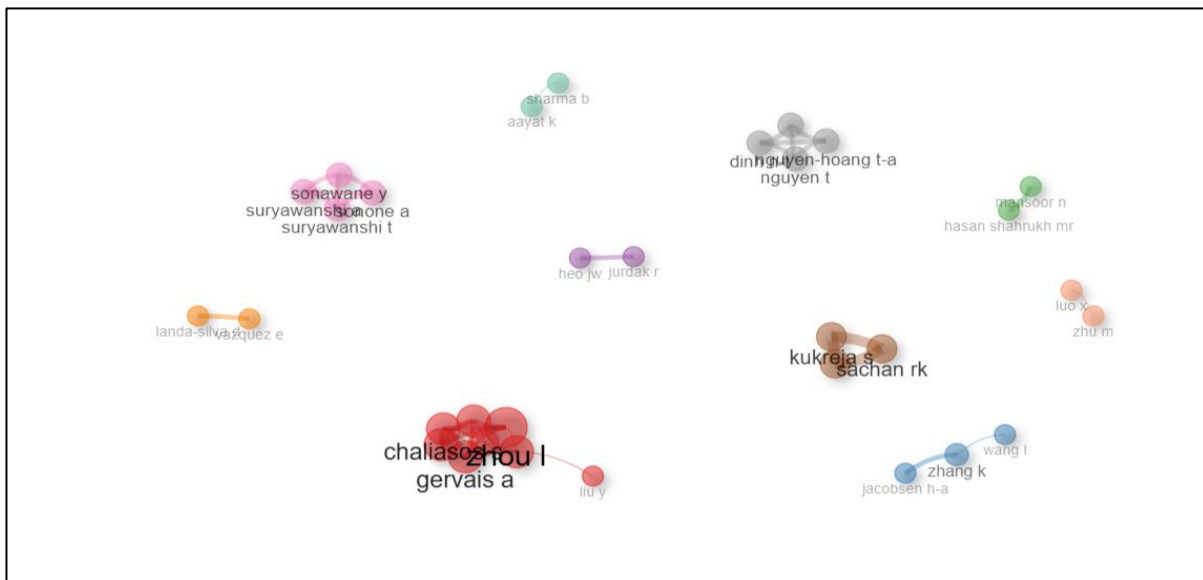


Figure 8. Collaboration

Source: Processed Data From R-Studio, 2025

Conceptual structure

Figure 5 presents a keyword co-occurrence network that illustrates the thematic structure of blockchain research in finance. Two major clusters can be identified. The first cluster is centered on blockchain and block-chain, which are strongly associated with themes such as transparency, security, banking, supply chains, and data sharing. This indicates that blockchain research has been widely linked to operational efficiency, trust, and transaction security across financial and related applications. The second cluster is centered on decentralized finance and decentralised themes, connected with governance, management systems, and access control. This suggests growing scholarly attention to decentralized financial models and alternative governance mechanisms within digital finance ecosystems.

Cluster 2 highlights security and privacy issues, with key terms such as cryptography, zero-knowledge proof (ZKP), and cybersecurity. Research in this cluster focuses on protecting user data through advanced encryption technologies such as

homomorphic encryption and multi-party computation (MPC) without compromising system transparency.

Cluster 3 discusses the application of blockchain in the Decentralized Finance (DeFi) ecosystem, with keywords such as cryptocurrency, stablecoin, and tokenization, demonstrating a shift toward decentralized financial practices, including digital asset trading, yield farming, and the development of Central Bank Digital Currency (CBDC). This pattern is consistent with previous studies showing that blockchain interoperability and decentralized infrastructures have become important foundations for the development of modern digital payment systems and decentralized financial services (Mohanty et al., 2022).

Meanwhile, Cluster 4 highlights regulatory and compliance aspects, with themes such as regulation, compliance, and AML/KYC, reflecting the growing attention to legal frameworks and government policies to ensure transparency and stability in blockchain-based economies.

Cluster 5 focuses on cross-industry applications beyond the

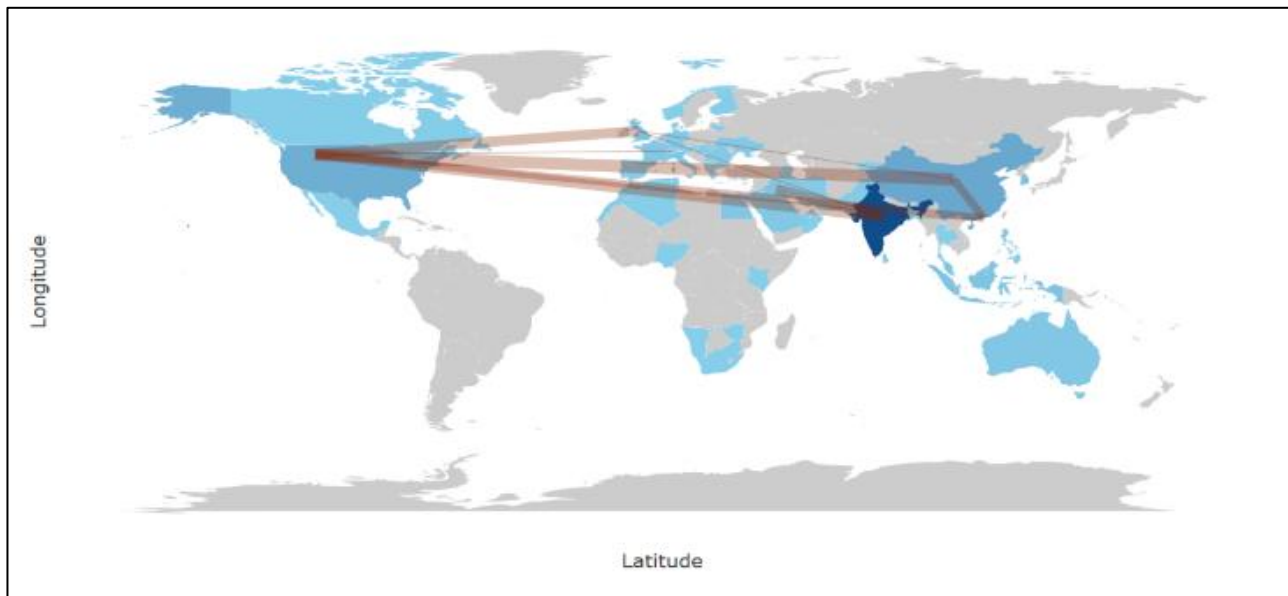


Figure 9. Countries' Collaboration World Map
Source: Processed Data From R-Studio, 2025

financial sector, encompassing supply chain management, healthcare blockchain, and e-government. This illustrates the use of blockchain to improve transparency, efficiency, and data security in the logistics, healthcare, and public administration sectors. This broader application pattern is consistent with previous studies suggesting that blockchain has expanded beyond cryptocurrency into diverse organizational and business applications through various blockchain-inspired business models (Chong et al., 2019).

Overall, the co-occurrence network demonstrates that blockchain research has expanded from foundational technological concepts toward broader application-oriented discussions within the financial domain. The relationships among keywords such as blockchain, smart contracts, security, privacy, and decentralized finance indicate increasing scholarly attention to the integration of blockchain technology with financial transparency and security issues. These findings reflect the interconnected structure of current blockchain research themes represented in the dataset.

Figure 6 presents a thematic map based on centrality and density. Centrality reflects the relevance of a theme within the overall research field, while density indicates the degree of internal development of that theme. In the lower-right quadrant (basic themes), blockchain, block-chain, and smart contract appear as core themes with high relevance, indicating their foundational role in blockchain research in finance. The cluster containing decentralized finance, decentralised, and decentralisation also appears as an important theme, reflecting increasing scholarly attention to alternative financial systems. In the upper-right quadrant (motor themes), network security, data privacy, and bitcoin are both relevant and well-developed, highlighting the importance of security and trust in digital financial ecosystems. In the upper-left quadrant (niche themes), consensus mechanism, cloud-computing, authentication, and digital storage represent more specialized technical topics. Meanwhile, themes in the lower-left quadrant, such as learning algorithms and decentralization, may represent emerging or relatively underdeveloped research directions. Overall, the map indicates that finance, transparency, and security remain central dimensions of blockchain scholarship.

Decentralized Finance (DeFi) describes decentralized financial innovations through smart contracts that increase transaction efficiency and transparency. Decentralization and blockchain form the foundation of secure and transparent

open systems, supporting various applications in the financial, logistics, and healthcare sectors. Meanwhile, Consensus Mechanism emphasizes validation algorithms such as Proof of Work and Proof of Stake to maintain network reliability.

Overall, these six themes form an interconnected research framework, ranging from security and authentication to decentralization and transaction validation, emphasizing blockchain's role as a foundation for secure, efficient, and transparent digital innovation across various sectors.

Intellectual structure

Figure 7 presents a historiographic map illustrating the chronological development of blockchain in finance research based on citation linkages among influential publications. Earlier studies, such as (Bogucharskov et al., 2018), (Dutta et al., 2020), and (Patil et al., 2021), appear among the initial nodes in the citation network, indicating their presence in the early development of the field. Subsequent publications, including works from 2022 to 2024, form later connected clusters, suggesting continued expansion of scholarly attention and knowledge accumulation. The increasing number of recent nodes indicates growing research activity and diversification of topics related to blockchain, transparency, security, and digital finance.

Entering 2021, (Rijanto, 2021) research appears as an important node within the historiographic structure and is connected to subsequent publications such as (Alnahari & Ariaratnam, 2022) and (Sriman et al., 2022), which expanded the discussion toward additional research topics. The historiograph also indicates increased publication activity in 2023, with contributions from (Raman et al., 2023) and (Rani et al., 2024), reflecting broader thematic diversification within blockchain research in finance.

This trend continued in 2024, with the emergence of new studies by Celia, Cruz, and (Abdullah et al., 2024), strengthening continuity and expanding the global research network. This historiographical pattern indicates that blockchain research has evolved gradually since 2018 from conceptual foundations to exploration of applications and policies and points to a direction that continues to evolve with the emergence of new approaches and perspectives enriching the academic literature.

Figure 8 presents the collaboration network among authors in blockchain in finance research. The network consists of several separate clusters, indicating that collaboration is

organized into small research groups rather than one highly integrated global network. The largest cluster is centered on Chalaszczyk and Gervais, suggesting relatively stronger collaboration links within that group. Other clusters consist of two to four researchers, reflecting more specialized or localized collaborative relationships. Overall, the map indicates growing but still fragmented collaboration patterns in this research field.

Network metric analysis showed that Wang Y had the highest Betweenness score, indicating a relatively central position in connecting collaboration groups within the co-authorship network. Several researchers, including Hasan Shahrukh Mr, Mansoor N, Heo JW, and Jurdak R, demonstrated high Closeness scores, suggesting relatively close connectivity with other collaborators in the network. Meanwhile, Zhang K obtained the highest PageRank score, reflecting a prominent position within the observed collaboration structure.

Overall, this network demonstrates a hierarchical yet efficient collaboration pattern, with large groups serving as research hubs and researchers occupying relatively central positions within the collaboration network, fostering the exchange of ideas, innovation, and strengthening cross-disciplinary research networks.

Figure 9 displays a map of global collaboration in blockchain research in the financial sector, representing a broad international network of collaborations. India occupies a central position with the highest frequency of collaborations, at 25, followed by the United States with 18 and China with 14, demonstrating the dominant role of these three countries in the development of global blockchain research.

The United Kingdom and Iraq are also active, albeit at a lower intensity, indicating diverse participation across the region. This pattern confirms that collaboration is not limited to large economies but also involves a wide range of countries with shared interests in technological innovation and digital financial research.

Overall, this map illustrates the increasing cross-border academic integration that strengthens global knowledge exchange and innovation, and emphasizes the importance of international partnerships in accelerating the progress of blockchain research and application across various sectors.

Temporal analysis indicates that research on blockchain in finance increased substantially between 2018 and 2024, with particularly strong growth after 2021. This pattern reflects expanding scholarly attention to the role of blockchain in digital financial systems, especially in relation to transparency, secure transactions, and decentralized finance. Similar upward publication trends have also been identified in recent studies on blockchain and financial technology (Bao et al., 2025). The increase is also consistent with broader digital transformation in the financial sector (Kuzior & Sira, 2022). From the perspective of innovation diffusion theory, the growth of publications may indicate a broader process of knowledge dissemination, experimentation, and gradual acceptance of blockchain-based solutions in financial markets. The lower publication count observed in 2025 should be interpreted cautiously, as the year may still be incomplete and subject to indexing delays. Overall, the findings suggest that transparency and security have increasingly developed as central dimensions in the evolving blockchain finance literature.

A co-occurrence analysis shows that blockchain research forms six main interconnected thematic clusters. The first cluster, Network Security, serves as the foundation for strengthening system security, focusing on data privacy and protection from cyberthreats (Díaz et al., 2025). The second cluster, Authentication, highlights cryptography-based authentication mechanisms that strengthen the validity of digital identities. The third cluster, Decentralized Finance

(DeFi), plays a crucial role in innovating a financial system without intermediaries, promoting transparency and efficiency in digital transactions. The fourth cluster, Decentralization, serves as the foundation for a more open and transparent digital economic ecosystem. Meanwhile, the Blockchain cluster serves as a core technology supporting various cross-sector innovations, such as logistics and healthcare. Finally, the Consensus Mechanism cluster focuses on algorithms such as Proof of Work and Proof of Stake, which maintain the integrity and validity of transactions (Ahn et al., 2024). These six themes illustrate the evolving direction of blockchain research from early conceptual exploration toward more practical implementation across financial systems and digital security contexts (Shoaib et al., 2023; Zhaisanova & Mansurova, 2023). While previous studies have generally discussed blockchain adoption trends, this study provides a more refined bibliometric mapping by identifying six interconnected thematic clusters that demonstrate how scholarly attention has progressively shifted toward transparency, security, and decentralized financial applications.

The researcher collaboration network exhibits a hierarchical structure, with large groups serving as primary research centers (Yu & Chen, 2021). Researchers like Wang Y play a crucial liaison role with the highest Betweenness score, indicating their ability to bridge diverse research groups. Meanwhile, researchers with high Closeness scores, such as Hasan Shahrukh Mr. and Jurdak R., have quick access to various parts of the network, accelerating the exchange of ideas across disciplines. Zhang K obtained the highest PageRank score, indicating a relatively prominent position within the observed collaboration network. From a global perspective, India, the United States, and China have emerged as major hubs of scientific collaboration, reflecting their dominance in global blockchain research and technology (Rejeb et al., 2025). This collaborative pattern demonstrates that blockchain research development is not solely driven by individual initiatives, but is also driven by increasingly robust international collaborative networks.

Overall, the findings suggest that blockchain research is evolving from foundational technological concepts toward more applied domains such as transparency, security, and decentralized financial systems. This overall pattern is consistent with the taxonomy proposed by (Alamsyah & Syahrir, 2023), which classifies financial services, governance, and security as major streams of blockchain research. Based on these bibliometric patterns, a possible conceptual pathway can be identified in which early studies focused on technological infrastructure, followed by increasing attention to trust and security mechanisms, and more recent interest in practical financial implementation. Future research may further explore regulatory frameworks, user adoption behavior, interoperability, and the long-term sustainability of blockchain-based financial ecosystems. The bibliometric findings suggest that blockchain is increasingly discussed in the literature as part of broader digital transformation initiatives associated with transparency, security, and efficiency in financial systems. Collaboration between countries and researchers strengthens innovation capacity, expands research reach, and opens up new opportunities for sustainable digital economic development.

Conclusion

This study analyzed the development of academic literature on blockchain technology in finance with particular emphasis on transparency and security. The findings indicate substantial growth in scholarly interest, especially in recent years, accompanied by the emergence of key themes such as smart contracts, distributed ledgers, decentralized finance, network

security, and data privacy. The bibliometric results also reveal evolving collaboration patterns and an expanding intellectual structure within the field. Unlike broader previous reviews, this study specifically contributes by mapping blockchain finance research through the focused dimensions of transparency and security, thereby offering a more refined perspective on current research directions. However, this study is limited by its reliance on the Scopus database, English-language publications, and selected document types. Future studies may extend the analysis by incorporating multiple databases and broader publication sources.

The results also indicate that blockchain research in finance has expanded significantly, particularly in recent years, into several major thematic areas, including blockchain foundations, security and privacy, decentralized finance, regulation, and cross-sector applications. These developments suggest increasing scholarly recognition of the need for financial systems that are more transparent, secure, and technologically adaptive. They also highlight the growing importance of governance frameworks and responsive regulatory policies to support the sustainable integration of blockchain within modern financial ecosystems. In addition, collaboration analysis indicates that blockchain research is supported by a complex and globally interconnected network of authors and countries.

These findings indicate that the literature increasingly recognizes blockchain not only as a technological tool but also as a strategic enabler of digital financial ecosystems. Bibliometric patterns suggest growing scholarly attention to blockchain's potential role in enhancing transparency through traceable and immutable transaction records, as well as strengthening security through cryptographic verification and distributed data structures. The literature also highlights increasing interest in decentralized financial architectures that may reduce dependence on centralized intermediaries and support more flexible financial service models. Future studies are encouraged to broaden data coverage through multiple databases and multilingual sources, while also

applying longitudinal or comparative designs to capture evolving research dynamics. Greater attention is needed to underexplored regions, particularly emerging economies where blockchain adoption may follow different institutional pathways. In addition, promising subfields for future inquiry include AI-blockchain integration for fraud prevention and cybersecurity, regulatory frameworks for decentralized finance, and governance challenges in blockchain-based financial ecosystems.

Author contributions

Yohanna Thresia Nainggolan contributed to the conceptualization of the study, including the development of the bibliometric framework and the focus on transparency and security in blockchain finance research, as well as research design, data analysis, and manuscript preparation. Bella Lisa Permatasari and Muh. Irfandy Azis assisted in data collection, data processing, and preliminary analysis. Irawati HM contributed to the interpretation of findings, particularly regarding thematic developments and scholarly implications, and reviewed the manuscript critically. Ferica Christinawati Putri supported the literature review, reference management, and manuscript editing. All authors read and approved the final version of the manuscript.

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