JOURNAL OF BUSINESS AND SOCIAL SCIENCES
eISSN:2805-5187 | Vol.2025, Issue 1, No.09

A Decade of Blockchain in Finance: Bibliometric Analysis and Research Directions

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Abstract

Blockchain technology has rapidly emerged as a transformative force across sectors such as healthcare, supply chains, energy, and voting systems. Its decentralized, transparent, and secure architecture improves efficiency, enhances trust, and reduces costs. Among these domains, finance has experienced the greatest disruption, with blockchain reshaping banking by fostering transparency, security, and efficiency. This study presents a bibliometric analysis of blockchain in finance, mapping trends, patterns, and intellectual trajectories. The analysis explores publication growth, document types, and leading contributors, while identifying the most cited works shaping the field. Using VOSviewer, keyword co-occurrence and bibliographic coupling visualize thematic clusters and intellectual linkages. By synthesizing these findings, the study highlights blockchain's current research landscape, identifies gaps, and proposes future directions.

Keywords

Blockchain, Finance, Bibliometric Analysis, Emerging Trends, Literature Review, VOSviewer

Introduction

Blockchain has become a central topic of scholarly attention in recent years [Dinh et al., 2018]. Its decentralized ledger architecture enables secure, transparent, and immutable transactions validated through consensus mechanisms such as Proof of Work (PoW) and Proof of Stake (PoS). While first associated with cryptocurrencies, blockchain is now applied in finance, healthcare, supply chains, and voting systems. Corporations such as Walmart, Visa, and Unilever have adopted it to strengthen efficiency and security [Rayenizadeh and Rafsanjani, 2025]. In finance, blockchain underpins cryptocurrencies like Bitcoin and supports secure peer-to-peer transactions. It also facilitates cost reduction, risk minimization, and faster settlements [Miah et al., 2023; Ito et al., 2017]. Forecasts illustrate its potential: Accenture [2018] projected $20 billion savings in global banking, while the World Economic Forum [2019] estimated blockchain could account for 10% of global GDP by 2025. Despite rapid growth, systematic

Submission: 30 August 2025; **Acceptance:** 22 September 2025 **Available online:** September 2025

analysis of blockchain in finance remains limited [Sharma et al., 2024]. Bibliometric studies can trace adoption trends, map scholarly evolution, and highlight key constructs [Kuzior and Sira, 2022; Pandey et al., 2022; Zainuldin and Lui, 2021; Pérez-Pérez et al., 2019]. Prior studies address blockchain's evolution [Firdaus et al., 2019; Dabbagh et al., 2019], theoretical foundations [Lima, 2018; Anjum et al., 2017; Fabiano, 2017], and efficiency [Vora et al., 2018; Akram et al., 2020], but few provide a comprehensive financial-sector focus. Given blockchain's interdisciplinary nature spanning mathematics, finance, computer science, and sociology [Guo, 2021], bibliometric analysis is essential for capturing emerging hotspots, international collaboration, and thematic clusters. This study analyzes 3,183 Scopus-indexed publications (2014–2024) using VOSviewer. It investigates growth trends, leading countries, institutions, and authors, as well as thematic linkages across finance-related blockchain research. The following questions guide the study:

1. What emerging trends characterize blockchain research in finance?
2. How has the research landscape evolved over time?
3. Which countries, institutions, and authors contribute most significantly?
4. What dominant themes shape scholarly discourse?
5. How can bibliometric analysis guide future blockchain-finance research?

Methodology

To examine international research on blockchain in finance, the Scopus database was selected for its broad coverage of scientific and professional literature. The search targeted keywords, titles, and abstracts containing *"blockchain"* and *"finance"*, covering 2014–2024. This strategy yielded 3,183 valid documents with full metadata, including publication year, authors, institutional affiliations, sources, and cited references. For analysis, the data were imported into VOSviewer, a visualization tool developed by Van Eck and Waltman [2010], which enables mapping of bibliometric networks. Nodes in these maps represent countries, institutions, authors, journals, or keywords, while links indicate co-occurrence or co-citation relationships [Chen and Bellavitis, 2020]. Applying established parameters, the study generated visual knowledge maps to identify leading contributors, intellectual structures, and emerging themes. This approach provides a systematic basis for uncovering research hotspots and scholarly trajectories in blockchain and finance, offering both breadth and precision by capturing the most relevant literature in the field.

Results

Documents by Year:
The publication trend reflects the developmental trajectory of blockchain research in finance.

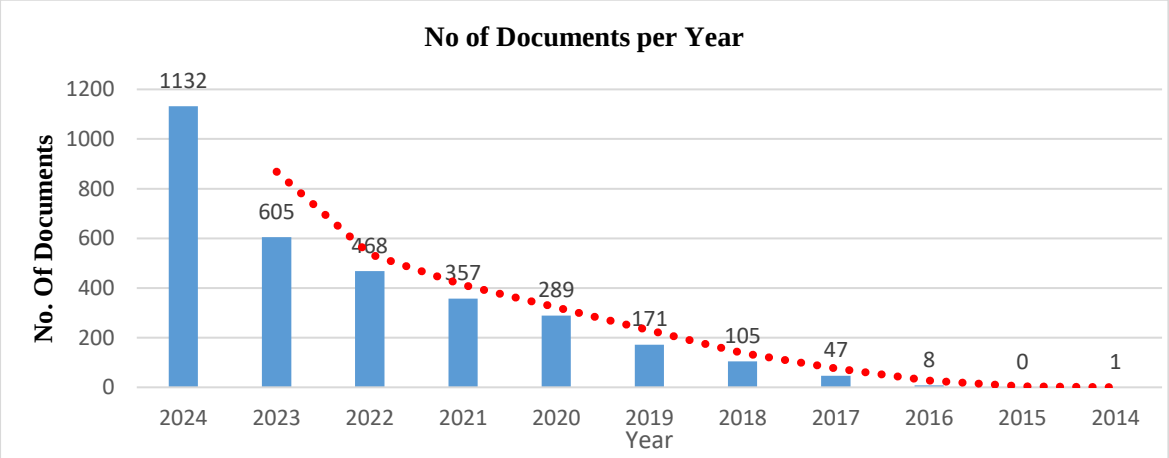
Table: 1 Publications on Blockchain Technology per Year

Year	No Of Documents
2024	1132
2023	605
2022	468
2021	357
2020	289
2019	171
2018	105

2017	47
2016	8
2015	0
2014	1

Source: Author generated from Database

Figure: 1 Annual publication trend of blockchain-related research in finance (2014–2024).



As shown in Table 1, fewer than 10 papers appeared between 2014 and 2016, with none in 2015. Activity increased sharply thereafter, from 47 publications in 2017 to 605 in 2023, peaking at 1,132 in 2024. This pattern reveals two phases: an initial exploratory stage (2014–2016) with minimal scholarly output, followed by rapid expansion (2017–2024), coinciding with growing institutional attention and supportive regulatory frameworks [Hughes et al., 2019]. The accelerating trend is illustrated in Figure 1.

Most productive and impactful countries

Blockchain research has witnessed widespread global participation over the past decade, with several countries emerging as leaders in publication output and collaborative networks. Analyzing national contributions not only highlights the most productive countries but also reveals the patterns of international cooperation that drive knowledge exchange. Such insights are essential for understanding how research hubs evolve and how collaborations shape the intellectual structure of the field. To capture these dynamics, a bibliometric mapping of countries was performed using VOSviewer, and the results are presented in **Figures 2a and 2b**.

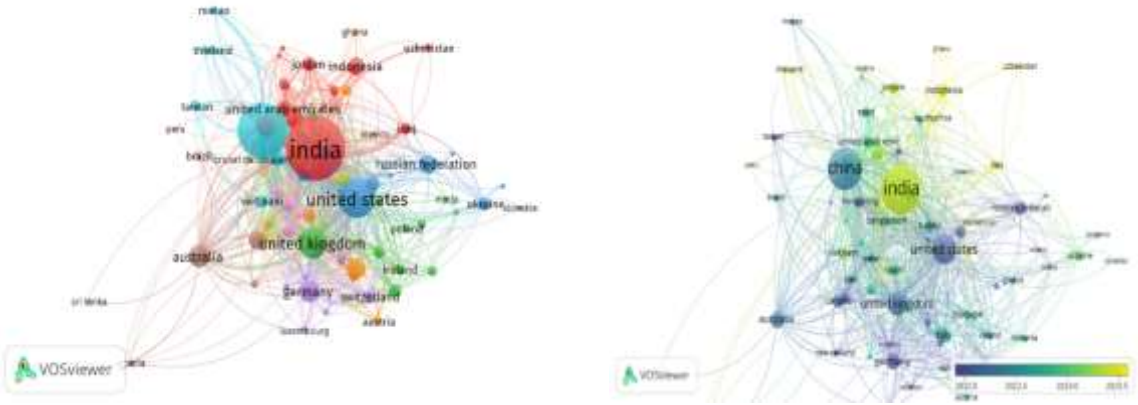


Figure 2a & 2b. Visualization maps of countries participating in blockchain research using VOSviewer

The bibliometric map shows that node size corresponds to publication volume, while centrality reflects collaborative influence. India emerges as the most central hub, maintaining strong partnerships with China, the United States, the United Kingdom, and Malaysia. China ranks second, followed by the USA, UK, and Malaysia. The India–China collaboration stands out as the most prominent bilateral partnership, marked by a high volume of co-authored work and robust academic synergy [Tanted et al., 2025]. Figures 2a and 2b illustrate the network structure, highlighting the globalization of blockchain research and the central role of international cooperation.

Most productive and impactful Institutions

To assess the most productive and impactful institutions in blockchain research, the study analyzed contributions from 2014 to 2024 using Scopus data. The findings are presented in Table 2 and visualized through a network map in Figure 3.

Table: 2 Top Ten Institutions Contributing to Blockchain Research (2014–2024)

Name of the Institute	No of Documents
Chandigarh university	10
Singapore university of social sciences	9
Lovely professional university	8
Chitkara business school, chitkara university	7
Gokaraju Rangaraju Institute of Engineering and Technology	6
SR university	6
National institute of fashion technology.	6
The islamic university, college of technology	5
Christ university	5
Oxford-hainan blockchain research institute	5

Source: Generated by author for Scopus Data Base

Figure 3. Visualization map of institutions participating in blockchain research generated using VOSviewer

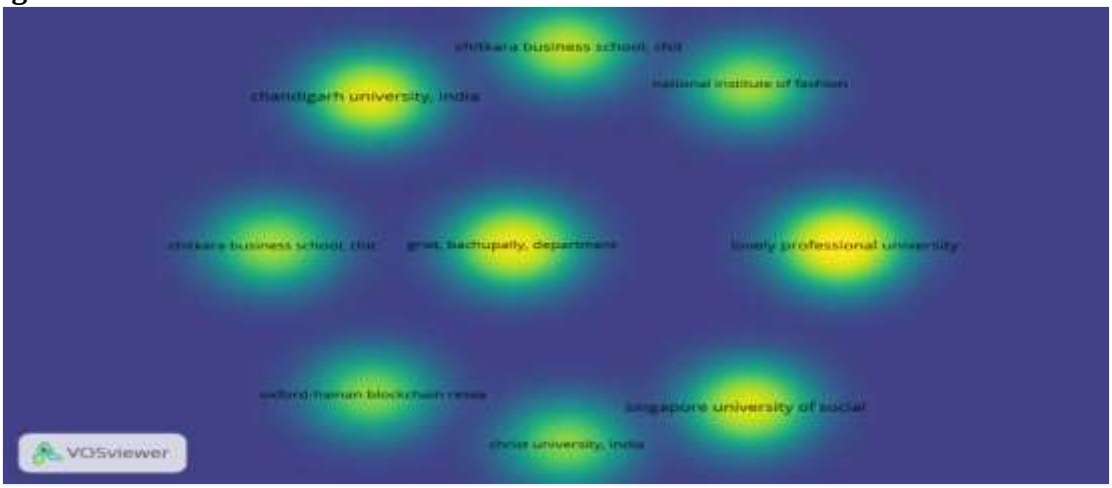
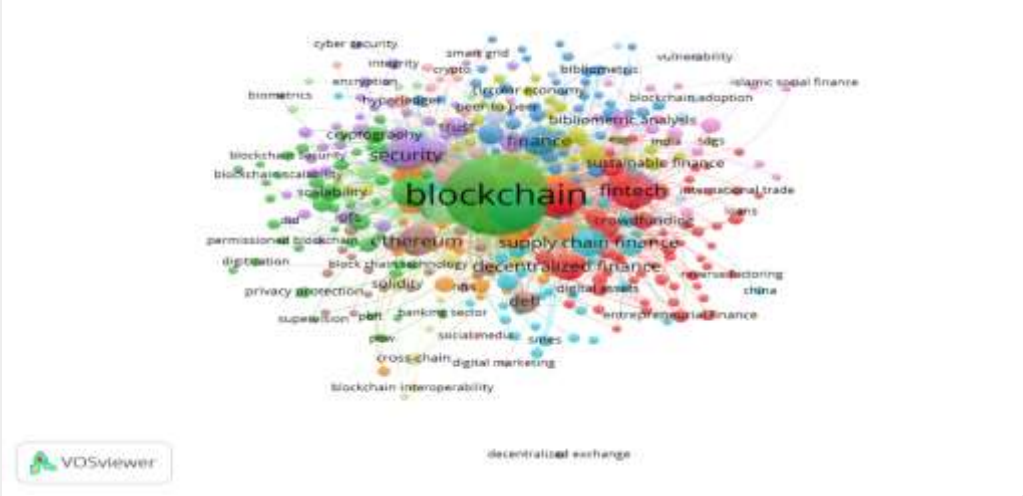


Table 2 and Figure 3 identify the top institutional contributors. Chandigarh University ranks first (10 papers), followed by Singapore University of Social Sciences (9) and Lovely Professional University (8). Notably, two of the top three institutions are Indian, highlighting India's expanding role in blockchain research, particularly in finance and banking [Patki and Sople, 2020]. Other active institutions include Chitkara Business School (7), Gokaraju

Rangaraju Institute of Engineering and Technology (6), SR University (6), National Institute of Fashion Technology (6), The Islamic University, College of Technology (5), Christ University (5), and Oxford-Hainan Blockchain Research Institute (5). These findings illustrate the global spread of blockchain research, with growing participation from Asia and the Middle East. The academic momentum generated by such institutions not only expands scholarly knowledge but also has the potential to shape regulatory frameworks and industry practices.

Co-occurrence of Keywords:
Identifying how frequently keywords appear together helps reveal dominant themes and emerging research fronts. The VOSviewer map in Figure 4 illustrates these relationships.

Figure: 4: The visualization map of co-occurrence of keywords in blockchain research generated by VOS Viewer



The VOSviewer keyword co-occurrence map (Figure 3) identifies **13 thematic clusters** that collectively outline the intellectual structure of blockchain research [Van Eck and Waltman, 2010; Ding et al., 2019]. These include fintech (64 terms, e.g., automation, banking, bitcoin, crowdfunding, cryptocurrencies), blockchain fundamentals (53 terms, e.g., accounting information, big data, banking sector), and finance (46 terms, e.g., adoption, accounting, financial systems). Other clusters highlight sustainability (42 terms, such as AI, carbon credits, and circular economy), security (38 terms, including confidentiality, cybersecurity, and data protection), and supply chain applications (32 terms, such as CBDCs, agriculture, and credit risk). Emerging intersections are also evident, such as deep learning convergence (30 terms, e.g., AI, 5G, big data analytics), Ethereum-linked applications (23 terms, e-commerce, NFTs, industry 4.0/5.0), Islamic finance (21 terms, financial inclusion, accountability, COVID-19), and Hyperledger-related studies (17 terms, decentralization, immutable ledgers, smart cities). Smaller yet influential clusters focus on smart contracts (15 terms, interoperability, DeFi, peer-to-peer lending), financial adoption (various terms including e-banking, consensus, distributed ledgers), and interoperability (8 terms, such as cross-chain, hash locking, DeFi). Collectively, these clusters emphasize blockchain's interdisciplinary nature, spanning finance, sustainability, digital assets, and advanced computational technologies, while also pointing to underexplored areas such as Islamic finance and cross-chain interoperability that present new opportunities for scholarly engagement [Kuzior and Sira, 2022; Narong, 2023].

Most cited Articles:

Highly cited publications represent the foundational works that shape the trajectory of blockchain research. Analyzing these papers provides insights into the core themes, influential authors, and interdisciplinary applications that have guided subsequent studies. Citation analysis also highlights the outlets where landmark contributions are published, reflecting both technological and managerial orientations of the field. Based on Scopus data, the top ten most-cited articles from 2014–2024 are listed in **Table 3**.

S.No	Authors	Title	Year	Source title	Cited by
1	Gomber P.; Kauffman R.J.; Parker C.; Weber B.W. [Gomber et al., 2018]	On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services of block chain	2018	Journal of Management Information Systems	1172
2	Dutta P.; Choi T.-M.; Somani S.; Butala R. [Dutta et al., 2020]	Blockchain technology in supply chain operations: Applications, challenges and research opportunities	2020	Transportation Research Part E: Logistics and Transportation Review	1116
3	Huh S.; Cho S.; Kim S. [Huh et al., 2017]	Managing IoT devices using blockchain platform	2017	International Conference on Advanced Communication Technology, ICACT	810
4	Dinh T.T.A.; Wang J.; Chen G.; Liu R.; Ooi B.C.; Tan K.-L. [Dinh et al., 2017]	BLOCKBENCH: A framework for analyzing private blockchains	2017	Proceedings of the ACM SIGMOD International Conference on Management of Data	748
5	Ahram T.; Sargolzaei A.; Sargolzaei S.; Daniels J.; Amaba B. [Ahram et al., 2017]	Blockchain technology innovations	2017	2017 IEEE Technology and Engineering Management Society Conference, TEMSCON 2017	498
6	Bocek T.; Rodrigues B.B.; Strasser T.; Stiller B. [Bocek et al., 2017]	Blockchains everywhere - A use-case of blockchains in the pharma supply-chain	2017	Proceedings of the IM 2017 - 2017 IFIP/IEEE International Symposium on Integrated Network and Service Management	497
7	Zou W.; Lo D.; Kochhar P.S.; Le X.-B.D.; Xia X.; Feng Y.; Chen Z.; Xu B. [Zou et al., 2021]	Smart Contract Development: Challenges and Opportunities	2021	IEEE Transactions on Software Engineering	486
8	Xiong Z.; Zhang Y.; Niyato D.; Wang P.; Han Z. [Xiong et al., 2018]	When mobile blockchain meets edge computing	2018	IEEE Communications Magazine	486

9	Chen Y.; Bellavitis C. [Chen and Bellavitis, 2020]	Blockchain disruption and decentralized finance: The rise of decentralized business models	2020	Journal of Business Venturing Insights	470
10	**Perboli G.; Musso S.; Rosano M. [Perboli et al., 2018]**	Blockchain in Logistics and Supply Chain: A Lean Approach for Designing Real-World Use Cases	20188	IEEE Access	442

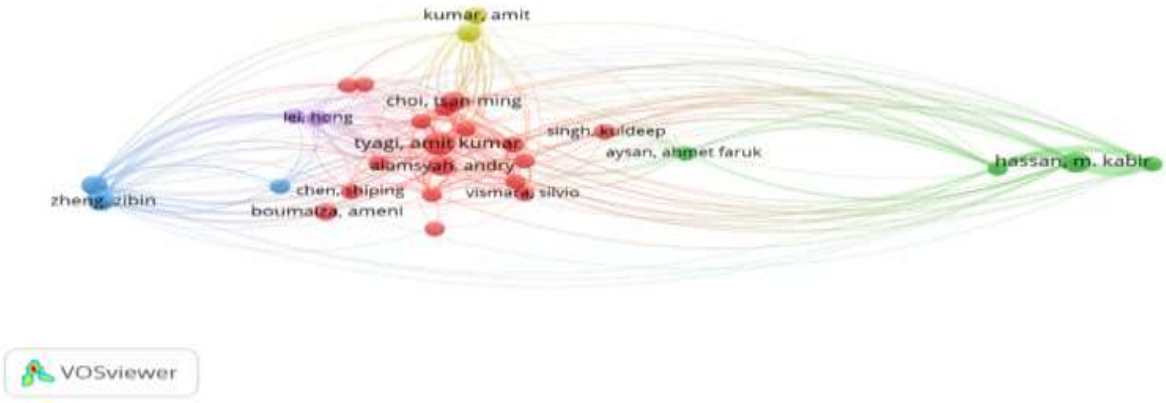
Table 3: Top 10 Most-Cited Blockchain Research Articles (Scopus Database)

Source: Top cited Documents generated by author from Scopus Database

Table 3 lists the ten most-cited works among the 3,183 documents retrieved. The most influential is On the Fintech Revolution [Gomber et al., 2018], cited 1,172 times, and followed by Blockchain Technology in Supply Chain Operations [Dutta et al., 2020] with 1,116 citations, and Managing IoT Devices Using Blockchain Platform [Huh et al., 2017] with 810 citations. Other key contributions include *BLOCKBENCH* [Dinh et al., 2017], Blockchain Technology Innovations [Ahram et al., 2017], and Smart Contract Development [Zou et al., 2021]. A notable pattern is the dominance of IEEE outlets, which account for five of the ten most-cited papers, underlining the strong technological orientation of blockchain research. The highly cited works span diverse domains, including financial services, supply chain management, IoT, and smart contracts, demonstrating blockchain's evolution into a general-purpose technology with interdisciplinary reach

Bibliographic Coupling

Figure: 5: Author co-citation network map generated via VOSviewer



Bibliographic coupling (figure: 5) explores the intellectual structure of a field by examining how frequently authors or documents cite the same sources. In this method, node size indicates citation strength, edges represent the degree of shared references, and colors denote clusters of related works [Tanted et al., 2025; Kleminski et al., 2022; Zhao and Strotmann, 2008; Koseoglu et al., 2016]. Applied to blockchain research, the analysis reveals four major clusters. The red cluster, featuring influential authors such as Tyagi, Amit Kumar; Vismara, Silvio; Choi, Tsan-Ming; and Alamsyah, Andry, represents a central intellectual base in fintech, sustainability, and supply chain finance, characterized by dense co-citation links. The green cluster, led by Hassan M. Kabir and collaborators, reflects niche areas such as Islamic finance, financial resilience, and development economics, showing strong internal cohesion but weaker external connectivity. The blue cluster, anchored by Zheng Zubin and Boulais Ameni, indicates regionally focused or engineering-driven approaches to financial models and blockchain applications. Finally, the yellow cluster highlights the bridging role of Kumar Amit, whose work connects multiple domains and underscores blockchain's cross-disciplinary integration. Together, these clusters illustrate how blockchain scholarship is both specialized and interconnected, blending theoretical and applied perspectives across finance and technology. Bibliographic coupling therefore complements co-citation and keyword analyses by uncovering shared intellectual roots and evolving concentrations [Kleminski et al., 2022; Zhao and Strotmann, 2008; Koseoglu et al., 2016]. The VOSviewer-generated author co-citation map further visualizes these relationships, emphasizing the influence of leading contributors within the blockchain research landscape.

Discussion and Scholarly Implications

The bibliometric analysis provides descriptive evidence of blockchain's rise in finance while offering insights into its intellectual structure, developmental trajectory, and global orientation. An exploratory phase from 2014 to 2016, marked by limited engagement, was followed by rapid growth from 2017 onward, coinciding with cryptocurrency adoption, DeFi, regulatory debates, and institutional experimentation. The acceleration in publications between 2017 and 2023 shows blockchain's progression from a niche innovation to a mature, interdisciplinary field [Choi and Siqin, 2022; Zainuldin and Lui, 2021]. Geographically, India and China have emerged as major hubs, producing high publication volumes and fostering strong collaborations. Their partnership reflects Asia's growing influence and underscores the

importance of considering diverse regulatory, cultural, and institutional contexts. Citation analysis shows that blockchain research has expanded beyond cryptocurrencies into supply chain management, smart contracts, IoT, and sustainability, confirming its status as a general-purpose technology. The prominence of IEEE outlets among the most-cited works highlights the technological and engineering-driven foundations of the field [Riahi et al., 2021; De Bakker et al., 2005]. Keyword co-occurrence mapping illustrates shifting priorities: early focus on efficiency, transparency, and cost reduction has expanded to ethical, environmental, and governance concerns. Clusters on sustainability, Islamic finance, and cross-chain interoperability highlight blockchain's potential in green finance, inclusive banking, and regulatory harmonization [Al-Ajlouni et al., 2018; Scardovi, 2016]. Bibliographic coupling shows fintech and supply chain finance as interconnected cores, while Islamic finance and sustainability remain peripheral, indicating silos that could benefit from cross-domain integration. Bridging these gaps could foster richer frameworks combining DeFi, smart contracts, and sustainable finance. More broadly, blockchain's interdisciplinary trajectory calls for theoretical innovation, moving beyond descriptive studies to incorporate perspectives from economics, sociology, and political science. Key issues include governance, trust, power distribution, institutional adaptation, and regulatory variation, which remain underexplored. In conclusion, blockchain research is entering a mature phase marked by thematic diversification, geographic reorientation, and interdisciplinary convergence, extending beyond cryptocurrencies toward financial inclusion, sustainability, digital governance, and global interoperability.

Practical and Policy Implications

The results of this study carry several important implications for practitioners, regulators, and technology developers.

- **For financial institutions**, the clustering of themes around sustainability, DeFi, and supply chain finance highlights opportunities to leverage blockchain not only for efficiency but also for trust, transparency, and ESG compliance. Institutions should therefore broaden their innovation strategies beyond cryptocurrencies to include applications that address systemic risks and ethical imperatives.
- **For regulators**, the concentration of research output in India and China suggests a potential reorientation of global governance. Western regulators must actively engage with Asian counterparts to harmonize standards, manage risks, and ensure inclusive financial innovation.
- **For technology developers**, the convergence of blockchain with artificial intelligence, IoT, and big data points to the necessity of designing interoperable platforms capable of operating across multiple ecosystems.

Directions for Future Research

Several gaps emerge from this study that provide avenues for future scholarly engagement:

1. **Longitudinal Analyses** – Future research could trace how blockchain scholarship evolves in relation to technological adoption cycles, regulatory changes, and market developments.
2. **Comparative Cross-Country Studies** – The centrality of Asian countries calls for systematic analyses of how institutional, cultural, and regulatory differences shape blockchain's integration into financial systems.

3. **Theoretical Advancement** – Bibliometric findings must be integrated with theories from economics, sociology, and organizational studies to move beyond descriptive analysis and build explanatory frameworks.
4. **Sustainability and Ethical Finance** – Clusters around sustainability and Islamic finance represent underexplored domains that warrant focused investigation into blockchain's role in responsible and inclusive innovation.
5. **Interdisciplinary Convergence** – Future work should examine blockchain's synergies with emerging technologies such as AI, IoT, and quantum computing, exploring how these intersections reshape financial and governance models

Conclusion

This study provides a comprehensive overview of blockchain research in finance over the past decade, highlighting its rapid growth and evolving interdisciplinary focus. Major contributions have come from the United States, China, India, and the United Kingdom, with Indian and Chinese institutions showing high productivity and influence. Keyword mapping and bibliographic coupling reveal prominent themes including fintech applications, security, smart contracts, supply chain integration, and convergence with AI and IoT. Emerging areas such as sustainable finance, Islamic finance, and cross-chain interoperability indicate growing thematic diversity. Despite significant advances, gaps remain in regulatory analysis, real-world implementation, and cross-country comparisons. Strengthening international collaboration, expanding data sources, and integrating theoretical frameworks can enhance both scholarly understanding and practical applications. Overall, blockchain research is transitioning from niche innovation to a mature field shaping the future of financial systems.

Acknowledgements

The author declares that there is no grant or funding bodies to be acknowledged for preparing this paper. The authors would like to express their sincere gratitude to Gayatri Vidya Parishad College for Degree and PG Courses (A) for providing the necessary facilities and support to carry out this research work.

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