# The impact of blockchain applications on the development of financial services : Bibliometric analysis (2020-2025)

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**Abstract:**

This study analyzes scientific production on blockchain applications in financial services through a bibliometric analysis of 517 Scopus-indexed articles published between 2020 and 2025. Annual output increased from 45 publications in 2020 to 159 in 2025, with 51.8% published during the last two years. China and the United States lead publication volume with 100 and 96 articles, respectively, indicating a bipolar concentration of research capacity rather than scientific impact. Hong Kong Polytechnic University ranks first institutionally with 23 publications, while keyword co-occurrence analysis identifies four clusters: blockchain infrastructure, financial technology and services, crypto-assets, and convergence with other digital technologies.

**Keywords:** Blockchain; Financial services; Bibliometric analysis; Fintech.
**Jel Classification Codes**: O33, G21, C38, G23.

## 1. INTRODUCTION

The global financial sector has undergone profound structural transformations driven by rapid technological progress and the accelerating pace of digitalization. Among the emerging technologies shaping this transformation, As blockchain has been actively applied in various services (Jang H, 2025). the technology is capturing the number of industries including cryptocurrency (quluzada, 2019) ,blockchain has attracted considerable academic and institutional attention (Dasaklis C, 2019) as the development and diffusion of this technology is still in its infancy, Blockchains possess multiple features that make them general-purpose tools in enabling transparency (UNCTAD, 2024), a systematic review of current thinking is likely to assist both academics and managers' sensemaking, where they become aware of this technological innovation (yingli Wang, 2019, p62), due to its potential to redefine the architecture of financial services and improve the efficiency, transparency, and security of economic transactions. Initially associated primarily with cryptocurrencies, blockchain technology has progressively evolved into a broader technological infrastructure supporting diverse financial applications, including digital payments, decentralized finance, smart contracts, and financial data management (Schar, 2021). As economic institutions increasingly seek innovative solutions capable of enhancing operational performance and responding to the challenges of digital transformation, blockchain has emerged as a strategic instrument for financial modernization and institutional innovation (Gomber, 2018), and emerged as a transformative force in global accounting and financial reporting (Moula, 2025, p322).

The blockchain is a decentralized, distributed ledger (public or private) of different kinds of transactions (Mathur, 2026) into financial ecosystems has stimulated an expanding body of scientific literature addressing its technological, economic, regulatory, and behavioral dimensions (chen, 2020). However, despite the rapid increase in academic production, the existing literature remains fragmented across multiple disciplines and research perspectives. This fragmentation highlights the

need for a comprehensive bibliometric assessment capable of identifying the intellectual structure, thematic evolution, and global research trends associated with blockchain applications in financial services (Donthu, 2021). In this context, the present study aims to analyze the scientific production indexed in the Scopus database in order to explore the evolution of research activity, the most influential countries, institutions, authors, and thematic clusters shaping this emerging field. By doing so, the study seeks to provide a clearer understanding of how blockchain applications are contributing to the development of financial services within economic institutions and how this research domain continues to evolve in response to ongoing technological and financial transformations.

The research will rely on an advanced analysis of a comprehensive corpus of academic literature extracted from the Scopus database, utilizing techniques such as co-citation analysis to identify the main intellectual schools and the connections between them. We planned to only answer the following research questions :

Q1: What is the distribution of research studies and publications on the impact of blockchain applications on the development of financial services 2020 to 2025?

Q2: Which countries have had the most significant impact on the research landscape concerning the impact of blockchain applications on the development of financial services?

Q3: Which educational institutions have made significant contributions to research on the impact of blockchain applications on the development of financial services?

Q4: Who are the most influential authors in research on the contribution of the impact of blockchain applications on the development of financial services?

Q5 : What have been the most prominent research topics and emerging keywords in the field of the impact of blockchain applications on the development of financial services ?

**2. Methodology:**

In this section, we will discuss the methods applied in this paper.

Moreover, the PRISMA framework (David, 2009) was utilized as the main framework for this study.

### 2.1. Identification

This review took place on 28th January 2026, using Scopus database. This review aimed to investigate relation between blockchain applications and financial services.

Two main keywords were used for instance, blockchain applications and financial services, and the query used for this is TITLE-ABS-KEY (Use of blockchain applications in Financial services). This search has been conducted for the last six years, as this query was used AND PUBYEAR > 2019 AND PUBYEAR < 2026. A set of inclusion and exclusion criteria were used on this review. Table 1 shows the inclusion and exclusion criteria.

**Table 1**. Inclusion and Exclusion criteria

| **Inclusion criteria** | **Exclusion criteria** |
|---|---|
| | Any other keywords |
| Article from 2020-2025 | Any research before 2020 was excluded, and any research in 2026. |
| Only articles in English language | Any other language |
| Only articles | Conference papers, books, thesis |
| Blockchain, Financial, Fintech, Decentralized Finance, Bitcoin, Cryptocurrencies, Artificial Intelligence**,** Bibliometric Analysis, Risk Management**,** Digital Finance, Financial System. | Any other field. |

**Source** : prepared by the author based on the scopus database.

### 2.2 Screening :

The initial search resulted 5985 documents in the scopus database. After applying the set of inclusion and exclusion criteria, 5,468 documents (91.4% of the initial records) were excluded and 517 articles were retained for analysis.

**2.3. Eligibility :**

Only articles in the field of Blockchain, Financial, Fintech**,** Decentralized Finance**,** Bitcoin**,** Cryptocurrencies **,** Bibliometric Analysis**,** Digital Finance**,** Financial System were included in this search, following the query :

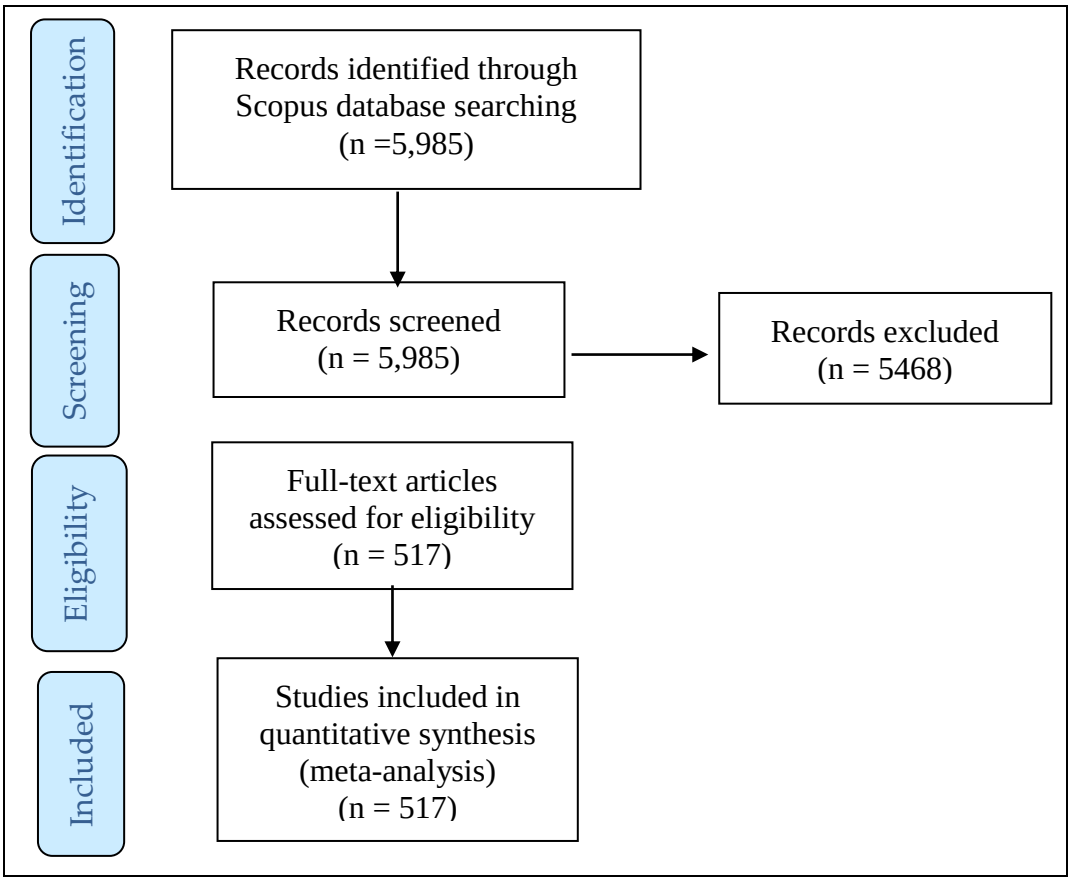
AND ( LIMIT-TO ( EXACTKEYWORD , "Blockchain" ) OR LIMIT-TO ( EXACTKEYWORD , "Block-chain" ) OR LIMIT-TO ( EXACTKEYWORD , "Finance" ) OR LIMIT-TO ( EXACTKEYWORD , "Fintech" ) OR LIMIT-TO ( EXACTKEYWORD , "Cryptocurrency" ) OR LIMIT-TO ( EXACTKEYWORD , "Blockchain Technology" ) OR LIMIT-TO ( EXACTKEYWORD , "Decentralized Finance" ) OR LIMIT-TO ( EXACTKEYWORD , "Bitcoin" ) OR LIMIT-TO ( EXACTKEYWORD , "Cryptocurrencies" ) OR LIMIT-TO ( EXACTKEYWORD , "Artificial Intelligence" ) OR LIMIT-TO ( EXACTKEYWORD , "Bibliometric Analysis" ) OR LIMIT-TO ( EXACTKEYWORD , "Risk Management" ) OR LIMIT-TO ( EXACTKEYWORD , "Financial Inclusion" ) OR LIMIT-TO ( EXACTKEYWORD , "Crowdfunding" ) OR LIMIT-TO ( EXACTKEYWORD , "Digital Finance" ) OR LIMIT-TO ( EXACTKEYWORD , "Banking" ) OR LIMIT-TO ( EXACTKEYWORD , "Financial System" ) ).

Lastly, only articles in English language were included as follow ; AND ( LIMIT-TO ( LANGUAGE , "English" ) ).

Four additional keywords "Financial Inclusion", "Banking", "Crowdfunding" and "Risk Management" were retained because they designate core functional domains of financial services in which blockchain is applied, while "Artificial Intelligence" was retained because the corpus repeatedly associates blockchain with adjacent digital technologies within integrated financial infrastructures. Records carrying these keywords were kept only when they simultaneously satisfied the blockchain-related criteria, so that the thematic focus of the corpus remained unchanged.

Figure 1 prisma framework is the main framework for this study.

**Fig.1.** PRISMA Framework




**Source**: Prepared by the author based on the PRISMA framework

### 2.4. The Bibliometric Analysis

The study integrates descriptive bibliometric approaches with performance analysis to provide a thorough review of the field (Nass, 2026). The primary objective of this analysis was to identify and interpret several key dimensions of the scholarly landscape, including: the patterns of collaboration among authors, the most influential and frequently cited researchers, the interrelationships among keywords, and the extent of international research cooperation. Furthermore, the study explored the countries contributing most significantly to the topic, the journals with the highest publication output, the most frequently cited and co-published journals, and the predominant research themes emerging from the literature (Kiyomi, 2022, p170).The analysis was conducted using the VOSviewer-

1.6.20 software, VOSviewer is a program that we have developed for constructing and viewing bibliometric maps. The program is freely available to the bibliometric research community (Nees, 2010).

## 3. Results :

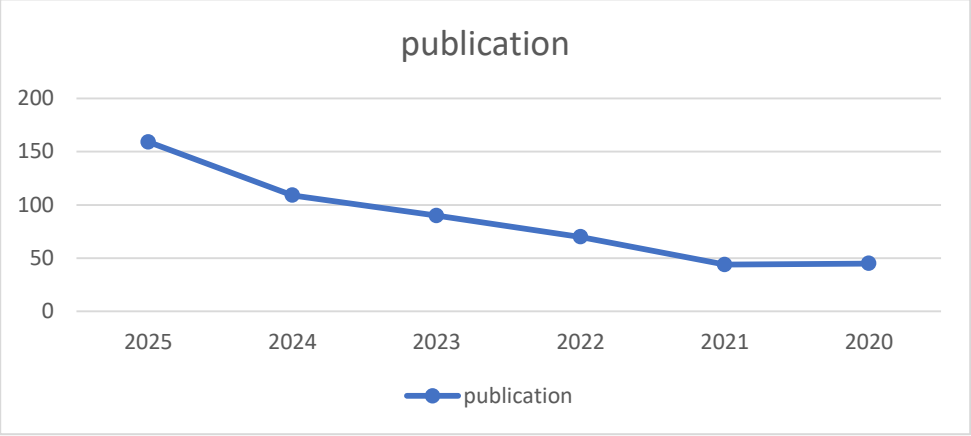
The bibliometric analysis section aims to elucidate The impact of blockchain applications on the development of financial services. Our study covers a six-year period (2020–2025), offering valuable insights into multiple facets of this constantly evolving field. It encompasses prominent research areas, publication trends, high-impact journals, leading academic institutions, influential authors, and pivotal keywords. This synthesis is designed to map the trajectory of blockchain applications in organizations, identify the core elements that drive performance improvement, and provide a comprehensive perspective on the global efforts underpinning the use of blockchain applications.

### 3.1 The distribution by years:

The following research question will be addressed in this section : "What has been the distribution of research and publications on the use of blockchain applications on the development of financial services from 2020 to 2025 ?

By analyzing the provided data, we can address the study's primary inquiry regarding the temporal distribution of research on blockchain applications in financial services between 2020 and 2025. The statistics reveal a discernible upward trend in the number of publications. as illustrated in Figure 02.

**Fig.2.** Publications by years




**Source : :** prepared by the author based on the scopus database.

The presented data reveals a steep upward trajectory in the volume of scientific publications addressing the blockchain applications and their impact on the development of financial services. Research output remained relatively stable during the initial years, with 45 publications in 2020 and 44 in 2021, indicating a modest level of scholarly activity at the beginning of the study period.

From 2022 onward, the number of publications increased progressively to 70, followed by 90 in 2023 and 109 in 2024, reflecting the growing research interest in this field.

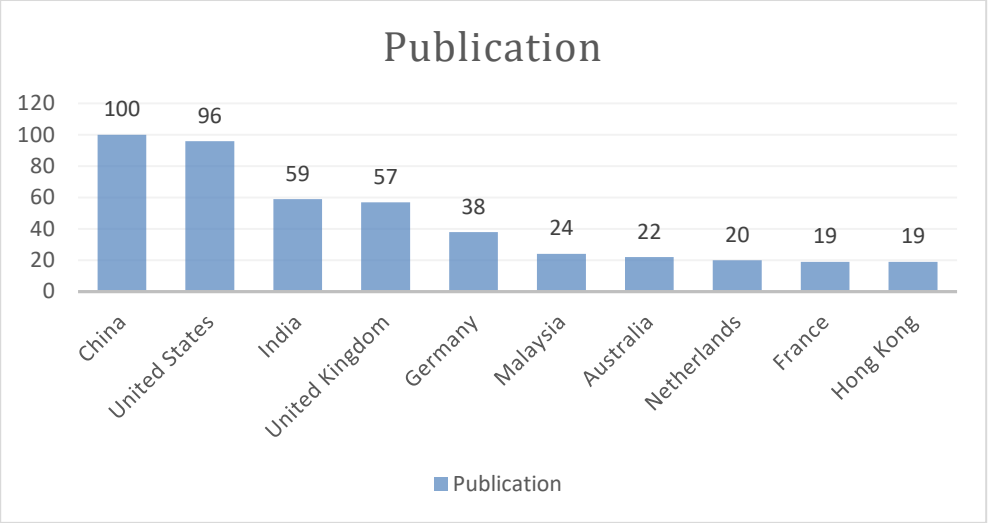
The most significant growth occurred in 2025, when the number of publications rose sharply to 159 studies, representing the highest level of academic output within the examined period. This surge reflects the consolidation of blockchain as a major research domain in financial studies, particularly as institutions worldwide increasingly experiment with digital infrastructures, smart contracts, and decentralized financial systems.

**3.2 The distribution by countries :**

The following research question will be addressed in this section "Which countries have had the most significant impact on the research landscape concerning the impact of blockchain applications on the development of financial services? "

The figure below represents the growth in the number of scientific publications on the use of blockchain applications in the field of financial services during the period 2020-2025.

**Fig.3.** Publications by Countries




**Source :** prepared by the author based on the scopus database.

The data reveal that China leads the field with 100 publications, followed closely by the United States with 96 a gap of only four studies.

This striking closeness is not merely a statistical coincidence; it reflects genuine research and strategic rivalry between the world's two largest economies in the field of digital financial innovation. Together, the two countries account for approximately 43% of the combined output of the top ten countries, pointing to a strong concentration of scholarly activity around the two economic powers most heavily invested in digital infrastructure and technological competition.

A sharp and notable decline occurs between the United States (96) and India (59) a gap of about 37 publications, marking the first genuine downward break in the sequence. India and the United Kingdom (57), separated by only two publications, reflecting two distinct yet comparably sized research trajectories. Germany (38 publications) follows as a transitional link, a gap of roughly 19 and 20 publications and from the next cluster.

The remaining countries demonstrate relatively lower publication outputs, including Malaysia (24), Australia (22), the Netherlands (20), France (19) and Hong Kong (19). The similarity in publication counts among these countries suggests a relatively balanced but modest contribution to the literature.

The above indicates the dominance of the China and United States, in terms of the number of articles, citation impact, and collaborative strength. Countries Like as the United Kingdom, India and Germanyalso play key mediating roles, while countries like malaysia, the Netherlands, France and Hong Kong demonstrate limited participation and influence.

3.3. **The top 10 educational institutions:**

The following research question will be addressed in this section "Which educational institutions have made significant contributions to research on the impact of blockchain applications on the development of financial services ? "

The following table highlights the most productive universities in terms of publications and citation impact, providing valuable insights into the centers of academic excellence driving blockchain related institutional research.

**Table. 02.** Top 10 educational institutions

| N | Educational institutions | TP | Most cited publications | Time cited |
|---|---|---|---|---|
| **01** | The Hong Kong Polytechnic University | 23 | Blockchain technology in supply chain operations: Applications, challenges and research opportunities | 1292 |
| **02** | University of Luxembourg | 8 | Decentralized finance | 362 |
| **03** | Università degli Studi di Bergamo | 7 | The entrepreneurial finance markets of the future: a comparison of crowdfunding and initial coin offerings | 160 |
| **04** | Erasmus Universiteit | 7 | The entrepreneurial finance markets of | 160 |

| | | | | |
|---|---|---|---|---|
| | Rotterdam | | the future: a comparison of crowdfunding and initial coin offerings | |
| **05** | Bank for International Settlements | 6 | Distrust or speculation? The socioeconomic drivers of U.S. cryptocurrency investments | 72 |
| **06** | Renmin University of China | 6 | Blockchain-enabled supply chain operations and financing: the perspective of expectancy theory | 42 |
| **07** | Universität Bayreuth | 6 | A multivocal literature review of decentralized finance: Current knowledge and future research avenues | 51 |
| **08** | Syracuse University | 6 | Blockchain-Enabled Deep-Tier Supply Chain Finance | 118 |
| **09** | Fudan University | 5 | Can blockchain help curb "greenwashing" in green finance? - Based on tripartite evolutionary game theory | 50 |
| **10** | Coventry University | 5 | Digital systems and new challenges of financial management – fintech, XBRL, blockchain and cryptocurrencies | 183 |

**TP**= Total publications

**Source : :** prepared by the author based on the scopus database.

The analysis of institutional contributions provides an important perspective on how knowledge related to blockchain applications in financial services has been produced and disseminated within the academic community. The data extracted from the Scopus database indicates that a relatively small group of universities and international research institutions accounts for a considerable share of the scientific output in this field.

At the forefront of these institutions is The Hong Kong Polytechnic University, which recorded the highest research productivity with 23 publications. The university's influence is further reinforced by the high

citation count of its prominent study titled “Blockchain technology in supply chain operations: Applications, challenges and research opportunities,” which received 1,292 citations.

The University of Luxembourg ranks second with eight publications, demonstrating its growing role in digital finance and financial technology research. One of its most influential works focuses on decentralized finance, an emerging area that explores how blockchain-based systems can restructure traditional financial intermediation. The high citation count associated with this research highlights the importance of decentralized financial models in contemporary financial innovation.

European universities also show a strong presence in this research domain. Both Università degli Studi di Bergamo and Erasmus Universiteit Rotterdam contributed seven publications each. Such work reflects the evolving mechanisms of capital formation enabled by blockchain technology and digital platforms.

Another significant contributor is the Bank for International Settlements, which produced six publications. As a global financial institution rather than a traditional university, its inclusion reflects the close relationship between academic research and policy-oriented financial studies. Its research examining the socioeconomic drivers behind cryptocurrency investments has attracted notable scholarly attention, emphasizing the behavioral and institutional dimensions of blockchain-based financial markets.

Several other universities have also made meaningful contributions with six publications each, including Renmin University of China, Universität Bayreuth, and Syracuse University. Their studies explore diverse themes such as blockchain-enabled supply chain finance, theoretical perspectives on decentralized finance, and the role of blockchain in enhancing transparency and efficiency in financial systems. These contributions demonstrate the multidisciplinary nature of blockchain research, integrating perspectives from finance, economics, and information systems.

In addition, Fudan University and Coventry University appear among

the institutions contributing to this field with five publications each.

**3.4. Top 10 authors :**

The following research question will be addressed in this section "Who are the most influential authors in research on the contribution of the impact of blockchain applications on the development of financial services? "

The analysis of author productivity and citation impact reveals a diverse group of influential scholars contributing to the advancement of research on the implementation of blockchain applications on the development of financial services.

**Table. 03.** Top 10 authors

| N | Authors | TP * | TC* | H-Index | Most cited publication | Publisher |
|---|---|---|---|---|---|---|
| **01** | Vismara, S. | 157 | 7616 | 47 | Equity retention and social network theory in equity crowdfunding | Springer New York LLC |
| **02** | Choi, T.M. | 438 | 25355 | 87 | Blockchain technology in supply chain operations: Applications, challenges and research opportunities | Elsevier Ltd |
| **03** | Bellavitis, C. | 28 | 1414 | 15 | Blockchain disruption and decentralized finance: The rise of decentralized business models | Elsevier Inc |
| **04** | Rabbani, M.R. | 133 | 2846 | 30 | Challenges for the islamic finance and banking in post COVID era and the role of Fintech | Statistical Economic and Social Research and |
| **05** | Adamyk, B. | 23 | 100 | 6 | Legal implications of automated suspicious | Palgrave Macmillan |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | transaction monitoring: enhancing integrity of AI | |
| **06** | Auer, R. | 31 | 796 | 14 | Central Bank Digital Currencies: Motives, Economic Implications, and the Research Frontier | Annual Reviews Inc. |
| **07** | Barbereau, T. | 16 | 152 | 7 | Decentralised finance's timocratic governance: The distribution and exercise of tokenised voting rights | Elsevier Ltd |
| **08** | Benson, V. | 73 | 1427 | 16 | Risk, trust, and the interaction of perceived ease of use and behavioral control in predicting consumers' use of social media for transactions | Elsevier Ltd |
| **09** | Chen, X. | 51 | 3200 | 27 | Supply chain finance: A systematic literature review and bibliometric analysis | Elsevier B.V. |
| **10** | Khan, S. | 50 | 1334 | 18 | Urban water resource management for sustainable environment planning using artificial intelligence techniques | Elsevier Inc. |

**TP**= Total Publications, **TC**=Total Citations

**Source : :** prepared by the author based on the scopus database.

Identifying the most influential authors in the field of blockchain applications and their impact on the development of financial services within economic institutions provides valuable insight into the intellectual

structure of this emerging research area. Bibliometric indicators such as the total number of publications (TP), total citations (TC), and the H-index help reveal which scholars have played a central role in shaping the academic discussion and advancing theoretical and empirical understanding.

Among the most prominent contributors is Choi T.M , whose scholarly influence is particularly evident through his remarkable citation record. Choi represents one of the most productive and widely recognized researchers in this interdisciplinary domain. His highly cited work on "Blockchain technology in supply chain operations: Applications, challenges and research opportunities" has become a foundational reference, bridging research on blockchain technology with operational and financial processes within institutional environments.

Another highly influential author is Vismara, S who demonstrates a strong research impact with 157 publications and more than 7,600 citations, alongside (H-index =47).

Rabbani M.R also stands out as a significant contributor, particularly through his research linking fintech developments with financial institutions. With 133 publications and nearly 2,900 citations, Rabbani's work has explored contemporary financial challenges such as the transformation of Islamic finance and banking in the post-COVID era and the role of fintech innovations in reshaping financial services.

Similarly, Chen, X has established an influential presence with over 3,200 citations (H-index = 27), offering valuable frameworks that connect blockchain-based technologies with financial service efficiency and transparency.

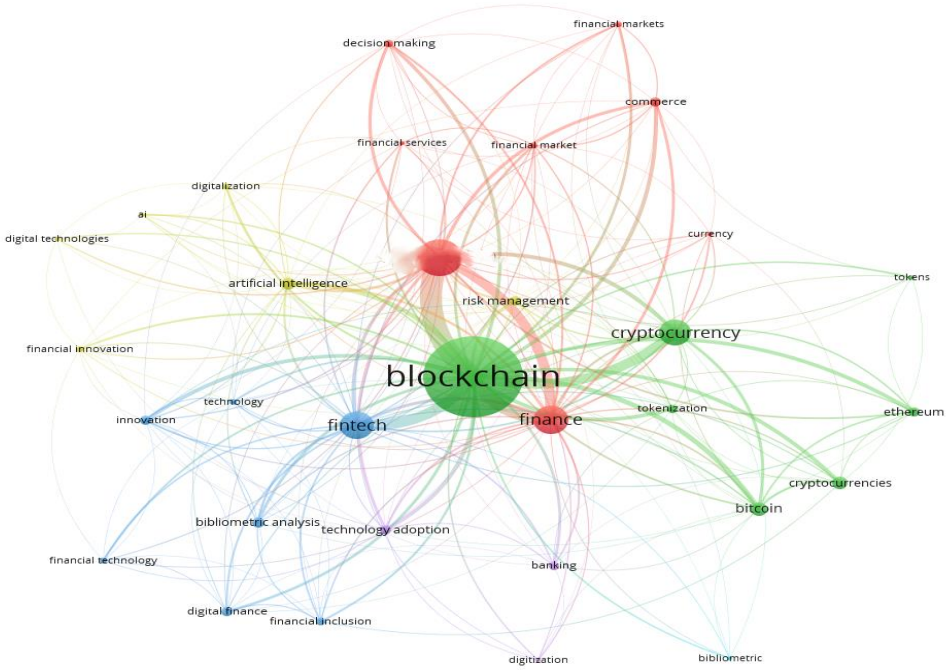
Other notable contributors include Benson, V. Bellavitis, and R. Auer, whose works address diverse yet interconnected aspects of blockchain-related financial innovation.

Additional authors such as Khan, S B. Adamyk, and Barbereau T contribute to expanding the scope of research by addressing regulatory, governance, and technological implications of blockchain applications.

**3.5. The primary research keywords and trends**

The following research question will be addressed in this section" What have been the most prominent research topics and emerging keywords in the field of the impact of blockchain applications on the development of financial services?" The chart shows the main search terms, as shown in the data shown in the image.

**Fig.4**. Visualization Map of Keywords co-occurrence.




**Source: VOSviewer output**

The keyword co-occurrence network, generated using VOSviewer based on bibliometric data related to blockchain research, reveals a strongly interconnected thematic structure organized around four major clusters. The term "blockchain" emerges as the dominant node with the highest occurrence frequency an appearing more than 250 times.

It is closely followed by "fintech" and "finance" approximately 80 occurrences and "cryptocurrency" 74 occurrences, centered on and "risk management" (approximately 40–50 occurrences), and "financial services" approximately 42 times, highlights the financial and institutional dimension of blockchain adoption,

The green cluster, anchored by "bitcoin" approximately 29

occurrences and "ethereum", represents the technological application oriented stream of research.

Finally, the yellow cluster, comprising "artificial intelligence," "digitalization," and "digital technologies" (each roughly 15–25 occurrences), illustrates the emerging intersection between blockchain and other disruptive technologies.

## 4. CONCLUSION

This study mapped the scientific production on blockchain applications in financial services through a bibliometric analysis of 517 articles indexed in Scopus between 2020 and 2025. The findings answer the five research questions directly. Scientific output grew from 45 publications in 2020 to 159 in 2025, with more than half of the corpus concentrated in the last two years (Q1). China and the United States dominate production with 100 and 96 publications respectively, jointly accounting for 43.2% of the output of the ten most productive countries, a bipolar structure that reflects two contrasting institutional models of digital financial innovation (Q2). The Hong Kong Polytechnic University leads institutional production with 23 publications, followed by the University of Luxembourg, while the presence of the Bank for International Settlements among the most productive institutions illustrates the convergence between academic research and financial policy (Q3). Author-level analysis identifies three distinct research streams, centred respectively on blockchain in operational and supply-chain finance, on decentralised and entrepreneurial finance, and on the regulatory dimension of crypto-assets (Q4). Finally, keyword co-occurrence analysis reveals four thematic clusters and a clear displacement of research attention from technological feasibility towards institutional and regulatory concerns (Q5).

The bibliometric analysis conducted in this study demonstrates that research on blockchain applications and their impact on financial services has evolved into a dynamic and rapidly expanding scientific field. The findings further reveal that blockchain research is no longer confined to technical considerations alone, but increasingly incorporates economic, institutional, regulatory, and behavioral dimensions that shape the future of

digital finance. The study also highlights the interdisciplinary nature of this research domain, where concepts related to fintech, decentralized finance, artificial intelligence, governance, and investment decision-making are strongly interconnected.

**5. Recommendations:**

For researchers: future work should move beyond descriptive mapping towards co-citation and bibliographic coupling analyses capable of identifying the intellectual foundations of the field, and should integrate citation normalised indicators in order to distinguish productivity from scientific influence.

For financial institutions: the concentration of research around regulatory compliance, risk management and financial inclusion suggests that the adoption of blockchain should be approached as an institutional and governance transformation rather than a purely technological upgrade.

For regulators, particularly in Arab and African economies: the absence of any Arab or African country from the ten most productive countries, despite growing policy interest in digital finance, points to a structural gap between political interest and scientific capacity. Addressing it requires dedicated research funding, the integration of blockchain and digital finance into university curricula, and the creation of regulatory sandboxes able to generate empirical data for academic research. In the Algerian context, where the digital transformation of the financial sector is a stated national priority, developing this research capacity is a precondition for informed regulatory design.

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