International Journal of Innovative Research and Scientific Studies, 8(2) 2025, pages: 1408-1423

ISSN: 2617-6548

URL: www.ijirss.com

The rise of fintech: Bibliometric analysis of global growth, emerging themes and the quality of scientific contributions

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Abstract

This study conducts a comprehensive bibliometric analysis of fintech adoption research from 2016 to 2024, identifying key trends, influential contributors, and emerging themes. To achieve this goal, we leverage data from Scopus and the SCImago Journal Rank to analyze the evolution of fintech scholarship, focusing on publication growth, geographic distribution, and scientific impact through the H-index and journal quartile rankings. In addition, advanced visualization tools, such as VOSviewer, are utilized to map keyword co-occurrences, collaboration networks, and citation dynamics. Our findings reveal that fintech-related research has experienced a substantial surge, particularly since 2020, primarily due to accelerated digital transformation and the COVID-19 pandemic. Moreover, Asia and Europe have emerged as leading contributors to both research output and innovation. Specifically, the dominant thematic clusters include blockchain, artificial intelligence, financial inclusion, and regulatory challenges. However, critical issues such as cybersecurity, trust, and regulatory uncertainty persist, which underscores the need for further investigation. From a practical perspective, these insights offer valuable guidance to policymakers and financial institutions in formulating adaptive regulatory frameworks and promoting responsible financial innovation. Furthermore, this study underscores the importance of interdisciplinary collaboration in fostering fintech ecosystems. Mapping both achievements and research gaps provides a strategic roadmap for future academic inquiry and policy development, ultimately reinforcing fintech's transformative impact on the financial sector.

Keywords: Bibliometric analysis, Emerging trends, Financial inclusion, Fintech adoption, Interdisciplinary research, Publication quality.

DOI: 10.53894/ijirss.v8i2.5469
Funding: This study received no specific financial support.
History: Received: 5 February 2025 / **Revised:** 7 March 2025 / **Accepted:** 12 March 2025 / **Published:** 18 March 2025
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Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Publisher: Innovative Research Publishing

1. Introduction

Financial technology has emerged as a powerful force driving significant transformation in the traditional financial and banking sectors. It redefines not only the delivery of services but also the methods by which these services are utilized. By leveraging technological advancements such as blockchain, artificial intelligence, and digital payments, fintech is revolutionizing established business models while fostering greater inclusion [1].

However, this rapid evolution presents considerable challenges concerning regulation, security, and user trust [2]. These technological innovations streamline financial processes by lowering costs, enhancing the customer experience, and broadening service access. Digital payments and participatory financing have emerged as powerful tools, creating new funding opportunities for previously marginalized populations [3].

Nonetheless, the widespread adoption of these technologies raises important concerns about personal data protection and disparities in financial literacy [4]. Fintech is particularly notable for its disruptive potential, driven by the integration of advanced technologies such as big data and artificial intelligence. These innovations enhance transparency, mitigate information asymmetries, and expedite processes, especially loan approvals [5].

In light of this transformation, traditional financial institutions must embrace these innovations to remain competitive. Despite these advancements, regulating digital financial services presents a complex challenge, as these innovations offer significant advantages while also exposing systems to cybersecurity and fraud vulnerabilities. Consequently, establishing updated regulatory frameworks is essential to ensure secure transactions and maintain compliance [6]. Adopting a balanced approach between innovation and regulation is critical for maximizing fintech benefits while mitigating associated risks.

In fact, recent bibliometric analyses have shown a substantial increase in research within this field, emphasizing topics such as blockchain and artificial intelligence, which are often linked to promoting financial inclusion in underbanked regions [7]. These trends underscore the importance of factors such as risk perception and user trust in adopting these technologies [8].

Moreover, the rise of financial technologies has led to exponential growth in scientific output, characterized by increased interdisciplinary and international collaboration. However, this rapid proliferation has raised concerns about the quality, relevance, and impact of academic contributions in this domain.

Consequently, how can bibliometric analyses, which utilize indicators such as keyword co-occurrences, citation networks, and academic journal rankings, effectively evaluate the quality and maturity of fintech research published in high-quality journals?

With this objective in mind, our study focuses on a systematic and comprehensive exploration of scientific production related to the adoption of fintech from 2016 to 2024. By employing rigorous bibliometric methodology, it seeks to identify and analyze trends, key contributors, emerging themes, and the geographical impact of academic contributions in this area.

Specialized tools such as VOSviewer and reputable databases like Scopus and SCImago Journal Rank facilitate both qualitative and quantitative assessments of scientific publications. Furthermore, by incorporating bibliometric indicators such as the H-index and quartiles, this study provides an updated perspective on the state of the art in 2024 while evaluating the relevance of journals and scientific output. It highlights advancements and gaps in fintech adoption research, addresses both academic and practical issues, and paves the way for future studies in this dynamic and ever-evolving field.

2. Literature Review

The trend in fintech research publications has significantly increased since 2019, characterized by a broadening of topics and a surge in international collaboration. Bibliometric analyses indicate that this growth has concentrated on areas such as participatory finance and digital finance, with China and the USA leading the way [9]. This development has a three-stage trajectory: initiation, development, and rapid acceleration. In addition, the research includes promising themes such as artificial intelligence, financial inclusion, and innovation [10]. Additionally, adoption models that incorporate factors such as perceived risk and the intention to use illustrate the growing maturity of research in this field [11].

The COVID-19 pandemic served as a catalyst, accelerating the global adoption of fintech solutions, especially in developing nations where access to financial services was previously limited [12]. Following this period, the importance of collaboration between governments and financial institutions became increasingly clear, as it played a crucial role in reducing transaction costs and expanding access to financial services [13]. The increasing prevalence of digital payments has underscored the importance of innovations in risk management and financial stability, particularly in Eastern Europe, where fintech solutions have played a pivotal role in alleviating the challenges posed by the crisis [14].

The fintech research ecosystem is shaped by contributions that define the key intellectual and thematic trends in the field. Advancements in areas such as blockchain and artificial intelligence are significantly increased by collaborations between institutions, especially those involving universities and major economic stakeholders [15]. In particular, both the USA and China have seen partnerships that have led to the development of innovative solutions focused on promoting inclusive finance and addressing economic inequalities [16]. In this context, the University of Sydney and the University of Hong Kong exemplify multidimensional approaches by incorporating interdisciplinary perspectives to address complex issues related to innovation and regulation [17].

Research on fintech primarily emphasizes disciplines such as management, economics, and computer science, which are crucial for addressing the intricate challenges within this field. A recent bibliometric analysis revealed that certain disciplines dominate academic publications and play crucial roles in advancing financial technologies, significantly influencing business models and information systems [18]. Likewise, the integration of interdisciplinary approaches, particularly through the application of blockchain technology, enables the addressing of social issues while fostering the development of innovative

business models [19]. Consequently, mapping research trends identifies major thrusts, such as the adoption of fintech and their impact on banking systems, underpinned by methodologies from core disciplines [20].

In summary, emerging themes such as artificial intelligence and the Internet of Things are gaining traction, but their development heavily relies on tools and algorithms from computer science, underscoring their critical importance [21]. The social and decision sciences further enhance this interdisciplinary approach by analyzing innovation adoption, user behavior, and strategic decision-making via frameworks such as the "Theory of Planned Behavior" [22].

On top of that, fintech exhibits notable distinctions between emerging and developed markets in terms of regulation, innovation, and institutional challenges. Notably, the USA and the UK are at the forefront of innovation in this sector, owing to their established regulatory frameworks and sophisticated financial infrastructures [23]. In contrast, emerging markets like India are experiencing rapid adoption of fintech technologies, although they face obstacles related to financial literacy and banking concentration [24]. These disparities are reflected in their social and economic consequences. In emerging economies, fintech platforms democratize access to financial services for marginalized communities, effectively addressing the gaps left by traditional banking systems [25]. Weaker institutional frameworks and underdeveloped regulations limit the full potential of financial innovation in comparison with advanced economies [26].

Conversely, local policies play a vital role in the adoption of fintech. In Pakistan, financial inclusion and education initiatives have increased access to financial services for marginalized communities [27]. On the other hand, in China, government policies promoting artificial intelligence and blockchain have fostered an environment that encourages the widespread adoption of fintech solutions [28]. On a different note, Indonesia's robust collaboration between the government and businesses has significantly enhanced consumer confidence and data security, both of which are crucial for the success of fintech [29].

To that end, regulatory innovations, such as regulatory sandboxes, are pivotal in balancing consumer protection with promoting innovation [30]. As a further point, scholarly research on fintech has focused primarily on renowned journals like the International Journal of Bank Marketing, which has focused on vital themes such as the adoption of digital platforms and the characteristics of participatory finance systems [31]. Concurrently, technological innovations, particularly in artificial intelligence and blockchain, are pivotal in advancing green finance. These technologies help to mitigate regulatory uncertainties and promote sustainable investments [32].

Within this framework, the primary supporters of fintech research, specifically China, the UK, and the USA, profoundly influence the adoption of financial technologies and the characteristics of financing platforms. These countries are particularly notable for their substantial contributions to developing fintech credits, primarily by promoting advanced technologies to increase organizational efficiency [33]. Hence, financing policies centered on innovations such as financial blockchains foster sustainable innovation and bolster companies' performance in their growth phases. By reducing information asymmetries, these policies foster R&D investments and enhance transparency in organizational processes [34]. They also promote green technologies and responsible resource management by alleviating financing constraints for emerging companies [35].

For this reason, it is vital to balance innovation incentives and regulatory requirements, particularly in cybersecurity, a relatively underfunded sector [36]. To build on this, constructive collaboration between fintech startups and traditional financial institutions is essential for enhancing the global technological and economic ecosystem [37]. Following this, the successful adoption of financial technologies relies on robust technological infrastructure, regulatory frameworks, and economic factors. For instance, insufficient digital infrastructure can hinder access to financial services for unbanked populations, emphasizing the need for solutions designed explicitly for marginalized communities [38].

In conjunction with these elements, trust in technology, alongside financial literacy, emerges as a vital determinant in the acceptance of fintech innovations. Moreover, performance expectations and the perceived effort required to engage with new technologies play pivotal roles in shaping individuals' intentions to adopt these advancements, as indicated by models that integrate unified acceptance and trust theory [39]. As a further point, innovations in mobile payments and digital lending solutions are transforming the informal financial sector into a more structured system, enhancing financial inclusion and driving economic growth [40].

On the environmental side, fintech companies play a crucial role in advancing green finance initiatives and promoting sustainable practices, significantly impacting global objectives such as eliminating energy poverty and effectively monitoring environmental projects [41]. While these advancements present challenges such as cyber threats and access disparities, they call attention to the urgent need for robust and tailored regulatory strategies to ensure a secure and equitable future [42].

In recent years, integrating financial technologies into sustainability efforts has become a crucial strategy for addressing environmental challenges and promoting ecological balance. A noteworthy example is the growth of fintech in Chinese cities, which has significantly contributed to reducing carbon emissions through targeted investments in research, environmental greening, and fixed assets [43]. Given the urgency of climate action, collaboration between fintech and climate finance is essential for minimizing the ecological footprint and improving environmental performance, thus facilitating the transition to low-carbon economies [44].

Nevertheless, fintech faces certain obstacles. While it can foster green finance and sustainability in certain contexts, such as Nepal, there is a risk that it may unwittingly stifle green innovation if its practices are not congruent with sustainable objectives [45]. Concurrently, technologies such as artificial intelligence and blockchain are transforming ESG strategies, promoting investment in sustainable financial practices, and ensuring greater transaction transparency [46].

3. Methodology

The objective of this study extends beyond merely gathering academic articles. It aims to illuminate rigorous and innovative research on fintech adoption while fostering a systematic and ethical evaluation of scientific contributions within this field. The methodology utilized is rooted in a comprehensive bibliometric approach that integrates established tools and databases to ensure the reliability and integrity of the results. This study delivers an in-depth review of the academic literature examining the critical factors influencing fintech adoption. This research aims to identify emerging trends, key players and institutions, principal themes, and the geographical impact of research in this field. To achieve this goal, we employ a rigorous bibliometric methodology, utilizing the Scopus and SJR databases to collect reliable data and assess the influence of academic contributions [47, 48].

Our initial inquiry focused on "Fintech adoption" to pinpoint the most relevant studies. We subsequently utilized bibliometric tools such as VOSviewer, renowned for its effectiveness in analyzing citation relationships and keyword cooccurrences. In the realm of temporal analysis, we often discover revealing patterns that illustrate the evolution of research focus. Recent observations indicate a significant increase in publications related to fintech adoption, particularly marked by a pronounced upsurge from 2020 onwards. These tools are instrumental in revealing publication trends, visualizing collaborative networks, and assessing the distribution of funding sources [49]. Consequently, this study aims to capture these dynamic shifts from 2016 to 2024. This timeframe reflects the recent evolution of academic interest in fintech and the growing incorporation of these innovations into economic, social, and technological discussions on a global scale.

At the institutional level, a comprehensive mapping of authors' affiliations was undertaken to identify key contributors and delineate specific regional dynamics. This effort encompassed the identification of research centers dedicated to advancing financial innovation and provided insight into influential journals that embrace multidisciplinary perspectives on critical topics, including sustainability, economic policy, and technological innovation. More importantly, examining keyword co-occurrences revealed major themes and their interconnections, which underscore the interdisciplinary essence of research. This is especially evident within the realms of social and decision sciences, which explore consumer behavior and the organizational implications stemming from fintech advancements, showcasing a diverse range of methodological approaches.

The year 2024 was deliberately chosen to evaluate the latest scientific output and obtain current data, aided by the updated list of journals indexed by Scopus as of January 2024. In this landscape, key metrics, such as the H-index and quartiles, were utilized to assess the quality of publications during this year. What is ensured within this section is a timely and relevant overview of publications that reflect the rapid changes occurring within the field. Adding to that, the targeted journals, categorized by ASJC classification codes, encompass specific domains such as business, management, and accounting ("ASJC 1400") as well as economics, econometrics, and finance ("ASJC 2000"). This methodology guarantees a consistent distribution of active journals.

4. Results and Discussion

4.1. The Evolution of Scientific Contributions to Fintech Adoption from 2016 to 2024

Examining the evolution of scientific publications on the adoption of fintech allows us to gain insights into the academic dynamics surrounding this pivotal topic. By utilizing data from the Scopus database spanning 2016 to 2024, this section illuminates annual trends and their correlation with significant events, such as the COVID-19 pandemic, that have shaped research in this area. This analysis offers a vital perspective for understanding shifts in research themes and their influence on contemporary economic and technological studies.

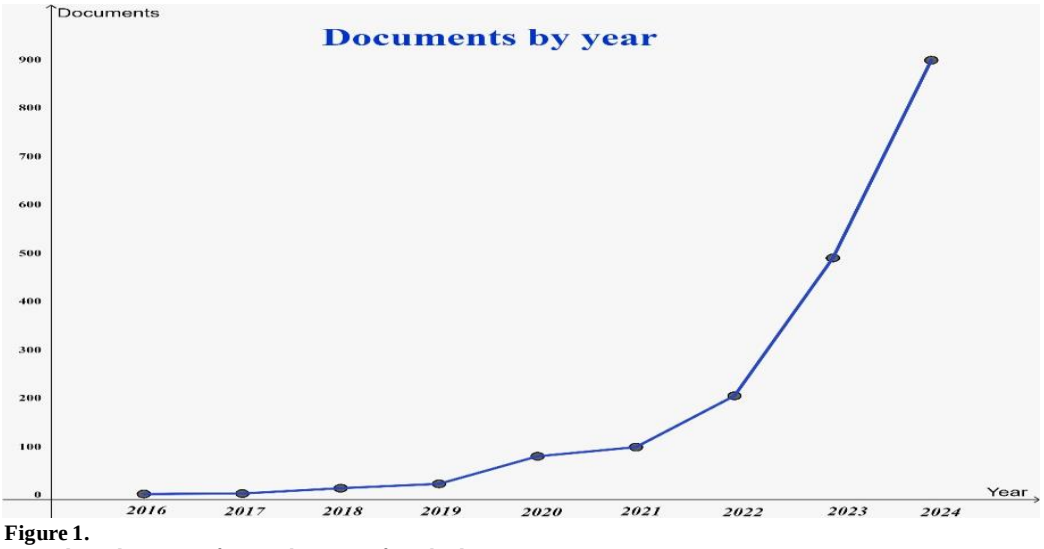

Figure 1.
Annual trends in scientific contributions to fintech adoption.

The analysis of publications by year and author is based on the idea that there is a specific pattern regarding the distribution of productivity among scientific authors. This concept suggests that a small number of authors contribute a majority of publications, whereas many authors contribute only a few [50].

An examination of fintech adoption research within the Scopus database from 2016 to 2024 reveals a remarkable growth trajectory, indicative of the increasing interest in this field among the academic community. This trend is evidenced by a consistent rise in the number of publications, escalating from a mere single article in 2016 to 898 articles by 2024.

The trend analysis indicates a pronounced acceleration beginning in 2020. Prior to this period, fintech research was relatively scarce, as illustrated by only 22 articles published in 2019. Beginning in 2020, there was a remarkable increase in the volume of publications. The number of publications climbed to 79 in 2020, increased to 98 in 2021, and rose further to 204 in 2022. This upward trend continued into 2023, with a total of 489 articles published, more than double the previous year's count.

The momentum reached its peak in 2024, with an impressive 898 articles, representing an approximate 84% increase over 2023 and more than eleven times the volume recorded in 2020. This peak not only highlights the growing maturity of fintech research but also underscores its importance as a crucial topic in economic, social, and technological studies.

Effectively, several factors have contributed to the rapid evolution observed, especially since 2020. The COVID-19 pandemic has played a pivotal role in accelerating digital transformation and fostering innovation within financial services. This unique context has intensified global awareness of fintech issues, particularly in a world undergoing a swift digital transition. Accordingly, fintech adoption has emerged as a key area of research interest for many scholars.

The period spanning from 2020 to 2024 represents a pivotal moment in fintech research, marked by a convergence of factors, including the emergence of financial technologies and their growing integration across various economic sectors. With a total of 898 publications anticipated in 2024, fintech is establishing itself as a central theme in international academic discussions, underscoring its significant role in the transformation of modern financial systems and economies.

4.2. Influential Players and Institutions in the Scientific Production of Fintech Adoption

This section delves into the contributions of authors, institutions, and funding sponsors in advancing research on fintech adoption, accentuating the key players and their strategic collaborations.

Distinguished researchers are often recognized for their specific contributions, which are frequently enhanced by influential institutional affiliations that play a crucial role in shaping the body of knowledge (Figure 2). Certain universities, such as Jadara University and Applied Science Private University, lead in academic output, highlighting the significance of centers of excellence and collaborative initiatives within this field (Figure 3).

Concurrently, funding agencies such as the National Natural Science Foundation of China and the European Commission demonstrate the substantial impact of financial support strategies on research priorities while fostering opportunities for international partnerships (Figure 4).

By connecting these various human, institutional, and financial dimensions, this analysis sheds light on the collaborative dynamics and strategic drivers shaping the growth of fintech knowledge at both regional and global scales.

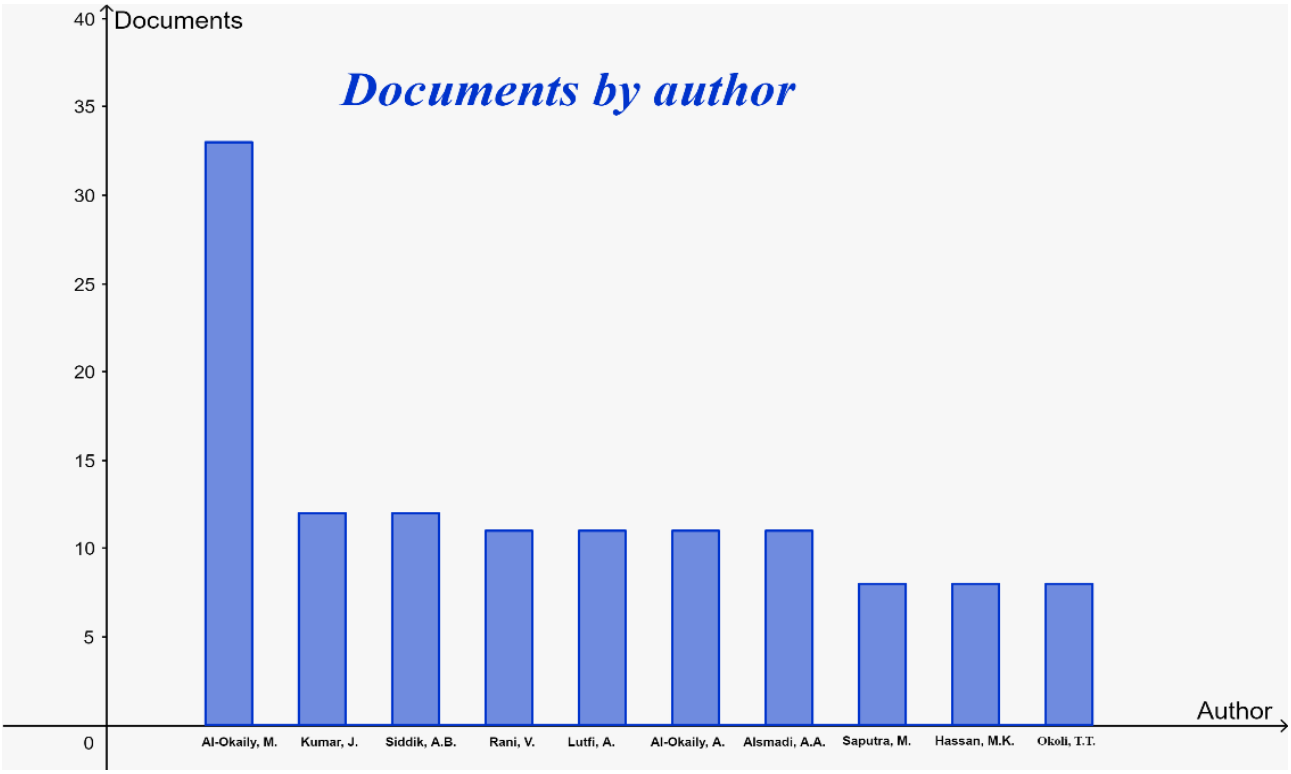

Figure 2.
Distribution of major scientific contributions to fintech.

The exploration of scientific productivity and the distribution of contributions has been thoroughly examined in the literature, particularly through the lens of a power law in scientific output. This viewpoint suggests that a small group of highly productive contributors plays a significant role in advancing certain research fields, while the majority tend to make more marginal contributions [51].

This phenomenon is evident in a study of publications on the adoption of fintech, which draws on data from the Scopus database, a comprehensive repository of scientific works in this area. The findings reveal that a select group of key authors significantly shapes this field. Among them, Bany Mohammad, et al. [52] stands out as the most prolific and influential figure, with an impressive total of 33 publications. Close behind are Anderson-Teixeira, et al. [53] and Rahman, et al. [54] each contributing 12 papers and demonstrating a solid commitment to fintech research.

At a slightly lower level, Bany Mohammad, et al. [52]; Alsmadi, et al. [55]; Almaiah, et al. [56], and Rani, et al. [57] each have 11 publications, reflecting their active involvement in the field. In contrast, Hassan, et al. [58]; Okoli and Tewari [59] and Saputra, et al. [60] with eight published works each, may not be as prolific, but they still contribute significantly to enhancing the knowledge base in this area.

This distribution reveals the breadth of contributions and spotlights the significant role of authors such as Bany Mohammad, et al. [52]. Their outstanding contributions place them at the leading edge of research into fintech adoption. The growing number of researchers with similar publication records demonstrates a collaborative effort to explore the various aspects of this dynamic field.

Examining these contributions lays a solid foundation for identifying future research directions. For example, a comprehensive review of the works by the most prolific authors could unveil emerging themes they are pursuing, such as the impact of fintech on financial institutions, technological advancements, or related risks. Moreover, exploring their research strategies could reveal gaps in the current literature, opening avenues for new inquiries to address these voids.

By exploring the contributions of these authors, valuable insights can be gained regarding ongoing trends and promising future paths in this domain. These observations deepen our understanding of fintech research dynamics and illuminate collaboration opportunities and critical themes for future studies.

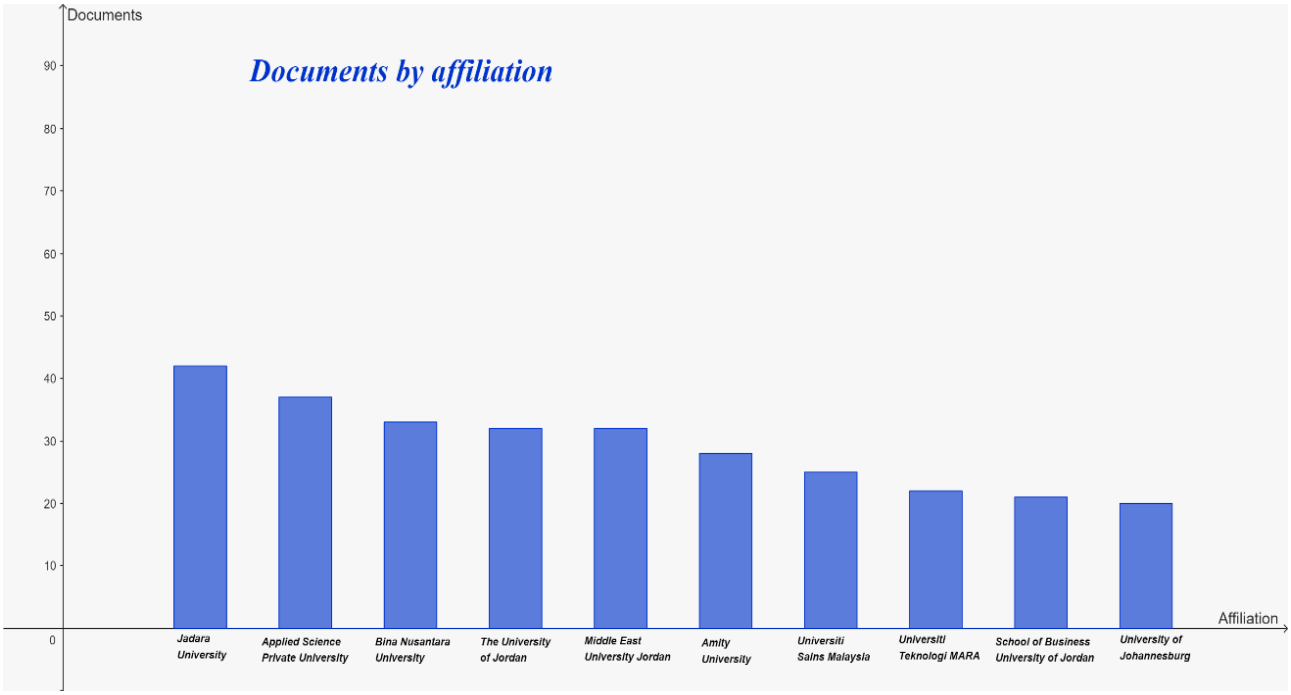

Figure 3.
Distribution of key scientific contributions to fintech.

The investigation of institutional affiliations within scientific publications is a recognized practice in the field of bibliometrics. They highlight the importance of bibliometric data in mapping institutional collaborations and comprehending the dynamics of scientific production. Specifically, they underscore the considerable impact that institutional affiliations and collaborative networks have on the distribution of publications and their influence within particular fields [61].

In this context, analyzing publications related to FinTech adoption, categorized by institutional affiliation from the Scopus database, offers valuable insights into the distribution of contributions among various academic institutions. This analysis highlights the most active institutions in the realm of fintech research, showcasing their levels of scientific output.

The findings indicate that Jadara University takes the lead with 42 publications, signifying a substantial contribution to the field. This prominent position may stem from the presence of specialized academic programs or research centers focused on financial innovation and technology. Following closely is Applied Science Private University, which boasts 37 publications and demonstrates a consistently high output in this area. Moreover, Bina Nusantara University holds a commendable position with 33 publications, potentially attributed to robust collaborations with industry or applied research initiatives.

Meanwhile, both the University of Jordan and Middle East University Jordan, each with 32 publications, exemplify the steadfast commitment of Jordanian institutions and reflect a vibrant regional scientific environment. These contributions likely arise from robust academic programs or focused research initiatives, further enhancing their reputation within the fintech sector.

Alongside these leading institutions, several other players have made moderate yet significant strides. Amity University, with 28 publications, affirms its presence in this research domain. Similarly, Malaysian universities Universiti Sains Malaysia, which has published 25 papers, and Universiti Teknologi MARA, with 22 publications, demonstrate a burgeoning interest in fintech adoption. Although their publication volumes are lower than those of the top-ranked institutions, they reflect a commendable commitment that enriches the literature in this field.

In this context, some institutions, despite being less prolific, also make notable contributions. For instance, the School of Business at the University of Jordan, with 21 publications, bolsters the standing of Jordanian universities in this analysis. In contrast, the University of Johannesburg, with 20 publications, signifies South Africa's increasing academic focus on fintech adoption. Despite having more modest publication outputs, these institutions play a crucial role in advancing research, often through specialized research centers or dedicated working groups focused on fintech.

Consequently, this analysis showcases an uneven yet dynamic distribution of scientific contributions across academic institutions. Jadara University and Applied Science Private University emerge as leaders in publication volume, whereas institutions such as Bina Nusantara University and various Jordanian universities contribute significantly to a collective effort.

In conclusion, the findings suggest the presence of centers of excellence, collaborative projects, and academic initiatives devoted to fintech.

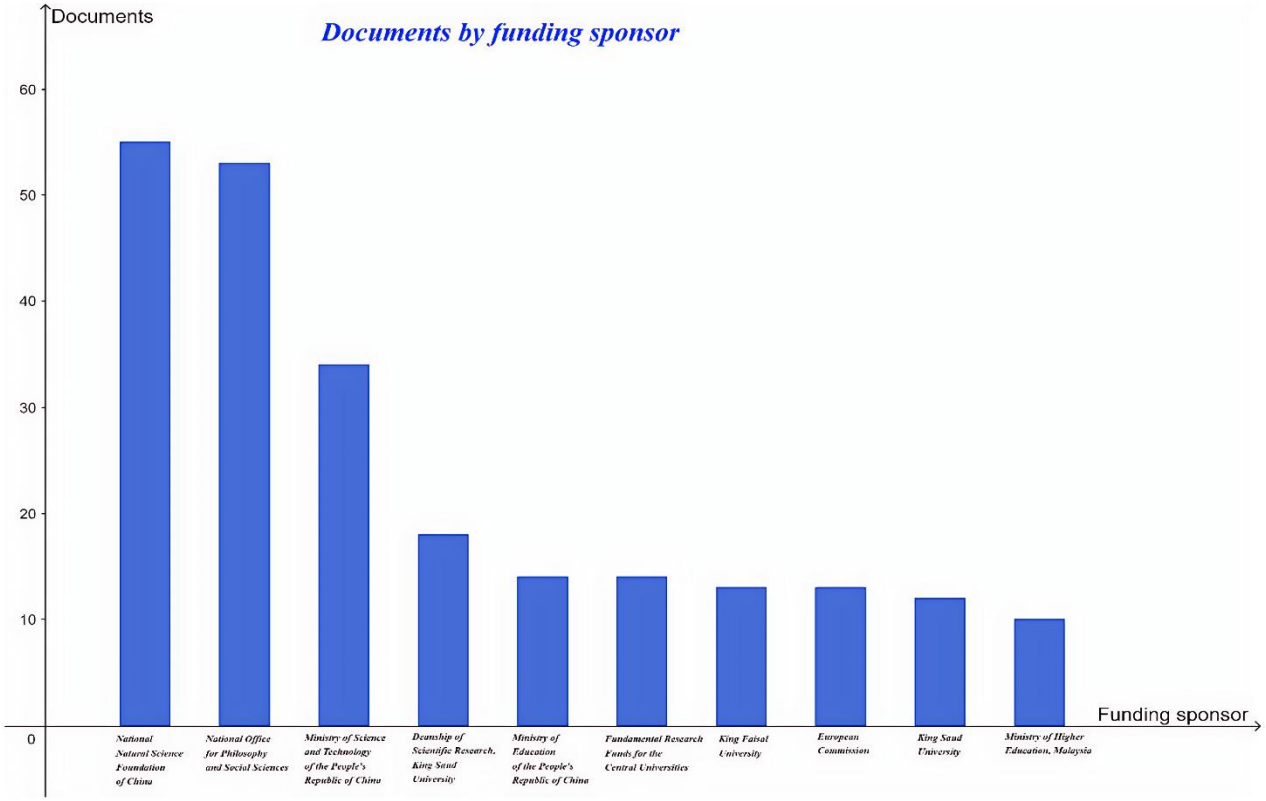

Figure 4.
Distribution of key scientific contributions to fintech.

Funding agencies significantly influence the promotion of scientific research, with their impact varying across regions and organizations, ultimately shaping academic priorities and objectives. Funding strategies, guided by national policies and international collaboration, are crucial in tackling political, economic, and technological challenges. This influence is particularly pronounced in financial technologies, where structured financial backing nurtures innovation [62].

The analysis reveals a notable concentration of funding from China, Europe, and the Middle East. Among these sources, the National Natural Science Foundation of China stands out, having funded 55 articles, considering China's vital role in advancing scientific and technological development. This considerable financial support is bolstered by contributions from the National Office for Philosophy and Social Sciences, which has sponsored 53 papers, and the Ministry of Science and Technology of the People's Republic of China, which has supported an additional 34 papers. Collectively, these initiatives help maintain research momentum in key strategic areas.

In effect, China shows impressive engagement from funding organizations such as the Fundamental Research Funds for the Central Universities, which have contributed to 14 articles. Furthermore, the Ministry of Education of the People's Republic of China has backed 18 articles, enhancing academic growth and fostering collaboration among national

universities. Consequently, the concentration of funding in China reflects a determined national policy to elevate the country to a leadership position in global scientific innovation.

Similarly, the European Commission is becoming a key player in Europe, having supported 13 articles, primarily through initiatives like Horizon 2020. This framework, as a consequence, suggests Europe's dedication to collaborative, multidisciplinary research that addresses social, economic, and technological aspects.

In the Middle East, institutions such as King Faisal University and King Saud University stand out as notable contributors, funding 14 and 13 articles, respectively. This effort signifies the region's ambition to engage actively in the global research landscape. At the same time, comparatively, internal funding from King Saud University's Deanship of Scientific Research, which has backed 10 articles, indicates the growing dynamism within Saudi universities.

Meanwhile, in Southeast Asia, Malaysia has emerged as a significant player; specifically, the Ministry of Higher Education has financed 12 research papers, demonstrating the country's dedication to promoting academic research and enhancing its reputation in the regional scientific community.

Alongside these primary supporters, various international and regional organizations are actively financing fintech research. For instance, Brazil's CNPq has backed seven papers, whereas the National Research Foundation of Korea has contributed to six papers, showcasing a diversity of global stakeholders. Additionally, institutions such as Middle East University and Binus University, each funding five papers, reflect their increasing involvement in this field.

Consequently, local universities and regional funding sources complement these research endeavors within their contexts. For instance, Renmin University of China has made significant progress in China, aided by the Humanities and Social Science Fund from the Ministry of Education. In contrast, in Saudi Arabia, the Deanship of Scientific Research at King Khalid University has also contributed, albeit to a lesser extent.

Overall, this trend highlights the dominance of Chinese and European funding sources while also recognizing the rise of regional contributors from the Middle East and Southeast Asia. Ultimately, as shown, the growing globalization of scientific research and the expanding avenues for international collaboration and multi-institutional funding are essential in addressing the complex and interdisciplinary challenges present in the fintech sector.

4.3. Sources and Quality of Scientific Contributions Regarding Fintech Adoption

This section examines the scientific journals that have significantly contributed to disseminating knowledge regarding fintech adoption, focusing on their publication volume (Figure 5), quartile rankings, and H-index for 2024 (Table 1). It accentuates these journals' role in structuring interdisciplinary research that spans economic policy and technological innovation.

The analysis of the correlation between quartile rankings and the H-index was confined to 2024 to accurately reflect the recent performance of academic journals and their relevance in the current landscape. This particular year was selected because of its significance in establishing quality standards and modern trends within the fintech sector.

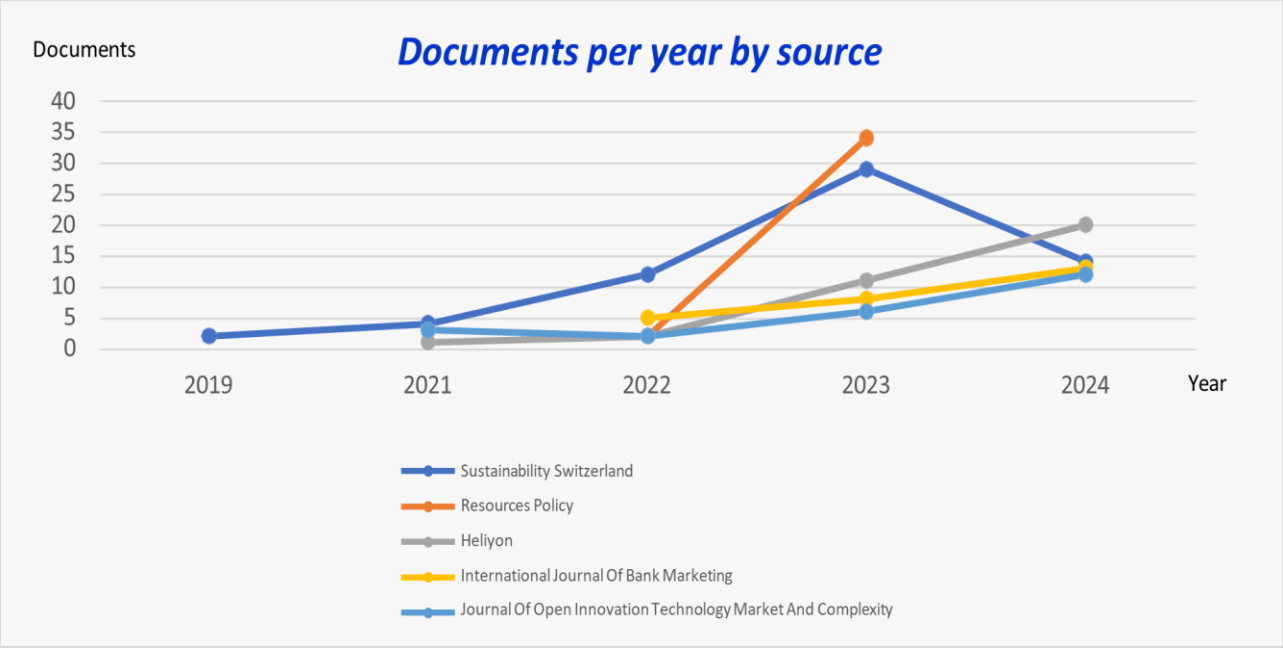

Figure 5.
Annual scientific contributions to fintech.

Bibliometric research emphasizes the importance of analyzing publications based on their source to deepen the understanding of the dynamics of scientific production. By identifying the journals that play a critical role in disseminating knowledge, this approach elucidates their influence on the evolution of various research fields. Such analyses are particularly relevant in understanding the dynamics of diverse areas of research, such as fintech [63].

Understanding the importance of methodology is essential for studying fintech adoption, as research is spread across several key sources. Sustainability Switzerland tops the list with 61 publications that focus on sustainability from environmental, social, and economic viewpoints. The following closely follows Resources Policy, which has 36 publications that draw attention to economic and regulatory insights critical to fintech adoption. Abiodun, et al. [64]contributed with 34 publications, taking a multidisciplinary approach to cover economic, technological, and societal themes.

The International Journal of Bank Marketing adds 26 publications centered on banking strategies, whereas the Journal of Open Innovation Technology, Market, and Complexity offers 24 publications that delve into open innovation. Specialized journals such as Finance Research Letters, with 19 publications, and Cogent Business and Management, with 16 publications, focus on topics related to financial innovation and management.

On the other hand, the International Journal of Data and Network Science presents 23 publications focusing on risk management. In comparison, the Journal of Risk and Financial Management contributed 21 publications dedicated to financial analysis. Journals with fewer citations, such as Frontiers in Psychology and PLOS One, examine behavioral aspects with 9 publications each.

Apart from that, Studies in Computational Intelligence and Energy Economics explore AI applications and economic implications, each boasting seven publications. Lastly, Kybernetes and Emerging Markets Finance and Trade provide six publications, concentrating on more niche areas.

In summary, these leading journals illuminate the interdisciplinary nature of fintech research, expounding on themes of sustainability, economic policy, and technological forecasting.

Table 1.
H-index and quartile evaluations of journals for 2024.

Journals in Scopus related to fintech adoption	Distribution of journals		Count of active journals classified by quartile		Average H-index of active journals by quartile	
	Active journals	Inactive journals	Q1	167	Q1	86
778	635	143	Q2	182	Q2	36
			Q3	153	Q3	21
			Q4	133	Q4	10

The H-index and the quartile system serve as essential bibliometric tools for assessing the academic impact and quality of scientific publications. The H-index measures both productivity and citation impact by determining the maximum number of publications that have at least that same number of citations [65].

Quartiles categorize journals according to bibliometric indicators, such as impact factor or SJR, which are divided into four groups: Q1, representing the highest level of scientific recognition, followed by Q2, Q3, and Q4, which indicate progressively lower levels of impact. The standard proposed by Scopus facilitates the identification of the most influential journals within various academic fields, which in turn aids researchers in making informed decisions regarding publication and collaboration [66].

In the rapidly evolving realm of fintech, these tools reveal significant trends concerning the impact of scientific publications. In our study, we reviewed journals indexed by Scopus as of January 2024, concentrating on fintech-related themes using ASJC classification codes. We applied code 1400 for business, management, and accounting, along with code 2000 for economics, econometrics, and finance. This evaluation identified a total of 778 journals, with approximately 82% still active in 2024.

An analysis of the distribution by quartile confirms a notable prevalence of journals ranked in the top quartiles, Q1 and Q2, which together account for more than 75% of the total H-index. Specifically, the average H-index of Q1 journals is nearly 2.5 times greater than that of Q2 journals and approximately nine times greater than that of Q4 journals.

The observed progressive decline in the average H-index from Q1 to Q4 marks the significantly greater influence wielded by the Q1 ranked journals, indicating that the Q1 and Q2 journals host the most impactful publications, with average H-indices of 86 and 36, respectively.

There is a clear positive correlation between high-quartile rankings and academic influence, as measured by citations and visibility. Within the context of fintech, these results confirm the considerable potential offered by publications in prominent journals, particularly those ranked Q1 and Q2.

However, it is important to acknowledge the increased competition for these journals, which attract a substantial number of submissions. Despite this challenge, their strategic importance for disseminating cutting-edge research affirms the necessity of targeting Q1 and Q2 journals to increase visibility, impact, and collaboration opportunities within this emerging field.

4.4. Typology and Formats of Scientific Contributions to Fintech Adoption

This section explores the various formats of scientific output related to fintech adoption, presenting the different types of documents that facilitate academic communication in this domain (Figure 6).

This study reveals a significant prevalence of scientific articles, which play a crucial role in disseminating original, empirical research. In conjunction with these articles, complementary formats such as book chapters, conference papers, and communications, combined with academic journals, enrich the literature landscape. These formats address the diverse needs of both researchers and practitioners, ensuring a broader dissemination of knowledge.

This categorization provides a valuable framework for understanding the mechanisms of knowledge dissemination and the interdisciplinary approaches within this rapidly evolving field.

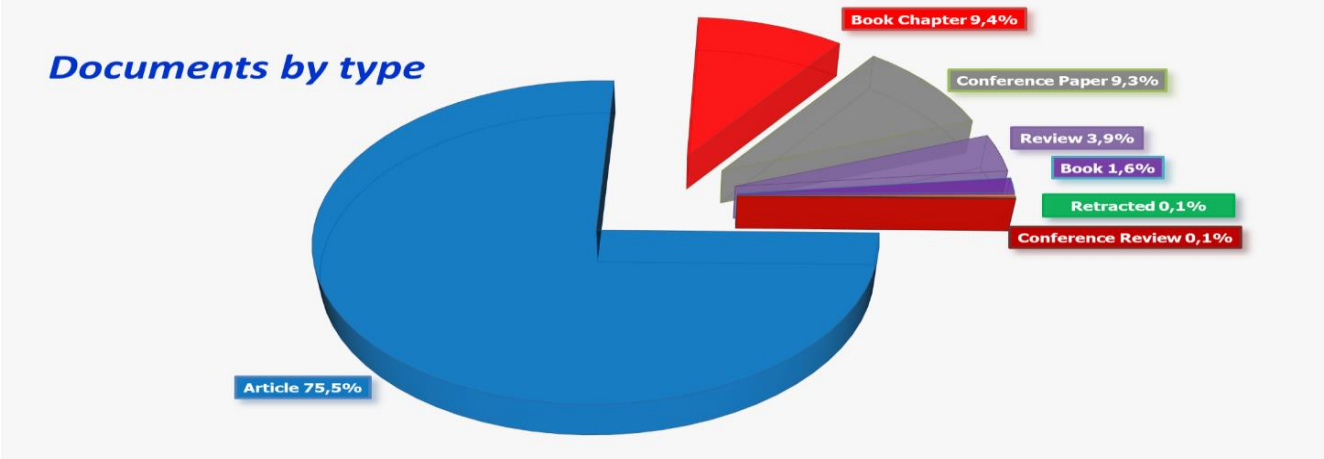

Figure 6.
Classification of scientific contributions to fintech adoption.

Analyzing scientific publications by their type is essential in bibliometrics, as it helps gain a deeper understanding of how knowledge is disseminated and the diversity of academic contributions. The importance of different publication formats significantly influences scientific communication and fosters collaboration among researchers [67].

Scientific articles serve as the primary medium for disseminating original research in financial technology, with a significant volume of 1364 publications, underscoring their importance in academic communication. These articles provide rigorous analyses and comprehensive discussions on fintech mechanisms and impacts.

Following them are book chapters, which total 170 publications and offer thematic aggregation and in-depth contextual analyses. Conference papers, numbering 168, facilitate the rapid dissemination of preliminary results and foster scientific discourse. Reviews, consisting of 70 papers, synthesize existing research while outlining future directions.

In parallel, books, with 28 publications, allow for integrated explorations of various topics. Other formats, including editorials and retracted papers, although limited in number, contribute to the literature.

Overall, while articles dominate the landscape of fintech research, complementary formats enhance the understanding and study of the field.

4.5. Geographical Distribution of Scientific Contributions to Fintech Adoption

This section points out the importance of conducting a geographical analysis of scientific publications related to fintech adoption, detailing the contributions of various countries and their influence on the global landscape (Figure 7).

This analysis helps us understand regional differences, pinpoint key research areas, and identify gaps. It also encourages teamwork to create a more inclusive and diverse research environment. We also evaluate the impact of scientific work through citation analysis by country (Figure 8), which helps us determine how academic contributions are recognized and their influence. Understanding this is crucial for grasping how national policies and international partnerships affect knowledge creation and enhance research's role in transforming financial systems worldwide.

Together, these analyses provide valuable reflection into the dynamics of this rapidly changing field.

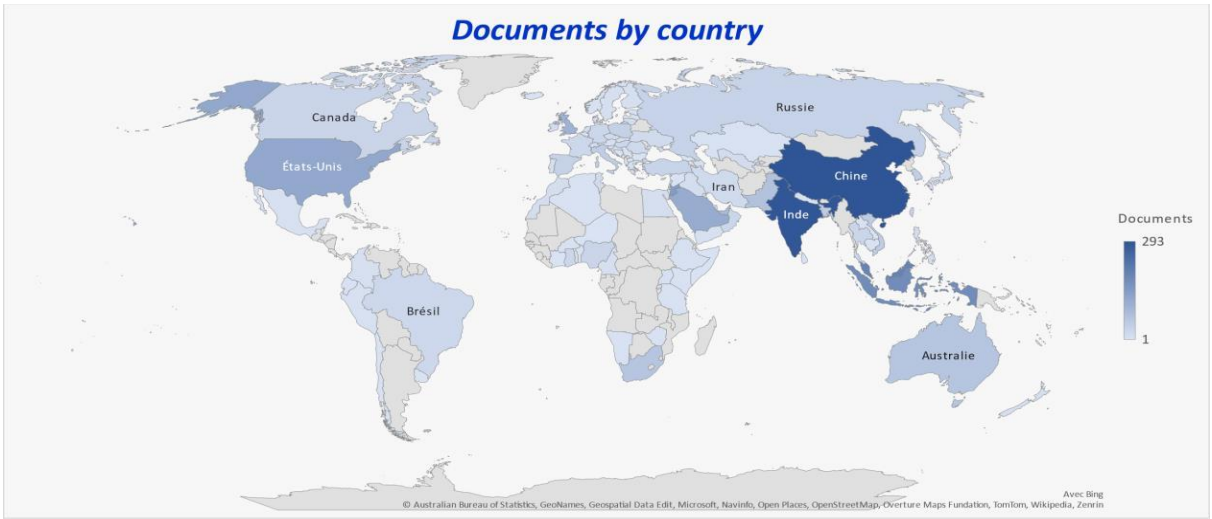

Figure 7.
Significant scientific contributions to fintech adoption by the country.

The geographical analysis of scientific publications builds on bibliometric sciences, focusing on global scientific output, international collaborations, and regional disparities, while also identifying research hubs and examining transnational collaboration networks, ultimately providing a valuable framework for understanding the geographical dynamics of research [68].

An analysis of scientific publications related to fintech reveals varying trends across regions, reflecting the diversity of economic, institutional, and technological factors that influence research. In particular, Asia holds a dominant position, with China and India leading the way with 293 and 287 publications, respectively. This preeminence can be attributed to ambitious public policies, enhanced support for innovation, and the rapid adoption of digital technologies, which create a conducive environment for research advancement. Additionally, other Asian nations, such as Malaysia, Indonesia, and Jordan, also contribute significantly, benefiting from favorable conditions and strategic national initiatives.

Outside of Asia, the United States holds a prominent position, publishing 121 works that underscore the role of American institutions, which prestigious universities and effective funding agencies bolster. In Europe, contributions vary considerably. The United Kingdom led with 99 publications, followed by Italy, Poland, and Spain. Clearly, this diversity confirms the robust research infrastructures present in certain nations and reflects differing levels of commitment to innovation across the continent.

Meanwhile, in the Middle East, countries such as Saudi Arabia and the United Arab Emirates are increasingly focusing on fintech, aligning their efforts with national strategies such as Vision 2030, which promotes economic diversification and technological advancement.

While African contributions to fintech research remain limited, countries such as Nigeria and Ghana demonstrate significant promise, a potential that could be enhanced through international partnerships and targeted investments. Undoubtedly, the COVID-19 pandemic has further accelerated fintech adoption in developing countries, fostering the growth of digital infrastructures and promoting financial inclusion among underserved populations.

In this context, China is making noteworthy advancements in oversight and innovation within the fintech sector, reinforcing its crucial position on the international stage.

Overall, the critical influence of public policy and international collaboration in fostering a more equitable distribution of scientific research exploring developmental opportunities in underrepresented regions is evident. This analysis provides strategic reflections that can inform future academic initiatives and strengthen global partnerships within the fintech sector, ultimately contributing to a more inclusive and innovative financial landscape.

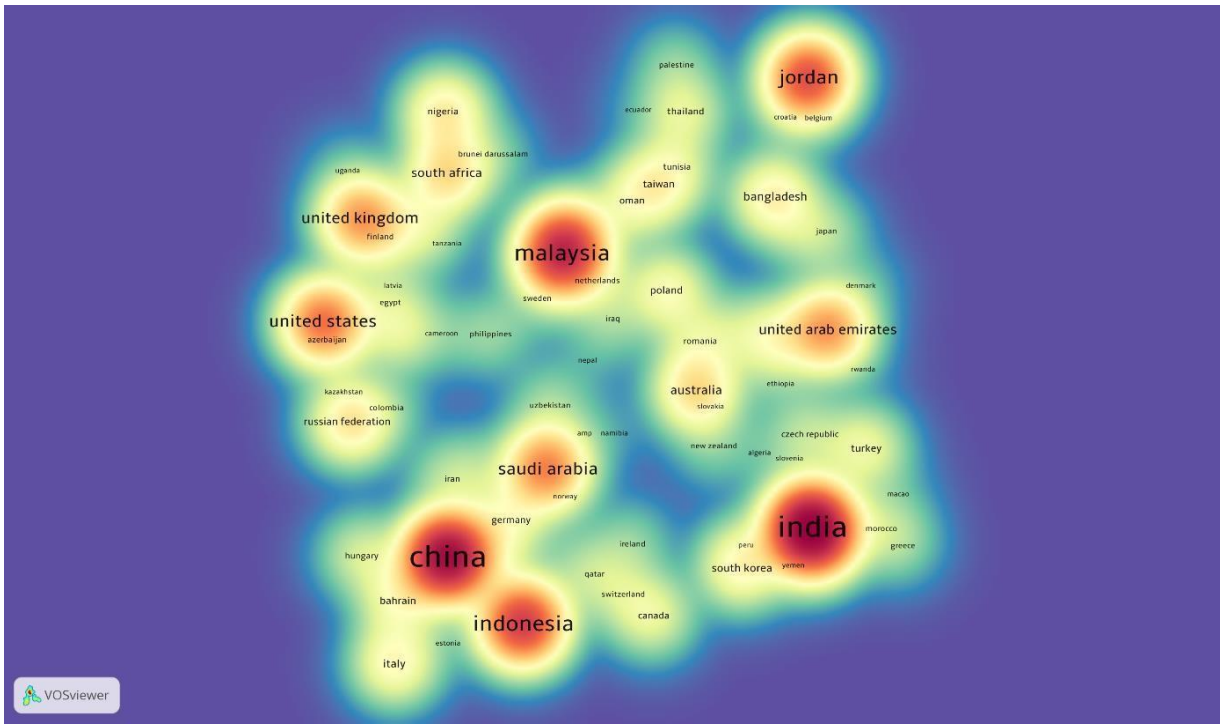

Figure 8.
Distribution of citations of scientific contributions to fintech adoption by country.

The analysis of citations as an indicator of scientific impact relies on methodologies that establish a correlation between citations and the recognition of research quality. Effectively, citations reflect a study's influence in its field and announce countries' role in producing and disseminating scientific knowledge [69].

In the fintech landscape, Asian countries such as India, China, Malaysia, and Indonesia stand out due to their impressive citation counts, which emphasize their significant international relevance and influence. This strong position as a global leader in fintech is supported by vibrant innovation ecosystems, aggressive digitization initiatives, and policies aimed at enhancing financial inclusion.

By harnessing financial technologies to modernize their economies and broaden access to financial services, these nations have made fintech a crucial element for both economic and social transformation. The increasing number of academic citations points to the importance of international collaborations that enhance the visibility and impact of Asian contributions. Such partnerships strengthen the region's reputation as a center of excellence in fintech research and innovation.

The growing interest in fintech signifies a pivotal moment in the evolution of global financial practices, with Asia emerging as a key contributor to the development and dissemination of knowledge in this sector. This progress inspires us to recognize the vital importance of these studies and affirms that the region holds the power to shape the future of the financial industry.

4.6. Relevant Areas and Themes in Scientific Contributions to Fintech Adoption

This part conveys the significance of a comprehensive examination of essential research domains that improve our comprehension of fintech adoption, illustrating their interdisciplinary characteristics.

By exploring critical fields such as business, management, accounting, economics, and finance (Figure 9), we outline their essential role in assessing fintech's organizational and economic impacts. Contributions from computer science and social sciences further enrich this analysis by incorporating technological and societal perspectives.

In broader terms, keyword co-occurrence analysis using VOSviewer (Figure 10) uncovers connections among key concepts and identifies four thematic clusters.

Building on this, keywords like "Fintech," "Financial inclusion," and "Sustainable development" reflect pressing research priorities related to innovation and sustainability.

Collectively, these interpretations offer a concise overview of the interdisciplinary dynamics that drive this rapidly evolving field.

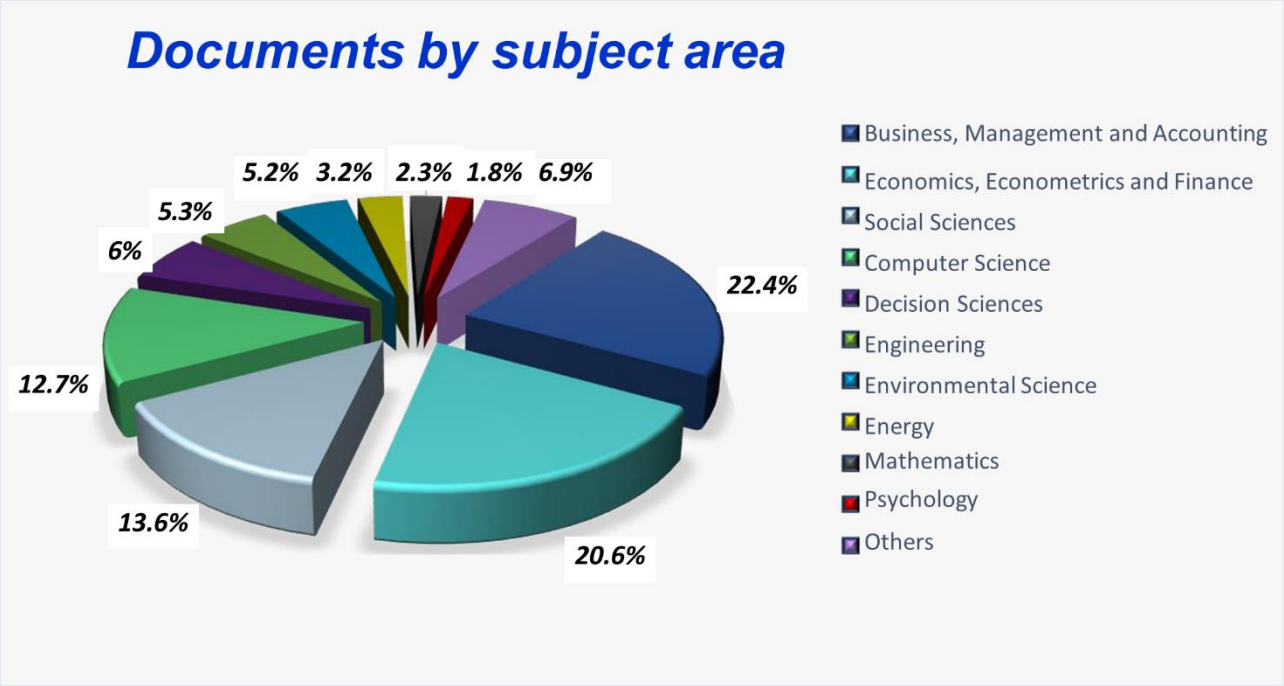

Figure 9.
Major scientific contributions to fintech adoption by research area.

The analysis of scientific publications by research field provides an interdisciplinary perspective on how each discipline contributes to knowledge advancement. Different fields employ varying problem-solving methods and methodologies, emphasizing the complementary roles of disciplines in examining complex phenomena like fintech adoption [70].

A review of the literature on fintech adoption reveals three main domains: business, management, and accounting, which collectively account for 823 publications. These fields concentrate on business strategies, economic models, and the processes of implementing fintech, recognizing the importance of risk management and organizational performance.

Following these are economics, econometrics, and finance, with 756 articles analyzing fintech's effects on financial markets and regulatory frameworks. The IT sector adds 465 articles, focusing on computer security, algorithms, and software development tailored to financial services.

There are also 499 publications from the social sciences, providing valuable insights into consumer behavior and the societal acceptance of fintech. Moreover, decision sciences contribute 220 articles that examine decision-making processes. Additionally, with 194 articles, engineering focuses on the infrastructure and innovative aspects of fintech solutions.

Then, the environmental sciences, comprising 191 publications, and energy studies, with 118 publications, investigate the sustainability challenges associated with fintech.

Finally, mathematics contributes 84 articles related to quantitative financial modelling, whereas psychology, with 67 publications, and the arts and humanities, with 55 articles, explore the cultural and ethical dimensions of fintech.

In summary, fields like medicine, which boasts 41 publications, earth sciences with 10, and biochemistry at 9, provide valuable but somewhat less prominent perspectives on fintech, thus contributing to a richer overall body of research in this domain.

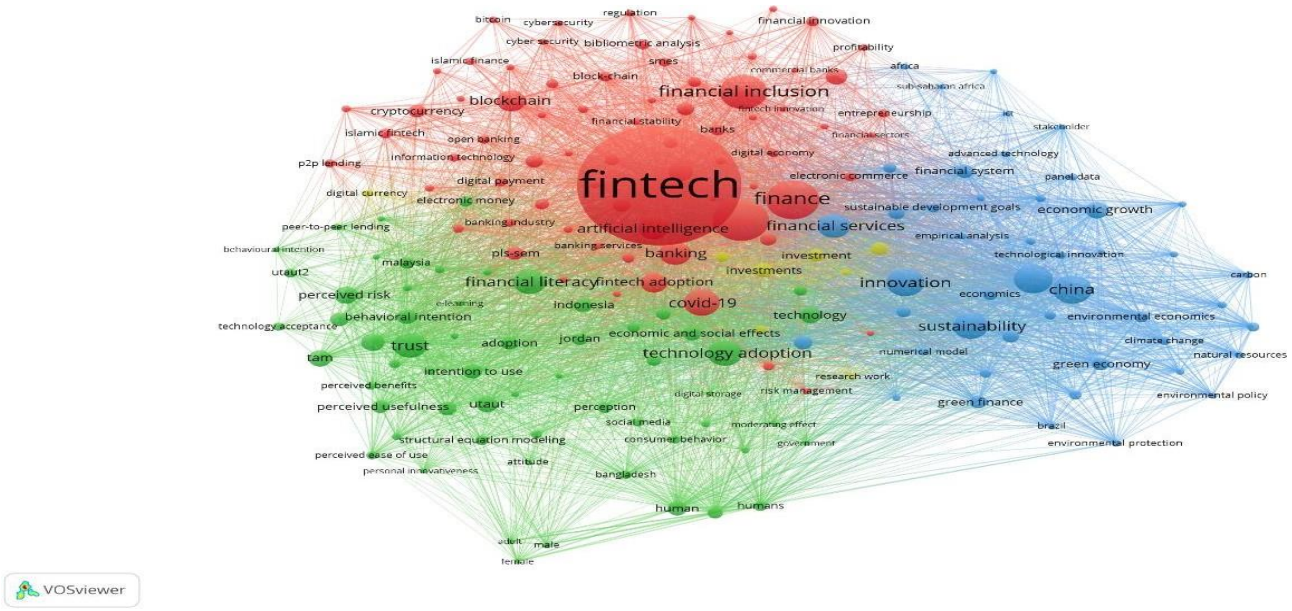

Figure 10.
Network of keyword cooccurrences in scientific contributions to fintech adoption.

Keyword cooccurrence analysis is an essential method in bibliometrics and is used to identify relationships between concepts frequently discussed in a research field. Ultimately, this systematic approach explores connections between terms through cooccurrence networks [71].

Over the years, it has become an indispensable tool for visualizing thematic dynamics in various fields. Owing to tools such as VOSviewer, this method can reveal thematic clusters and identify priority areas for research. Indeed, by analyzing keywords in the fintech field, this approach offers an overview of the leading research topics that authors consider priorities in this specific field.

By examining keywords that appear at least 10 times in the analyzed corpus, the results reveal a total of 6,266 keywords, of which 188 meet this threshold and are divided into four main thematic clusters. Cluster 1 includes 74 items, Cluster 2 contains 60, Cluster 3 has 46, and the more restricted Cluster 4 includes 8 items. In this way, the identified keywords are distributed across different subdomains, outlining the fundamental thematic structures of the fintech field.

Among the most frequent terms, "Fintech" is dominant with 546 occurrences, followed by "Financial technology" with 134 occurrences and "Finance" with 124 occurrences. These central concepts reflect the fundamental interest in financial technologies and their implications. Other terms, such as "Financial inclusion" with 107 hits, "Sustainable development" with 82 hits, and "Innovation" with 81 hits, illustrate a notable convergence between financial inclusion, sustainability, and digital transformation, underlining research priorities in this area.

In conclusion, this analysis also reveals the emergence of themes related to technology adoption, modern financial services, and the impacts of the pandemic, which have profoundly influenced recent directions in fintech research, calling attention to the interconnections between key concepts and research priorities.

As a result, keyword co-occurrence analysis is a valuable tool for exploring and visualizing major themes within a field of study. Grouping key ideas into well-defined clusters provides a better understanding of current scientific orientations and identifies strategic axes for future research.

5. Conclusion

This article presents a comprehensive bibliometric analysis of research on fintech adoption from 2016 to 2024. Using data from the Scopus and SCImago Journal Rank databases, along with tools such as VOSviewer, we observed a significant surge in publications since 2020, peaking at 898 articles in 2024 (Figure 1). This upward trend highlights the rapid acceleration of global digital transformation, which has been largely driven by the COVID-19 pandemic.

Fintech research has grown substantially in recent years, fueled by digital transformation and innovation-friendly policies. Notably, Asia and Europe have emerged as leaders in this field due to strategies promoting financial inclusion. Leading academic institutions, such as Jadara University and Applied Science Private University, play crucial roles in advancing knowledge and fostering international collaboration (Figure 3). Additionally, key researchers such as Bany Mohammad, et al. [52]; Anderson-Teixeira, et al. [53] and Rahman, et al. [54] have significantly shaped fintech adoption research, reflecting the power law distribution of scientific contributions (Figure 2).

Major funding sources, primarily in Asia and Europe, shape research trajectories, whereas prestigious journals play a key role in disseminating high-quality, interdisciplinary studies. Notable journals, including Sustainability Switzerland, Resources Policy, and Abiodun, et al. [64], are instrumental in publishing fintech-related research (Figure 5).

The H-index, a critical metric for publication impact, indicates that top-tier journals host the most cited research, reflecting the strong demand for rigorous studies in management, economics, and computer science (Table 1). Additionally, journals focusing on emerging topics such as blockchain and artificial intelligence are gaining influence in this rapidly evolving field. Fintech research is focused primarily on management, economics, and computer science, with emerging themes such as blockchain, artificial intelligence, and financial inclusion shaping both current and future challenges in the sector (Figure 9).

Despite these advancements, significant challenges remain, including regulatory issues, user trust, and cybersecurity, which pose barriers to widespread fintech adoption. Disparities in funding and the geographical concentration of research further highlight the need for increased global collaboration (Figure 7). Citation analysis confirms that the impact of fintech research is concentrated in Asia, with countries such as China, India, and Malaysia leading in terms of academic influence (Figure 8).

Looking ahead, aligning technological innovation with sustainable development goals will be essential. Future research could explore the intersection of fintech and green finance, as well as the adoption of emerging technologies in developing economies. Moreover, keyword co-occurrence analysis reveals that financial inclusion, sustainable development, and digital transformation are becoming the dominant themes in fintech adoption research (Figure 10).

While this article focuses on bibliometric trends, a more in-depth qualitative analysis could provide deeper insights into the impact of fintech on economic and social systems. By shedding light on these trends and challenges, our findings offer a valuable roadmap for researchers and practitioners navigating the dynamic fintech landscape, contributing to the transformation of a more sustainable and inclusive financial sector.

Abbreviations

The following abbreviations are used in this manuscript.
Fintech: Financial Technology.
SJR: SCImago Journal Rank.
ESG: Environmental, Social, and Governance.
USA: United States of America.
UK: United Kingdom.
R&D: Research and Development.
ASJC: All Science Journal Classification.
CNPq: National Council for Scientific and Technological Development.
AI: Artificial Intelligence.
PLOS: Public Library of Science.
IT: Information Technology.

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