A Comprehensive Analysis of Fintech in Marketing Research: Bibliometric Approach using Web of Science Core Collection Database

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Abstract. Using information from the Web of Science Core Collection database and 226 papers from the years 2018 through 2023, this study gives an extensive bibliometric analysis of fintech research in the marketing field. The survey found a 54.85% compound annual growth rate in research, which reflects the fintech sector's quick development and growing influence on marketing. With businesses leveraging technology to improve customer services and marketing initiatives, fintech's disruptive potential was clear. Fintech adoption by financial institutions and regulatory adaption, however, were both stressed. Notably, a high amount of local collaboration was seen among Chinese academics in corporate risk management, suggesting the need for additional international collaborations. Researchers, practitioners, policymakers, and individuals working in the field of innovative financial services can all benefit from the research, which also recognizes the contributions of famous authors like Yifei Zhang. The study emphasizes the need of comprehending and utilizing fintech for successful marketing tactics and suggests further study to improve this key sector.

Keywords: Bibliometric, financial technology, fintech, Web of Science

1. Introduction

Fintech, often known as financial technology, is the use of technology to enhance and automate financial services. It includes a variety of financial practices, including internet banking, crowdsourcing, mobile payments, and robo-advising. The financial industry has been transformed by the fintech industry's rapid development and integration (Retkutė & Davidavičienė, 2021; Suryono et al., 2020). Fintech developments have made it possible to reach underserved groups, like small enterprises and low-income households, with financial services. Blockchain technology's application in the fintech industry has the potential to increase financial security and lessen fraud (Martin Kim, 2017; Xu et al., 2019). Furthermore, machine learning algorithms and big data analytics(Yusupa et al., 2023; Zalmi et al., 2023) have made it possible to assess creditworthiness and manage risks more effectively. However, the rise of fintech has also brought about new risks, such as cybersecurity threats and data privacy concerns. The scientific study of fintech aims to understand the impacts and implications of these developments and to develop effective policies and regulations to manage risks and promote innovation (Chen et al., 2019).

Technology Acceptance Model (TAM)(Rejali et al., 2023), which posits that perceived ease of use and perceived usefulness directly influence technology adoption. This theory is pertinent to understanding fintech's adoption, where technology use is integral to its services. Second, the Diffusion of Innovation theory(Acikgoz et al., 2023), which explains how, why, and at what rate new ideas and technology spread. In the context of fintech, this theory can elucidate the factors that influence the uptake of fintech services, such as mobile payments and online banking, among businesses and consumers.

The Service-Dominant Logic (SDL) theory, which regards services rather than goods as the primary basis of transaction, has important marketing implications for fintech(Kovalchuk et al., 2023). Financial services are advertised and supplied digitally in a fintech environment, focusing on value co-creation between providers and customers.

The domain of financial technology (fintech) has experienced substantial expansion and advancement during the previous decade, as demonstrated by the rising quantity of publications and research investigations concerning this topic. The examination of research patterns in the field of fintech indicates an increasing focus on subjects pertaining to marketing (Wanof & Gani, 2023), financial inclusivity, digital transactions, blockchain technology, and adherence to regulatory requirements (Adinarayana & Kishore Babu, 2019). Moreover, there is a growing emphasis on the utilization of financial technology in developing nations, where a substantial portion of the population lacks access to traditional banking services. Scholars are currently investigating the effects of financial technology on conventional financial establishments, with a specific focus on the possible destabilization of the banking sector. Furthermore, there is an increasing scholarly attention towards the ethical and societal ramifications of financial technology, encompassing aspects such as safeguarding of data privacy, fortification against cyber threats, and ensuring the welfare of consumers (Cao et al., 2021). In general, the current research patterns in fintech demonstrate a swiftly developing environment, where novel technologies and advancements are instigating transformations in the financial industry and creating fresh avenues for research inquiries and prospects (Azzaakiyyah, 2023; Kaur et al., 2021).

In recent years, the significance of financial technology, commonly known as fintech, has grown considerably within the marketing domain. Fintech pertains to the utilization of technology to enhance financial services and products, thereby increasing their efficiency, accessibility, and user-friendliness. Fintech has facilitated the provision of customized and efficient financial experiences to customers in the marketing domain. This has been achieved through the implementation of technologies such as mobile payments, online banking, and digital wallets (Al-Dmour et al., 2020).. The emergence of data and technology has presented novel prospects for marketing experts to utilize these resources in crafting

inventive financial offerings that are more aligned with the demands and inclinations of their intended clientele. The emergence of fintech has facilitated the expansion of business operations to markets that were previously neglected, including small businesses and low-income households, through the provision of financial services that are more adaptable and cost-effective (Li et al., 2020; Nguyen & Bang, 2019).

The amalgamation of fintech and marketing is a relatively new area of exploration, with limited research conducted on the transformative impact of fintech on marketing strategies. Almansour (2023) notable research delved into the manner in which fintech enterprises utilize customer data to tailor marketing proposals.

The swift progression of fintech advancement has engendered apprehensions regarding the safeguarding of data privacy, security, and regulatory adherence. These concerns necessitate persistent research and vigilance to guarantee the judicious and ethical utilization of financial technology in the realm of marketing. This article presents a bibliometric analysis of financial technology in marketing research, aiming to offer a comprehensive overview of the current research status in this field. Our study will employ bibliometric techniques to examine the patterns in Enterprise Risk Management (ERM) research during the previous decade. The present investigation aims to offer valuable perspectives on the preeminent authors, journals, and publications that have exerted a significant impact on the field of fintech marketing research. The findings of this investigation hold significant importance for scholars, professionals, and decision-makers seeking to enhance their comprehension of the present status of fintech marketing research and its impact on risk management methodologies within firms.

2. Methods

The present study undertook a comprehensive bibliometric examination of financial technology (fintech) in the domain of marketing research, utilizing data sourced from the Web of Science Core Collection (WOS-CC) database (Thelwall, 2018). The researcher conducted a comprehensive search for scholarly articles utilizing the search terms "fintech" and "marketing," yielding a total of 226 publications as of March 2023. Subsequently, the data underwent filtration based on the type of literature and temporal scope. Any redundant or extraneous articles were manually eliminated, culminating in a final dataset comprising 226 articles. The BibTex format was utilized to obtain comprehensive records for each article, encompassing author name, document type, publication year, source, volume, edition, pages, and citation count. Furthermore, Biblioshiny's analysis was substantiated by acquiring references for each article. Through the implementation of rigorous methodologies, we conducted a comprehensive analysis of fintech within the realm of marketing research.

Through the utilization of the WOS-CC database, this investigation ensured the comprehensiveness and representativeness of the data, thereby affording the author a substantial sample size of articles for analysis. The implementation of filters and manual screening played a pivotal role in ensuring the pertinence and precision of the data, establishing a dependable foundation for the bibliometric analysis. The study's methodology was fortified by the incorporation of comprehensive records and reference information, which facilitated a detailed examination of the characteristics of each article. This approach enabled a thorough and exhaustive analysis utilizing Biblioshiny. The utilization of rigorous methods in the study ensured the credibility and accuracy of the research outcomes, thereby contributing to a comprehensive comprehension of fintech in marketing research.

Biblioshiny is a supplementary software application that is constructed upon the Bibliometrix linguistic package within the R computational environment. The main objective of this tool is to enable quantitative research in scientific metrology through the provision of a user-friendly and effective approach for analyzing research data. The program has been tailored to cater to the needs of researchers by offering a

comprehensive and lucid exposition of research domains. This facilitates the identification of popular themes, significant literature, and contemporary research patterns. Biblioshiny presents noteworthy enhancements in contrast to the conventional mode of Bibliometrix script execution. The software offers a user interface that is intuitive and user-friendly, thereby enhancing its accessibility and ease of use for researchers. Biblioshiny provides researchers with improved capabilities to efficiently and effectively analyze data from web pages. In general, Biblioshiny is a valuable resource for researchers who wish to conduct bibliometric analyses within the realm of scientific metrology(Aria & Cuccurullo, 2017).

Biblioshiny is a highly advanced and intricately designed instrument that facilitates bibliometric investigations for scholars with great convenience. The software's capacity to produce a multitude of visual maps upon importing literature is a noteworthy benefit. The utilization of visual maps proves to be highly advantageous in the examination of diverse facets of scholarly research production. The maps in question exhibit notable characteristics such as the identification of document sources, references to cited documents, authorship attribution, publication affiliation, and the country of origin of the author. The diverse range of visualization tools at the disposal of researchers offers a versatile and all-encompassing framework for conducting bibliometric analyses. The software's adaptability and multifunctionality render it an indispensable tool for scholars seeking to undertake a comprehensive and nuanced analysis of scholarly inquiry within their respective discipline(Batubara et al., 2021; Gadzali, 2023; Ronal Watrianthos et al., 2022; Watrianthos et al., 2022).

The installation of Biblioshiny in the R programming environment provides researchers with a robust data analysis tool that facilitates the importation and examination of data from distinguished academic databases, including Scopus and the Web of Science. The aforementioned feature offers scholars the capability to perform comprehensive evaluations of scholarly literature, encompassing the aptitude to categorize and scrutinize past data from investigations carried out within particular timeframes, as well as extract pertinent metadata from databases. Biblioshiny is a multifaceted and refined instrument for performing bibliometric investigations on scholarly literature, providing cutting-edge functionalities and a user-friendly interface that render it an indispensable asset for scholars in diverse disciplines. Biblioshiny is a noteworthy advancement in the realm of bibliometrics, as it enables a sophisticated examination of research production and dissemination(Watrianthos et al., 2022).
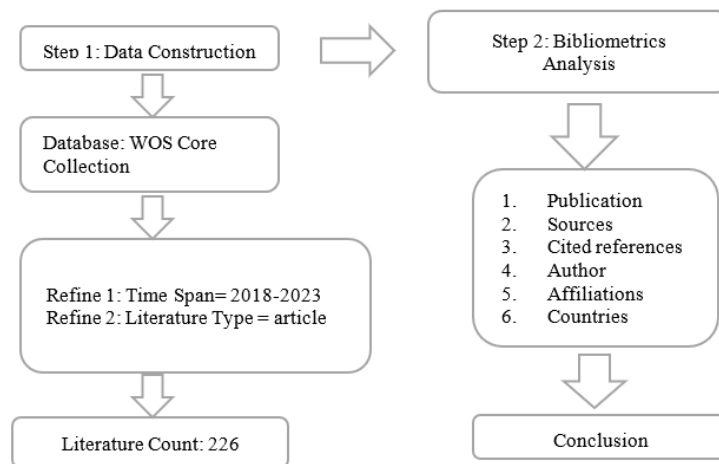

Fig. 1: Research Step

Biblioshiny extends beyond rudimentary visual representations of bibliometric information. The software possesses sophisticated functionalities for the purposes of data mining and analysis, which facilitate the extraction of valuable metadata and the conduction of thorough field analyses by researchers. The advanced functionalities encompassed in the system comprise the capability to extract significant terminologies and perform co-citation and bibliographic coupling analyses, thereby facilitating the identification of pivotal research themes and authors. Figure 1 depicts an instance of the output generated by the software, showcasing a concise overview of enterprise risk management research that encompasses seven distinct stages. Through an analysis of the present state of research, including its trends and limitations, the software offers a comprehensive overview of the area of study being examined. Biblioshiny's advanced features enable researchers to perform comprehensive analyses of research domains, facilitating a more efficient comprehension of the intricacies of their research topics.

The methodology employed in the study is currently under investigation. The focus of this article is to perform an extensive bibliometric examination of financial technology (fintech) within the domain of marketing research.

a. Search Strategy: The strategy began with a search for articles in the Web of Science Core Collection (WOS-CC) database using the keywords "fintech" and "marketing." This initial search resulted in a total of 226 publications. The WOS-CC is a widely recognized and reliable source for scholarly publications, hence providing a strong starting point for data collection

b. The screening process involved the application of inclusion and exclusion criteria to the extracted data. The application of filters was based on the categorization of literature type and temporal scope. Moreover, the study employed a manual procedure to eliminate duplicate and extraneous articles, thereby guaranteeing the inclusion of highly pertinent articles in the dataset pertaining to the research topic. Consequently, the ultimate dataset comprised of identical 226 articles, signifying that all the initial articles were pertinent.

c. The study utilized Biblioshiny, a software tool developed on the Bibliometrix language package in the R programming environment, to analyze bibliometric indicators. The writer utilized all available indicators in the tool, encompassing the capacity to scrutinize comprehensive records for each article, such as author name, document type, publication year, source, volume, edition, pages, and number of citations, as well as references for each article. The employed methodology facilitated an in-depth examination of the dataset, thereby assisting in the detection of significant patterns and revelations within the domain of fintech marketing research.

d. Limitations and Potential Biases: As rigorous and comprehensive as this methodology appears, it is not free from potential limitations and biases. Firstly, the reliance on the WOS-CC database could introduce bias since it only includes articles indexed within it, potentially excluding relevant articles published elsewhere. Secondly, the keyword-based search approach may not capture all relevant articles if different terminology was used in their title, abstract, or keywords. Thirdly, the manual process of removing duplicates and irrelevant articles could introduce personal bias, and it's also subject to potential human error. Finally, the use of Biblioshiny, despite its advanced capabilities, also limits the study to the functionalities and algorithms provided by the tool.

Despite these potential limitations, the use of the WOS-CC database, the manual screening process, and the advanced capabilities of Biblioshiny provided a solid basis for conducting a robust and in-depth bibliometric analysis of fintech in marketing research. This research article represents a substantial contribution to understanding this emerging field, and the methodology used can be considered a best practice example for bibliometric studies.

3. Results And Discussion

By analyzing the annual research output on fintech in marketing, we get a lot of insightful knowledge about the overall pattern of this research area. The scientific literature pertaining to the utilization of fintech in

marketing has undergone significant changes in the past five years, as evidenced by the data presented in Figure 2 of the research investigation. The data suggests that there has been a consistent rise in worldwide investigations pertaining to the utilization of financial technology in the realm of marketing throughout the previous half-decade, and noteworthy advancements have been achieved. The observed trend indicates a growing inclination among scholars towards incorporating fintech into marketing practices.

Based on the analysis of data, it can be inferred that the investigation of financial technology (fintech) applications in the field of marketing has exhibited a compound annual growth rate (CAGR) of 54.85%. The field under consideration has exhibited a noteworthy, annualized growth rate (AGR) of 54.85% over the last five years, indicating substantial progress in research endeavors. To contextualize this, it can be inferred that the quantity of pertinent research papers released annually has exhibited a mean growth rate of 54.85 percent. The Compound Annual Growth Rate (CAGR) of 54.854% indicates a growing interest in this research, which is attributed to the rapid evolution of the fintech industry. In this context, marketing research is deemed crucial for companies to maintain a competitive edge and effectively cater to their clients' demands. The research's annual growth rate of 54.854% indicates an increasing level of popularity. The observed yearly increase in frequency of engagement indicates a rising trend in the popularity of this particular research.

The aforementioned trend indicates that the utilization of financial technology in the realm of marketing is gaining significance among organizations, as they endeavor to enhance the caliber of their customer engagements, augment the efficiency of their business processes, broaden their consumer base, and fortify their security measures. The utilization of technology and data can enhance marketing strategies for businesses, leading to improved outcomes such as growth and heightened customer satisfaction. As illustrated in Figure 2, there was a consistent upward trend in the quantity of publications pertaining to this field during the period spanning from 2018 to 2022.
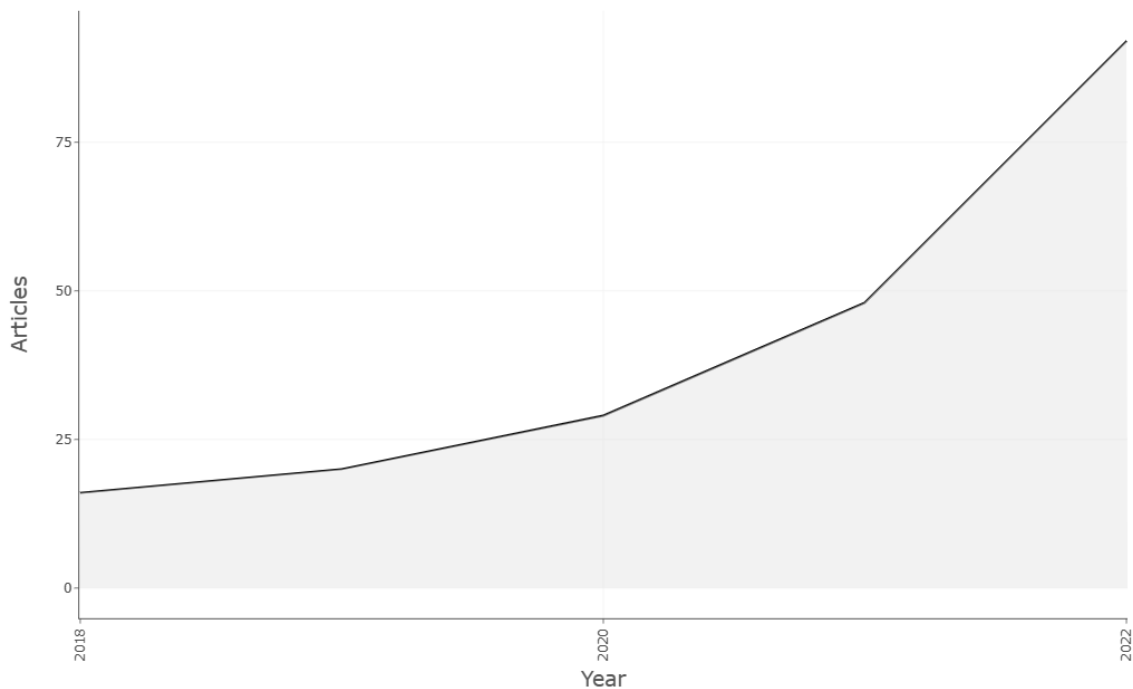

Fig. 2: Annual Scientific Production in Fintech Marketing Research

The escalation of the fintech industry has led to a surge in fintech marketing research. In order to formulate effective marketing strategies, corporations must possess a comprehensive comprehension of the requirements and inclinations of their intended consumer base. Furthermore, it is imperative for organizations to maintain a competitive edge in an industry that is constantly undergoing change and to establish effective communication channels with their intended audience. Utilizing research empowers organizations to generate more effective marketing strategies, stimulating growth.

Marist College's John Hill wrote this database's first article. He claims fintech startups are displacing banks by offering more efficient, cost-effective, and customer-friendly financial services. Fintech companies and conventional banks are using technology to improve customer service, which has spurred competition and innovation. The essay emphasizes fintech's role in personalized marketing and consumer experience. Data analysis and AI help fintech organizations understand customer wants and preferences and tailor marketing campaigns. Technology can automate marketing operations, streamline efforts, and expand audiences through digital platforms. The report stresses brand awareness and safety in the financial business, which impacts fintech marketing. Customers can trust incumbent banks' brands despite fintech startups' better tech. To compete with established banks, fintech businesses must build client trust through strong security and branding. Fintech and The Remaking of Financial Institutions (2018) published this research(Hill, 2018).

3.1.Source of Fintech Marketing Research

A literature review identifies high-quality research materials in a certain field and gives researchers the skills they need to publish. Figure 3 displays the top ten enterprise risk management research sources in this topic. The h-index is crucial for assessing academic journal impact. The h-index measures highly cited publications. Higher h-index scores reflect a journal's greater impact and contribution to the field. Researchers can find high-quality research sources and establish their importance by examining a journal's h-index score.

The h-index is a powerful tool for determining journal impact and academic research worth. Academic journals with high h-indices are often considered the most influential and impactful in their professions. Enterprise risk management researchers can use the h-index to evaluate journals and identify the most significant research sources. Therefore, they can publish in the most relevant and impactful publications. Researchers can use journal h-index scores to measure a journal's influence and find high-quality research sources. Thus, the h-index helps researchers choose the most impactful journals to publish their findings.

In Table 1, you can see the h-index and the total number of citations from the ten most essential sources. The top five sources for research into teacher critical thinking are the Journal of Risk and Financial Management (number of documents = 12), the Journal of Risk and Insurance (N = 11), the Journal of Risk Research (N = 11), Risk Management: An International Journal (N = 11), and the International Journal of Production Research (N = 10).

Table 1. Top 10 most relevant sources in Fintech Marketing Research From 2018 – 2022

No.	Sources	NP	TC	H-index	Publisher
1	Sustainability	10	36	3	MDPI
2	Journal Of Economics and Business	6	196	2	Elsevier
3	Technological Forecasting and Social Change	5	154	5	Elsevier
4	Review Of Financial Studies	5	147	3	Oxford University Press
5	Finance Research Letters	4	31	3	Elsevier

6	Risks	4	18	3	MDPI
7	Financial Innovation	4	12	2	Springer Nature
8	Journal Of Asian Finance Economics and Business	3	22	2	Korea Distribution Science Association
9	New Political Economy	3	67	2	Taylor & Francis Online
10	Electronic Commerce Research	3	11	1	Springer Nature

Sustainability, published by MDPI, is ranked among the top 10 sources for financial technology research in marketing, with ten publications across 2018–2022. This journal has an h-index of 3 with 36 citations in the WOS-CC. The research by Puschmann et al. (2020) is the study that has attracted the most attention from other researchers, with a total of 11 citations in WOS-CC (Puschmann et al., 2020). This paper discusses the concept of "green fintech," representing the intersection of sustainability and digitization in the financial services industry. The paper systematically summarizes relevant literature and provides an empirical analysis of the Swiss FinTech landscape to identify the current state of green FinTech startups, and the services incumbents offer. The study finds that while research on green fintech has increased in recent years, the literature mainly focuses on isolated aspects of the topic. A comprehensive perspective has yet to be available. In addition, the study shows that Green FinTech works along the entire value chain of financial services and includes C2C, B2C, and B2B services.

In terms of how financial technology is used in marketing, the results of this paper show how sustainability in financial services is becoming increasingly important and how digitization can help promote sustainable financial services. Financial institutions can leverage green fintech to meet changing customer needs and preferences and differentiate themselves from the competition. As startups dominate the field, this also presents an opportunity for financial institutions to partner with startups to develop innovative and sustainable financial solutions.

The journal that contributes the most, with 196 citations in the WOS-CC, is Elsevier's Journal of Economics and Business. This journal produced six publications with an h-index of 2. Loannis Anagnostopoulos (2018), from Royal Holloway University London, was cited 103 times in WOS-CC for his research on fintech and its impact on regulators and banks, published in volume 100 in 2018 (Anagnostopoulos, 2018a). The paper aims to provide insights into the disruptive potential of FinTech and its impact on the broader financial ecosystem, mainly on financial institutions and regulators. It combines practice-oriented research with academic research to determine where FinTech is now and where it will go.

The results of this paper about FinTech in marketing show that FinTech has the potential to help consumers, make the financial services industry more efficient, and improve its reputation. To get these results, regulators must change how people think and ensure that technological advances align with regulations. Such developments could further support systemic stability and restore confidence in the financial system. Financial institutions need to use FinTech and look into strategic partnerships to stay competitive and meet their customers' changing needs and wants. The paper's action-oriented research findings have implications for both research and practice. They should be helpful to regulatory standard-setters, investors, international organizations, academics researching regulatory and competition issues, and those interested in technology working in the innovative financial services space.

The source dynamics of the top 5 journals used in this research are shown in Figure 3. The graph shows an analysis of publication patterns for these journals over the period 2018–2023. The results show that the number of articles published in most journals has grown. For example, Sustainability magazine did not publish any papers related to the fintech marketing study before 2019. On the other hand, this magazine published ten articles between 2019 and 2022, which means a significant increase in papers submitted for

publication. This indicates an increasing interest in fintech marketing research and underscores the importance of keeping up with the latest articles in this field.
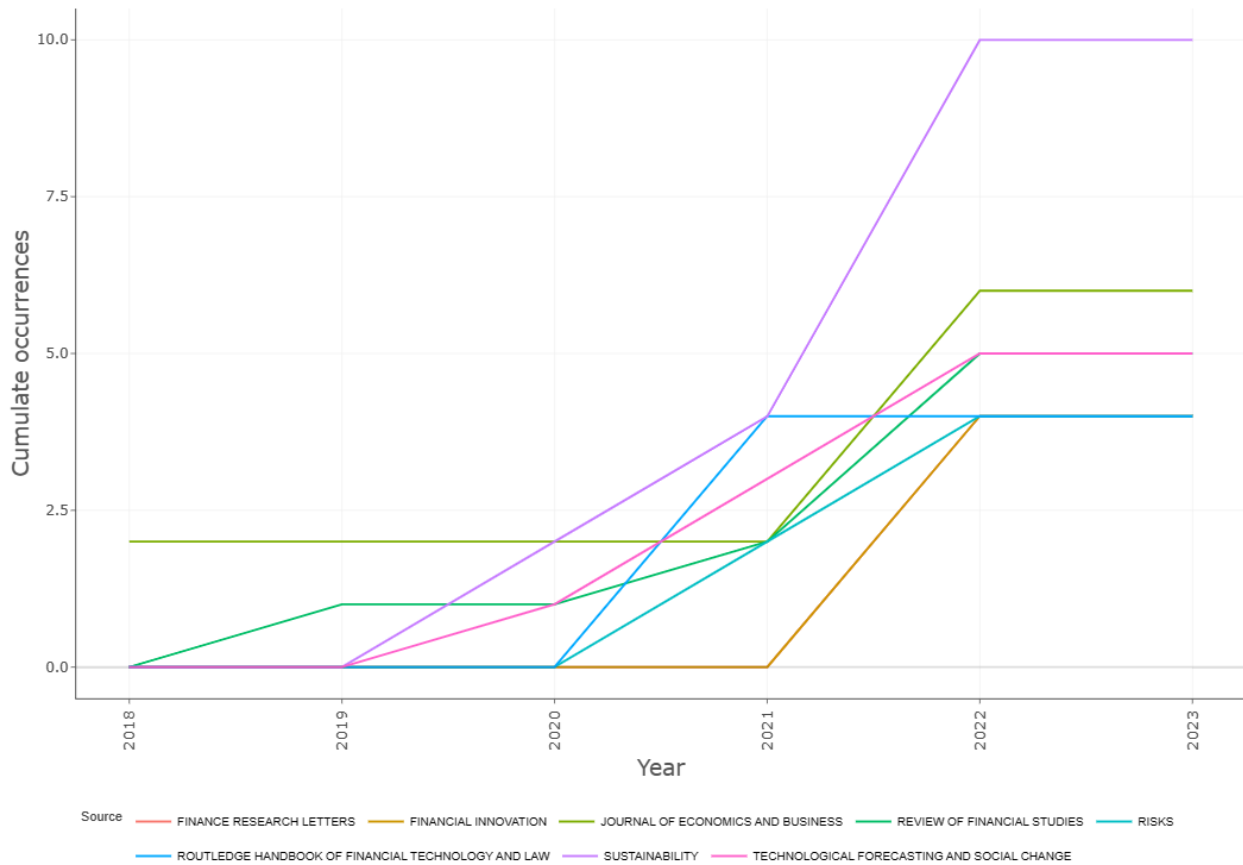

Fig.3: Source Dynamics in Fintech Marketing Research

3.2. Cited Documents in Enterprise Risk Management Research

Figure 4 shows how the average number of article citations changed annually from 2018 to 2022. The decline in the average number of citations per year in fintech research from 18.32 in 2018 to 4.23 in 2022 could be due to research space, a shift in research priorities, a change in citation practices, or the impact of the COVID-19 pandemic. Understanding why this is happening can help researchers and institutions decide where to focus their research and how to use their resources. It also shows how important it is to keep analyzing and evaluating citation data to monitor trends and patterns in the scientific community.

Citations are an essential aspect of research and serve several important functions. They let researchers recognize and thank others for their contributions, build credibility and authority in their field, back up claims with evidence, make research more visible, and help move knowledge forward. Citations are a way to build on previous work and create a shared understanding of a subject by connecting new research to what is already known. As such, they play a crucial role in fostering progress and innovation in science, technology, and other research areas.

The study by Gomber et al. (2018), cited 304 times over five years, added to the research on fintech in the WOS-CC database. This study looks at how new technologies and business process changes affect the financial services industry. It underlines the need for new paths to successful business models, better

customer experiences, and service transformation. The article emphasizes that the changes in the financial services industry are more like a revolution than a small change. It also mentions the dominance of leading companies that need help connecting effectively with the fintech revolution. The article shows a new way to map fintech innovations that lets you figure out how significant the changes and transformations are in four areas of financial services. Some of these areas are operations management, technological innovation, credit and deposit services, investment and financial markets, and operations management. This article was published in the Journal of Management Information Systems, Volume 35, 2018 (Gomber et al., 2018a).
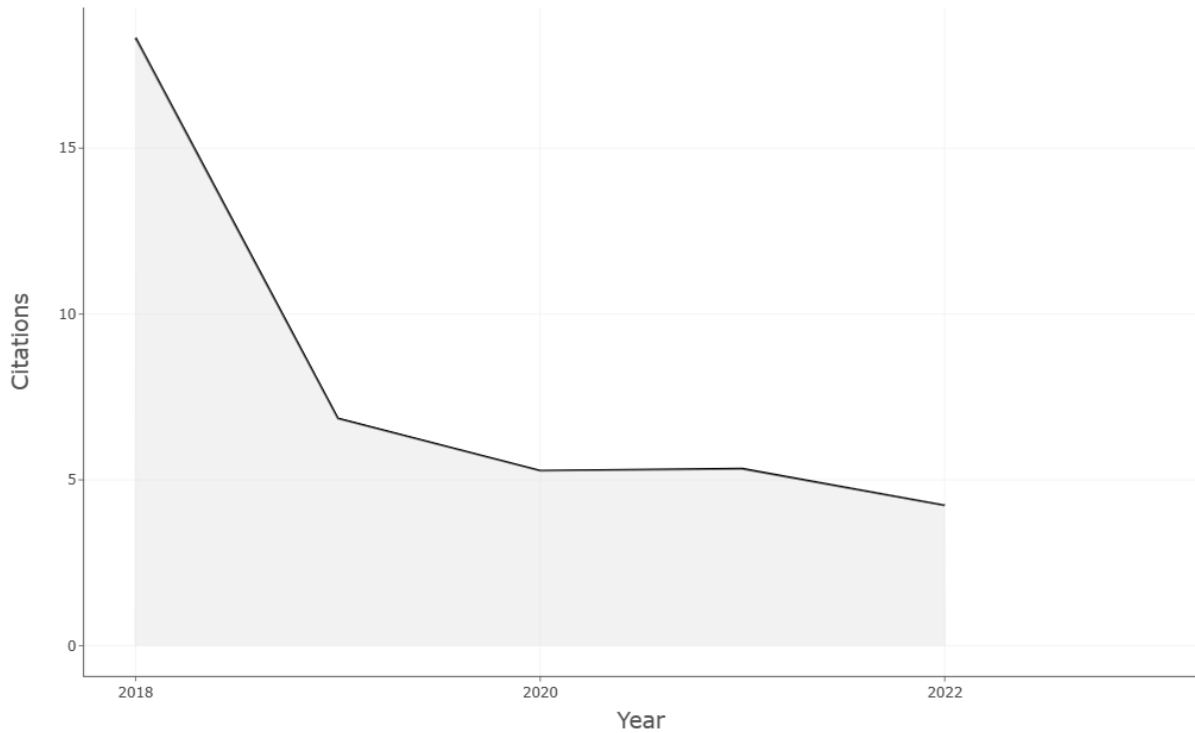

Fig.4: Average Citation Per Year in Fintech Marketing Research

The number of citations received by downloaded articles in the Web of Science database, also known as global citation scores, is presented by analyzing the documents that received the most citations (GCS). If the GCS is high, it indicates that researchers worldwide have paid close attention to the paper. Table 2 shows the ten most-read articles on fintech marketing research, as well as the results of these articles.

Table 2. Top Ten Highest Cited Documents Related Fintech Marketing Research from 2018 – 2023

Rank	Title	Authors	TC	Findings
1	"On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services"	Gomber et al. (2018)	304	The article talks about the dangers that could happen to long-time leaders who need help adapting to the fintech revolution and discuss a new way to map fintech innovations that looks at how much change and transformation are happening in four areas of financial services: operational management, payments, credit and deposit services, and investments (Gomber et al., 2018b).
2	"Fintech: Ecosystem, business models,	Lee et al. (2018)	286	The article highlights the paradigm shift in the financial industry where information technology

	investment decisions, and challenges"		is driving innovation and transforming traditional financial markets. Fintech is considered a disruptive innovation that has the potential to change the landscape of financial services. The article provides a historical overview of fintech and describes the ecosystem of the fintech sector. Various fintech business models and investment types are also discussed (Lee & Shin, 2018).
3	"Fintech, regulatory arbitrage, and the rise of shadow banks"	Buchak et al. (2018)	255	The article presents findings on the growth of the shadow banking sector in residential mortgage origination, especially among online fintech lenders. The authors investigate the factors that contributed to this growth, including regulatory differences and technological advantages. Using difference in difference tests, the authors find that traditional banks contracted in markets where they faced more regulatory constraints, and shadow banks, including fintech lenders, partially filled these gaps (Buchak et al., 2018).
4	"The emergence of the global fintech market: economic and technological determinants"	Haddad et al. (2019)	150	The article investigates the economic and technological factors that influence the formation of fintech startups. The authors find that countries with well-developed economies and easy access to venture capital tend to have more fintech startups. The availability of secure internet servers, mobile phone subscriptions, and labor force also positively impacts the development of fintech (Haddad & Hornuf, 2019).
5	"Fintech and banking: What do we know?"	Thakor et al. (2020)	147	The article provides a literature review on fintech and its interaction with banking. The authors define fintech as including innovations in payment systems (including cryptocurrencies), credit markets (including P2P lending), and insurance, with Blockchain-assisted smart contracts playing a role. The paper examines some statistics and stylized facts on fintech and reviews the theoretical and empirical literature (Thakor, 2020).
6	"How Valuable Is FinTech Innovation?"	Chen et al. (2019)	127	The article presents findings on the occurrence and value of FinTech innovation, based on a large-scale analysis of patent filings from 2003 to 2017. The authors use machine learning to identify and classify innovations by their underlying technologies and find that most FinTech innovations yield substantial value to innovators, with blockchain being particularly valuable (Chen et al., 2019).
7	"Fintech and regtech: Impact on regulators and banks"	Anagnostopoulos et al. (2018)	103	The article discusses the implications of FinTech development on the financial industry and regulatory system. The paper draws upon recent research and aims to offer various perspectives to aid understanding of the disruptive potential of FinTech. The authors examine the implications for financial institutions and regulation, particularly when technology poses a challenge to the global

				banking and regulatory system (Anagnostopoulos, 2018b).
8	"Time and frequency domain connectedness and spill-over among fintech, green bonds and cryptocurrencies in the age of the fourth industrial revolution"	Le et al. (2021)	91	The article examines the time and frequency domain connectedness and spill-over among Fintech, green bonds, and cryptocurrencies using daily data from November 2018 to June 2020. The study finds that the total connectedness of 21st century technology assets and traditional common stocks is very high, and hence in the turbulent economy, there is a high probability of contemporaneous losses (Le et al., 2021).
9	"Do fintech lenders penetrate areas that are underserved by traditional banks?"	Jagtiani et al. (2011)	90	The finding in this article is that the fintech lending platform LendingClub has been able to expand credit access to consumers in areas that may be underserved by traditional banks, such as in highly concentrated markets and areas that have fewer bank branches per capita (Jagtiani & Lemieux, 2018).
10	"Understanding FinTech start-ups - a taxonomy of consumer-oriented service offerings"	Gimpel et al. (2010)	74	The finding in this article is the proposal of a taxonomy of non-functional characteristics of consumer-oriented FinTech start-ups(Gimpel et al., 2018).

Based on Table 2, this finding covers various aspects of fintech, including the challenges faced by longtime executives in adapting to fintech, a new way of mapping fintech innovation, the growth of the shadow banking sector in residential mortgage lending, economic and Technological aspects Factors influencing fintech startups, fintech's interaction with banking, the emergence and value of fintech innovation, the impact of fintech on the financial industry and regulatory system, the time and frequency domain linkage between fintech, green bonds and cryptocurrencies, as well as expanding LendingClub's credit access. The paper also suggests a non-functional taxonomy of consumer-facing finance firms.

The insights mentioned in the previous articles relate to various aspects of fintech, including the potential dangers that veteran leaders could face by not adapting to fintech innovation, the growth of shadow banks and online fintech lenders, the economic and technological factors influencing the formation of fintech startups, the emergence and value of fintech innovation, the impact of fintech development on the financial industry and regulatory system, and the interconnectedness and spillover between fintech, green bonds and cryptocurrencies. Fintech could disrupt the financial services industry. This fast-growing industry is altering traditional financial markets, improving financial inclusion and access to finance, and offering new prospects for innovation and growth. Companies, investors, legislators, and regulators all prioritize fintech.

3.3.2018–2023 Fintech Marketing Research Authors, Affiliations, and Countries

543 fintech marketing research writers were found by this study's bibliometric analysis. Based on productivity and influence, Table 3 lists the ten most influential authors. Zhang Y has the most papers with 6, followed by Chen X with 4. Zhang Y is also this field's most influential author with an h-index of 3, a g-index of 3, and a citation count of 13. His high-quality works have advanced fintech marketing research. These writers' research output has continuously increased, showing their continued interest and commitment to the topic.

Table 3. Top 10 Most Influential Authors in Fintech Marketing Research from 2018 – 2023

No.	Author	NP	TC	H-index	Affiliation	Country
1	Zhang, Yifei	6	13	3	Hong Kong Polytechnic University	Hongkong
2	Chen, Xueru	4	20	3	Nanjing Tech University	China
3	Li, Xuerong	3	122	3	University of Chinese Academy of Sciences	China
4	Abakah, Emmanuel Joel Aikins	3	93	2	University of Ghana	Ghana
5	Arner, Douglas W	3	68	2	University of Hong Kong	Hongkong
6	Buckley, Ross	3	68	2	University of New South Wales Sydney	Autralia
7	Jagtiani, Julapa	3	103	2	Federal Reserve Bank - Philadelphia	USA
8	Lee, Chi-Chuan	3	82	2	Southwestern University of Finance & Economics - China	China
9	Tiwari, Aviral Kumar	3	93	2	Indian Institute of Management Bodh Gaya	India
10	Zetzsche, Dirk A	3	68	2	University of Luxembourg	Luxembourg

In Table 3, Yifei Zhang wrote the most about corporate risk management. This author has 6 WOS-CC-related articles with 13 citations. Yifei Zhangn researched fintech marketing in academia. His research examines how FinTech might aid the poor. Yu'E Bao, a Chinese fintech breakthrough, changed China's financial business. The study reveals that Yu'E Bao's success hinders his growth. The study impacts governments, politicians, fintech practitioners, and product designers(Tan et al., 2021).

Figure 5 lists the top 10 affiliations for fintech marketing research. New South Wales (9 papers), Sydney (9), and Southwestern University Finance and Economics (18) lead the list. Top Australian university UNSW offers business, finance, and technology studies. UNSW is great for students interested in fintech and marketing because it emphasizes research and innovation.

The University of New South Wales Business School provides a Bachelor of Commerce curriculum that specializes in Marketing. The aforementioned program imparts a comprehensive understanding of fundamental marketing principles to students, while acquainting them with nascent developments in the domain, such as fintech. The pursuit of a Master of Marketing degree is also a viable option for students seeking a more specialized curriculum that centers on marketing strategy and research. The University of New South Wales provides a range of academic programs that delve into the significance of financial technology in the field of marketing. The course titled "Marketing in the Digital Age" delves into the impact of digital technologies on marketing strategies. It examines the utilization of fintech tools, such as mobile payment systems and blockchain technology, in marketing practices. The course on Fintech and the Future of Financial Services offers a comprehensive perspective on the fintech industry and its impact on conventional financial services, while also exploring novel avenues for business growth.
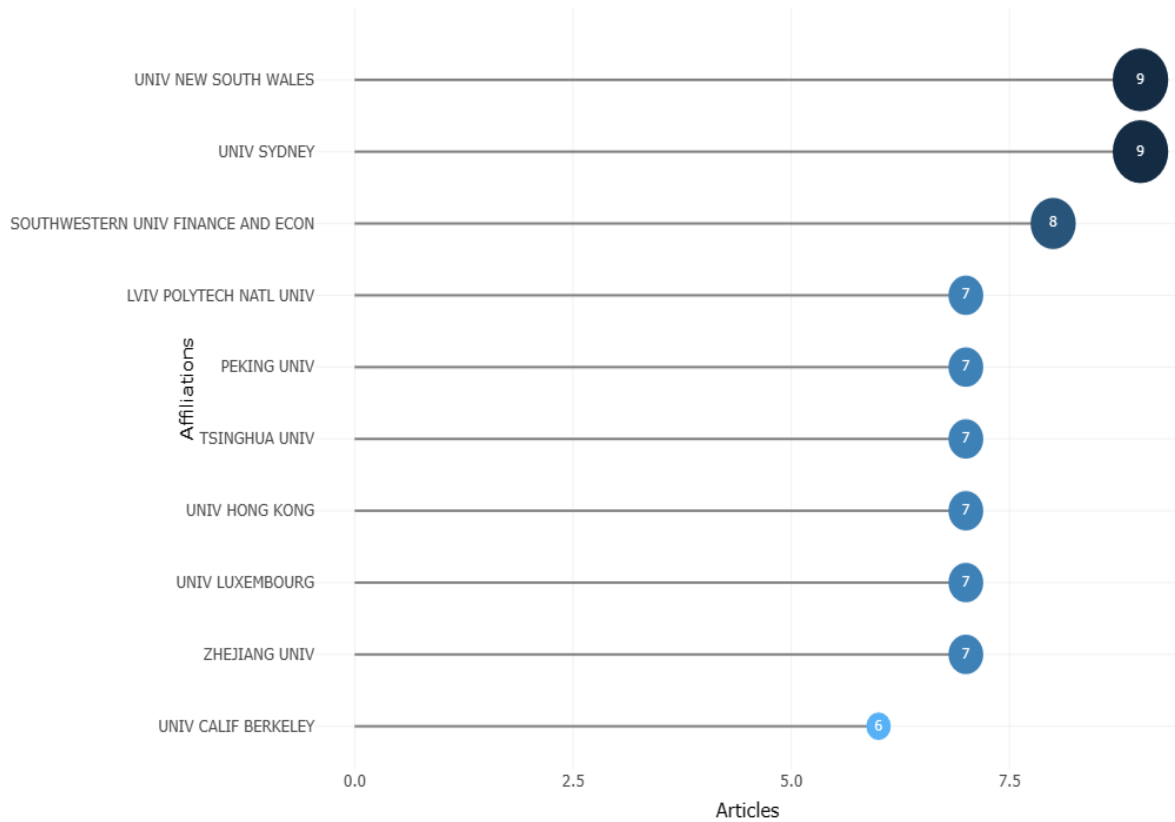
Fig.5: Most relevant affiliations in fintech marketing research

The present study investigated the co-authorship patterns of scholars hailing from diverse countries/regions in the domain of enterprise risk management, utilizing the MCP and SCP metrics. The Multinational Co-authorship Proportion (MCP) metric pertains to the quantity of scholarly articles that are co-authored by researchers hailing from diverse countries or regions. Conversely, the Same-Country/Region Co-authorship Proportion (SCP) metric pertains to the quantity of scholarly articles that are co-authored by researchers originating from the same country or region. As shown in Figure 6, the SCP value is significantly higher than the MCP value in the top ten countries/regions, indicating that researchers are more likely to be within their own country/region than across countries/regions work together. The MCP rate, which indicates the proportion of international collaboration, was relatively low in most countries/regions. Notably, Chinese authors show high levels of collaboration, albeit with an MCP ratio of only 0.250 (as shown in Table 4), indicating a preference for intranational collaboration. For example, Yifei Zhang, Xueru Chen and Xuerong Li are both affiliated with universities in China.
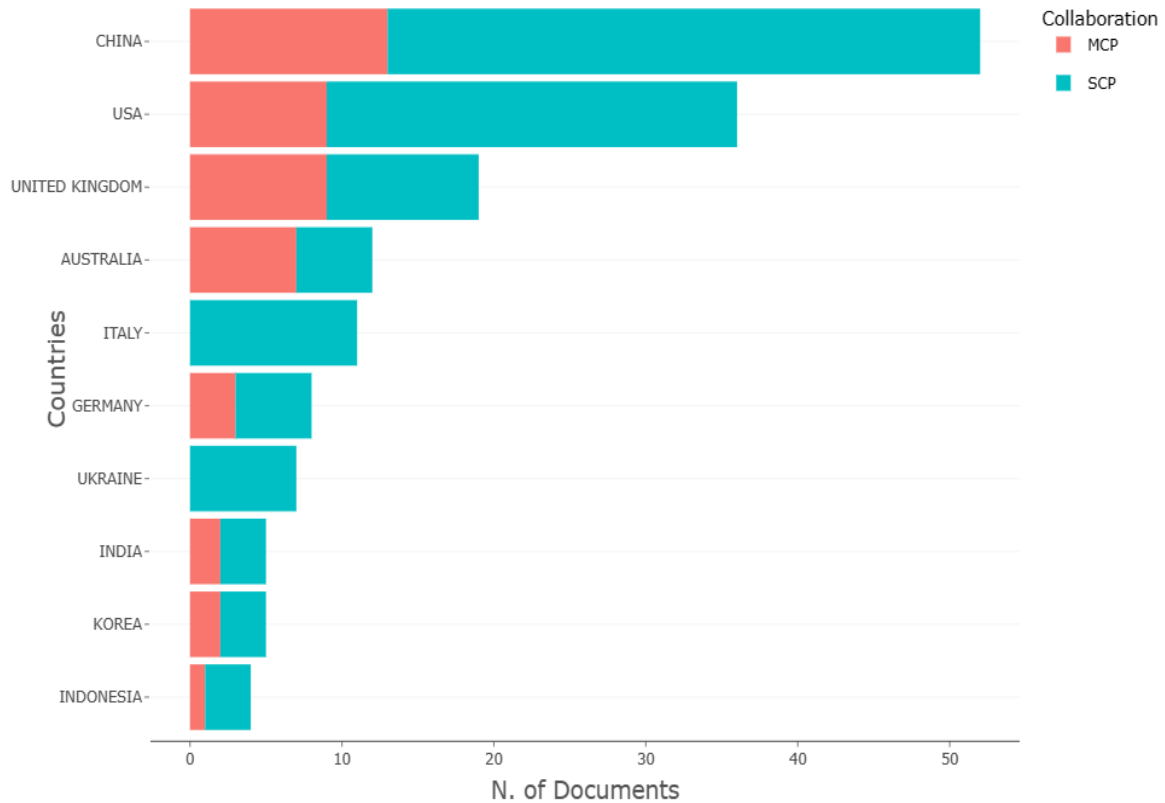
Fig. 6: MCP and SCP Comparison in Fintech Marketing Research

This suggests that there is significant space for international collaboration in fintech marketing research. While collaboration within countries/regions is beneficial, international collaboration can lead to greater sharing of ideas and knowledge, ultimately leading to a broader understanding of fintech marketing. Therefore, it is recommended that researchers from different countries/regions increase their efforts to collaborate in this field.

Table 4. Top 10 Corresponding Author's Country in Fintech Marketing Research From 2018 – 2023

No.	Country	Articles	SCP	MCP	MCP Ratio
1	China	52	39	13	0.250
2	USA	36	27	9	0.250
3	United Kingdom	19	10	9	0.474
4	Australia	12	5	7	0.583
5	Italy	11	11	0	0
6	Germany	8	5	3	0.375
7	Ukraine	7	7	0	0
8	India	5	3	2	0.400
9	Korea	5	3	2	0.400
10	Indonesia	4	3	1	0.250

Table 4 shows that Fintech Marketing is a significant research area in the China, with many universities, think tanks, and other organizations dedicating resources to studying ERM. China's Fintech Marketing research community is strong and diverse, with numerous businesses aiming to improve risk management.

Government policies, supportive regulations, and growing digitization have fostered fintech in China. Thus, domestic and foreign investors have invested heavily in fintech in recent years.

Hua et al. (2021) explain fintech's expansion in China, citing supply constraints in the formal financial market, government backing for financial inclusion through digital technology, and a more "tolerant" regulatory framework. Fintech development enhances efficiency, employment, and entrepreneurship, but regulatory uncertainty, unlawful transactions, and data exploitation are obstacles. European Journal of Finance, Volume 27, mentioned the work 21 times on WOS-CC(Hua & Huang, 2021).

The previous data demonstrate the growing interest in fintech applications in marketing. Research in this topic has grown annually for five years at 54.85%. The rapid evolution of the fintech industry and the requirement for organizations to identify and address customer expectations through effective marketing tactics have contributed to this growth. Fintech disrupted traditional banking in the first piece. Technology-enabled fintech enterprises offer more efficient, cost-effective, and customer-friendly financial services, increasing competition and innovation. The essay underlines the use of technology in individualized marketing strategies and consumer experience. Data analysis and AI help fintech companies understand customer preferences and tailor marketing campaigns. Technology automates marketing and expands digital reach.

This research shows that fintech can improve consumer financial services, efficiency, and financial system trust. To maintain stability and compliance, regulatory frameworks must adapt to technology. Fintech and strategic partnerships can help financial institutions stay competitive and meet client needs. The articles discuss fintech's growth, shadow banking and online lending, fintech startups, fintech innovation, green bonds, and cryptocurrencies, and traditional executives' struggles to adapt to fintech. Fintech may disrupt the financial services industry, promote financial inclusion, and spur innovation and growth.

Co-authorship trends investigation investigated business risk management researchers from different countries/regions. The results showed a higher likelihood of researchers collaborating within their own country/region rather than across countries/regions. While most countries/regions exhibited relatively low rates of international collaboration, Chinese authors stood out with a high level of collaboration within their own country. Notable researchers from China, such as Yifei Zhang, Xueru Chen, and Xuerong Li, are affiliated with universities in China. Overall, these findings have implications for both research and practice. They provide valuable insights into the trends and patterns in fintech research within the marketing domain. The increasing popularity of fintech research underscores the importance of understanding and leveraging technology for successful marketing strategies. The implications also extend to regulatory standard-setters, investors, international organizations, and academics researching regulatory and competition issues, as well as professionals working in the innovative financial services space.

4. Conclusions

This study has executed an in-depth bibliometric examination of financial technology (fintech) research within the marketing discipline, utilizing data drawn from the Web of Science (WOS) Core Collection database. Covering a total of 226 papers released between 2018 and 2023, the analysis touched upon varied elements such as publication patterns per annum, citations, journals, authors, affiliations, and nations. The primary objective of this investigation was to offer a comprehensive understanding of the research landscape in fintech utilization within marketing. To serve the broader academic community better, the authors could link their findings more explicitly to their research objectives. For instance, they could elucidate how their analysis of key trends, issues, and influential contributors in the field aligns with their aim of enhancing understanding of the fintech research landscape in marketing. The implications of their

findings for different stakeholders in this field, such as researchers, practitioners, and policymakers, should be discussed in detail. It would be beneficial for these groups to understand the potential impacts of this study's outcomes on their work.

In addition, the article by Gomber et al. (2018) entitled On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services as the most cited work and made a significant contribution to the fintech marketing research WOS-CC with 304 citations. The study also provides a comprehensive list of the most influential authors, affiliations, and countries in the fintech marketing research field. Yifei Zhang from Hong Kong Polytechnic University ranked first in the number of articles published in the WOS-CC. The University of New South Wales emerged as the leading research institution in this field, publishing 9 articles during the research period. China has been found to be a major contributor to enterprise risk management research, with several key countries exerting significant influence in this area. Collaboration between authors in China is common, although the MCP ratio is as low as 0.250. This study shows that researchers tend to collaborate more frequently within countries than between countries, indicating the need to strengthen cross-country collaboration in the future. The research results suggest that future research should focus on analyzing emerging trends and research points related to fintech in marketing in order to refine the current understanding of this important research area.

References

Acikgoz, F., Elwalda, A., & De Oliveira, M. J. (2023). Curiosity on Cutting-Edge Technology via Theory of Planned Behavior and Diffusion of Innovation Theory. *International Journal of Information Management Data Insights*, *3*(1), 100152. https://doi.org/10.1016/J.JJIMEI.2022.100152

Adinarayana, P. J., & Kishore Babu, B. (2019). The role of shaping fin-tech services: Social media marketing. *International Journal of Innovative Technology and Exploring Engineering*, *8*(10). https://doi.org/10.35940/ijitee.J9045.0881019

Al-Dmour, H., Asfour, F., Al-Dmour, R., & Al-Dmour, A. (2020). The effect of marketing knowledge management on bank performance through fintech innovations: A survey study of jordanian commercial banks. *Interdisciplinary Journal of Information, Knowledge, and Management*, *15*. https://doi.org/10.28945/4619

Almansour, M. (2023). Artificial intelligence and resource optimization: A study of Fintech start-ups. *Resources Policy*, *80*, 103250. https://doi.org/10.1016/J.RESOURPOL.2022.103250

Anagnostopoulos, I. (2018a). Fintech and regtech: Impact on regulators and banks. *Journal of Economics and Business*, *100*, 7–25. https://doi.org/10.1016/j.jeconbus.2018.07.003

Anagnostopoulos, I. (2018b). Fintech and regtech: Impact on regulators and banks. *Journal of Economics and Business*, *100*, 7–25. https://doi.org/10.1016/j.jeconbus.2018.07.003

Aria, M., & Cuccurullo, C. (2017). bibliometrix : An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Azzaakiyyah, H. K. (2023). An Entrepreneur's Character from Professor Musa Asy'arie's Perspective. *Apollo: Journal of Tourism and Business*, *1*(1), 6–13. https://doi.org/10.58905/APOLLO.V1I1.7

Batubara, H. S., Giatman, M., Simatupang, W., & Watrianthos, R. (2021). Pemetaan Bibliometrik Terhadap Riset pada Sekolah Menengah Kejuruan Menggunakan VOSviewer. *EDUKATIF : JURNAL ILMU PENDIDIKAN*, *4*(1), 233–239. https://doi.org/10.31004/edukatif.v4i1.1818

Buchak, G., Matvos, G., Piskorski, T., & Seru, A. (2018). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of Financial Economics*, *130*(3), 453–483. https://doi.org/10.1016/j.jfineco.2018.03.011

Cao, L., Yang, Q., & Yu, P. S. (2021). Data science and AI in FinTech: an overview. In *International Journal of Data Science and Analytics* (Vol. 12, Issue 2). https://doi.org/10.1007/s41060-021-00278-w

Chen, M. A., Wu, Q., & Yang, B. (2019). How Valuable Is FinTech Innovation? *The Review of Financial Studies*, *32*(5), 2062–2106. https://doi.org/10.1093/rfs/hhy130

Gadzali, S. S. (2023). Determinants of Consumer Purchases in the Perspective of Business Psychology. *Apollo: Journal of Tourism and Business*, *1*(1), 23–28. https://doi.org/10.58905/APOLLO.V1I1.9

Gimpel, H., Rau, D., & Röglinger, M. (2018). Understanding FinTech start-ups – a taxonomy of consumer-oriented service offerings. *Electronic Markets*, *28*(3), 245–264. https://doi.org/10.1007/s12525-017-0275-0

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018a). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, *35*(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018b). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, *35*(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766

Haddad, C., & Hornuf, L. (2019). The emergence of the global fintech market: economic and technological determinants. *Small Business Economics*, *53*(1), 81–105. https://doi.org/10.1007/s11187-018-9991-x

Hill, J. (2018). They are Not Dead Yet: How Big Financial Institutions Will Work with Fintech Startups to Define the Market Structure of the Future. In *FinTech and the Remaking of Financial Institutions* (pp. 331–351). Elsevier. https://doi.org/10.1016/B978-0-12-813497-9.00017-2

Hua, X., & Huang, Y. (2021). Understanding China's fintech sector: development, impacts and risks. *The European Journal of Finance*, *27*(4–5), 321–333. https://doi.org/10.1080/1351847X.2020.1811131

Jagtiani, J., & Lemieux, C. (2018). Do fintech lenders penetrate areas that are underserved by traditional banks? *Journal of Economics and Business*, *100*, 43–54. https://doi.org/10.1016/j.jeconbus.2018.03.001

Kaur, G., Lashkari, Z. H., & Lashkari, A. H. (2021). Understanding Cybersecurity Management in FinTech: Challenges, Strategies, and Trends. In *Springer*.

Kovalchuk, M., Gabrielsson, M., & Rollins, M. (2023). Industrial BRAND-personality formation in a B2B stakeholder network: A service-dominant logic approach. *Industrial Marketing Management*. https://doi.org/10.1016/J.INDMARMAN.2023.05.006

Le, T.-L., Abakah, E. J. A., & Tiwari, A. K. (2021). Time and frequency domain connectedness and spill-over among fintech, green bonds and cryptocurrencies in the age of the fourth industrial revolution. *Technological Forecasting and Social Change*, *162*, 120382. https://doi.org/10.1016/j.techfore.2020.120382

Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, *61*(1), 35–46. https://doi.org/10.1016/j.bushor.2017.09.003

Li, B., Hanna, S. D., & Kim, K. T. (2020). Who Uses Mobile Payments: Fintech Potential in Users and Non-Users. *Journal of Financial Counseling and Planning*, *31*(1). https://doi.org/10.1891/JFCP-18-00083

Martin Kim, M. H. (2017). Blockchain technology and the fintech revolution. *Turkish Online Journal of Educational Technology*, *2017*(December Special Issue ITEC).

Nguyen, & Bang, B. H. (2019). Marketing Communications Plan for a Fintech company. Case: Rundit Oy. In *Laurea Univercity of Applied Science*.

Puschmann, T., Hoffmann, C. H., & Khmarskyi, V. (2020). How Green FinTech Can Alleviate the Impact of Climate Change—The Case of Switzerland. *Sustainability*, *12*(24), 10691. https://doi.org/10.3390/su122410691

Rejali, S., Aghabayk, K., Esmaeli, S., & Shiwakoti, N. (2023). Comparison of technology acceptance model, theory of planned behavior, and unified theory of acceptance and use of technology to assess a priori acceptance of fully automated vehicles. *Transportation Research Part A: Policy and Practice*, *168*, 103565. https://doi.org/10.1016/J.TRA.2022.103565

Retkutė, K., & Davidavičienė, V. (2021). Application of Multichannel Access and Customer Journey Map in the Context of Innovative Business Projects. *Journal of Service, Innovation and Sustainable Development*. https://doi.org/10.33168/sisd.2021.0109

Ronal Watrianthos, Ambiyar Ambiyar, Fahmi Rizal, Nizwardi Jalinus, & Waskito Waskito. (2022). Research on Vocational Education in Indonesia: A Bibliometric Analysis. *JTEV (Jurnal Teknik Elektro Dan Vokasional)*, *8*(2).

Suryono, R. R., Budi, I., & Purwandari, B. (2020). Challenges and trends of financial technology (Fintech): A systematic literature review. In *Information (Switzerland)* (Vol. 11, Issue 12). https://doi.org/10.3390/info11120590

Tan, T., Zhang, Y., Suang, C., & Ge, C. (2021). Empowerment of Grassroots Consumers: A Revelatory Case of a Chinese Fintech Innovation. *Journal of the Association for Information Systems*, *22*(1), 179–203. https://doi.org/10.17705/1jais.00658

Thakor, A. v. (2020). Fintech and banking: What do we know? *Journal of Financial Intermediation*, *41*, 100833. https://doi.org/10.1016/j.jfi.2019.100833

Thelwall, M. (2018). Dimensions: A competitor to Scopus and the Web of Science? *Journal of Informetrics*, *12*(2). https://doi.org/10.1016/j.joi.2018.03.006

Wanof, M. I., & Gani, A. (2023). MSME Marketing Trends in the 4.0 Era: Evidence from Indonesia. *Apollo: Journal of Tourism and Business*, *1*(2), 36–41. https://doi.org/10.58905/APOLLO.V1I2.22

Watrianthos, R., Sagala, A. H., Syafriyeti, R., Yuhefizar, Y., & Mesran, M. (2022). Studi Bibliometrik Jurnal Media Informatika 2018-2022. *Jurnal Media Informatika Budidarma*, *7*(1), 409–415.

Xu, M., Chen, X., & Kou, G. (2019). A systematic review of blockchain. In *Financial Innovation* (Vol. 5, Issue 1). https://doi.org/10.1186/s40854-019-0147-z

Yusupa, A., Manullang, J., Marbun, N., Bill, S., & Ginting, F. (2023). Decision Support System for Determining the Best PAUD Teacher Using the MOORA Method. *SAGA: Journal of Technology and Information System*, *1*(2), 50–55. https://doi.org/10.58905/SAGA.V1I2.101

Zalmi, W. F., Sitompul, B. J. D., Nduru, S. W., & Lumbangaol, S. K. (2023). Welder Recruitment Decision Support System Using the SMARTER Method. *SAGA: Journal of Technology and Information System*, *1*(2), 44–49. https://doi.org/10.58905/SAGA.V1I2.98