



insights into fintech(financial technology): a bibliometric analysis

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Abstract

Purpose: Fintech has captured the interest of both industry and academia during the last ten years. New research fields like fintech begin to emerge as a result. Fintech refers to companies using new technology to deliver financial services in a way that competes with traditional financial ways. The word is a mix of "business" and "financial technology". This essay offers a current account of fintech practices and contributes to the understanding of fintech study.

Design/Methodology/Approach: In this study, 307 papers were retrieved from the Web of Science (WOS) database during a period of almost two decades, from 2006 to 2022. The authors used the bibliometric analysis approach to analyze and derive conclusions from these articles. The four steps of the methodology's schematic are data gathering, analysis, visualization, and interpretation. The current study uses the Bibliometric R-package and VoSviewer software to analyze fintech scholarship.

Findings: This study adds to the body of literature on fintech by identifying significant terminology, authors, journals, and intellectual and conceptual terms.

Research limitations/Implications: The study serves as the foundation for research in the subject of fintech in order to comprehend trends over the previous 16 years in terms of prolific writers, most influential journals, important themes, and the intellectual climate of the field. According to the report, this field is still in its early stages of development. Therefore, more laborious research is required to help create a deeper knowledge of this emerging discipline.

Originality/Value: The researchers' findings may serve as a guide for more fintech research.

Keywords: Fintech, Financial Technology, Financial Inclusion, Innovation, Banking, Bank.

Paper type: Literature Review.

Introduction

An industry titled "FinTech" use information technology, highly flexible technology, to improve the financial system's efficiency. In the latest days, the banking industry has been more digitalized because of the growth of FinTech, which is a relationship between finance and information technology. The way a business model is developed, modified, or improved is a sign of fintech. FinTech also has a tool for collaboration or disruption. FinTech is a term used to refer to a number of business models and recent technological advancements that have the potential to transform the financial services sector. The term "fintech," or "financial technology," is used to describe businesses that provide cutting-edge technology to the financial industry. Fintech is used specialized software and algorithms on computers and, increasingly, smartphones to help businesses, company owners, and consumers better manage their financial operations, processes, and lives. The word "fintech" was first used to describe the technology used in the back-end systems of established financial institutions when it first appeared in the 21st century. However, since that time, there has been a change toward more consumer-focused services and, thus, a more consumer-focused definition. The term "fintech" currently refers to a variety of fields and industries, including education, retail banking, non-profit fundraising, and investment management, to mention a few. Fintech can be divided into a number of distinct periods, in accordance with a paper by Arneris, Barberis, and Ross. Each of these three (and a half) periods experienced a distinctive degree of market differentiation, which changed how customers interacted with their money. The infrastructure needed to support globalized financial services is being built from (1886-1967). The first transatlantic cable (1866) and Fedwire (1918) in the USA allowed for the development of the first electronic fund transfer system, which used telegraph and Morse code technology. The ability to execute financial transactions over a longer distance was revolutionary at a time when infrastructure and transportation were developing, even though it was straightforward by today's standards. This era, which is characterised by the conversion of money from analogue to digital, was officially launched in 1967 with the introduction of the first ATM by Barclays. The Society for Worldwide Interbank Financial Telecommunications (SWIFT), a protocol for financial institutions to interact with one another that permitted the large volume of international transactions, and NASDAQ, the first computerised stock exchange in the world, were both established in the 1970s. The 1980s saw the continuation of this era with the emergence of bank mainframe computers (and a "Gordon Gecko" sense of Wall Street style...) and the growth of online banking, which changed the way people do business and changed how they viewed financial institutions. When linked clients started managing their money in different ways in the 1990s, the initial steps towards digital banking were made. PayPal's 1998 launch served as a precursor to the new payment technologies that would develop as society became increasingly dependent on the internet. Gordon Brown, the UK's then-chancellor, even announced the "end of boom and bust" as a result of how well the economy appeared to be doing. The global financial crisis of 2008, however, was the specific bust that ended this fintech age and sparked the innovation that would mark the one that followed. The financial crisis's impact on people's trust in banks, combined with regulatory changes, has made the market more open to new suppliers. 2009 saw the creation of Bitcoin, the first cryptocurrency built on a blockchain. Mobile devices will be used more frequently to access the internet and other financial services as more people utilise smartphones. The thirst for innovation in new products and services among consumers and investors has ushered in the start-up age. The distinguishing characteristic of Fintech 3.0 has been the move away

from the traditional banks of the Fintech 2.0 era. Even well-established institutions are starting to present themselves and do business like startups. New technologies have emerged to make it easier to construct digital banking products utilising Open Banking, which gives outside organisations access to financial data. With the help of platforms for banking as a service (BaaS), like Treezor and Solaris Bank, banks and other financial institutions may now launch "neo-banks"—digital banks that were created with the intention of improving the client experience—much more easily than they could previously do by replacing their intricate legacy systems. Fintech has an advantage since it uses technologies to develop customer-focused goods and services. Fintech can be used by banks to create APIs or to expand their stack using the architecture already in place. Banks can benefit from the whole customer experience that a fintech provides. Fintech has reduced expenses and is quicker, more cost-effective, and more secure. Their guiding principle is to gain trust by providing better customer service and acquiring clients through referrals. This will enable banks to offer better services. Once more, using contemporary techniques like gamification, banking apps may make routine tasks like budgeting more enjoyable for users. The branding of legacy services is being updated, which is something banks require. Internet and mobile device use has significantly increased. Any company that wishes to interact with its clients offers mobile-friendly goods. They can provide real-time information and faster transactions. Since the epidemic, everything has moved online, and customers now find internet services more convenient than going to the bank in person. There is no longer a problem with time. Anytime transactions can be completed without difficulty. One may quickly locate lenders for a payday loan or short-term loan and keep track of the progress of their transactions. Additionally, fintech makes the entire banking procedure more efficient. Automation can provide a greater degree of specialization, and the standard of service will undoubtedly rise. Fintech works to make banking secure for all users and takes precautions to safeguard clients' financial data. There are several security enablers available, from implementing AI for fraud detection to utilizing cutting-edge blockchain technologies, RegTech, multi-cloud data storage, and IoT for smarter security solutions. Fintech businesses store enormous amounts of extremely sensitive consumer data due to the nature of their company, including social security numbers, credit card numbers, income and investment information, and more. Due to the increased usage of phone and online banking services, this information is always at risk of being compromised in transit. Because of this, the information is extremely sensitive. As a result, risk always exists along with fintech's application security and data privacy concerns. Information security is gaining importance all the time. Because of advancements in technology, you can remotely access crucial IT infrastructure. Using sophisticated data blocking against financial data sources seems to be easier. Additional problems include the lack of physical inspections of essential infrastructure and endpoint devices that transfer company data. Starting a finance company is difficult. Due to fraud alerts and data breaches, getting approval to launch a fintech business is now far more difficult. These restrictions are not only hard to adhere to, but they also make it impossible for Fintech companies to join the Indian market. Make compliance rules a rigid regulatory structure that works to stop fraud. They too pose significant challenges for budding Fintech companies. Fintech start-ups must meet a lot of requirements before they can begin operating. The world of finance is known for being challenging. Although the processes used by fintech companies have rapidly evolved. Creating a fantastic user experience that goes beyond a straightforward UI still has a long way to go. A commercial innovation called conversational UI focuses on a unique user interface that mimics speaking with a real person.

The user may receive information from bots in the format they like. In terms of accessibility and ease, fintech has led the way. Additionally, opening an account with any of the banks is now straightforward. There is more transparency because fees and charges are disclosed upfront. Trading platforms like Robinhood have simplified the jargon of finance. Fintechs should review their income and expense plans and adjust or increase their resource allocation. Many organizations are employing cost-cutting measures including personnel reductions and compensation reductions to deal with the economic crisis. There are a lot of adjustments that must be made within enterprises if the firm takes off. Changes in revenue sources and other business dependencies are included in this. Your business models will also change as a result. Fintech companies that accept contactless payments are reallocating their resources to handle the increased transaction volumes.

Literature review

We looked at numerous further studies in the field of fintech (financial technology). We can observe from the research that the majority of discussions center on three main topics: the advancement of technology necessary to accept fintech, customer behavior necessary to accept fintech (in terms of benefits and dangers), and fintech policies. First, we observe how fintech is advancing in terms of technology. As far as we are aware, China has more articles in this field published in journals. As a result of the advancement of financial technology in areas such as mobile, internet, cloud computing, big data search engines, blockchain technology, artificial intelligence, and communication technology, according to Chen Z. et al. (2017), J. Jagtiani et al. (2018), Cheng M. et al. (2020), C. Yoon et al. (2020), and S. Dashhottar et al. (2021), regulatory disparities and technical advantages played a role in the risk Suwandaarachchi CM et al. (2020), the author, suggests examining the important factors that may affect customers' decisions to utilize AI in banking services. The study, according to Lufti, A., et al. (2021), examined the factors that affect how popular the mobile payment system is.

Now that we've discussed the advantages and dangers of fintech, let's talk about consumer happiness. First of all, we are aware of the advantages of fintech. According to the author, Marier E. et al. (2016); Drasch Bj. et al. (2018); Hu Z. et al. (2019); Jaksic M. et al. (2019); Rm Stulz et al. (2019); X Vives et al. (2019); Juenger M. et al. (2020); Dinh Hoang Bach Phan Dhbp, et al. (2020); Hung Jl. et al. (2020); S. Carbo-Valverde, et al. (2020); Dwh Fung, et al. (2020); Kou G, et al. (2021); Lee CC, et al. (2021); Yang Wang YW, et al. (2021); T Yao, et al. (2021); S Chava, et al. (2021); C De Roure, et al. (2022) examining its impact on market competition as well as potential improvements to productivity and consumer happiness. We add to the amount of knowledge regarding switching, satisfaction, and crowdfunding in the financial services industry. By utilising financial technology, reducing bank operating costs, improving service effectiveness, bolstering risk control capabilities, developing improved customer-oriented business models for customers, improving comprehensive competitiveness, and offering customer-focused solutions, banks can improve their traditional business model. According to Jagtiani J. et al. (2018) and Sheng T. et al. (2021), SMEs and weak regions experience an increase in loan volume.

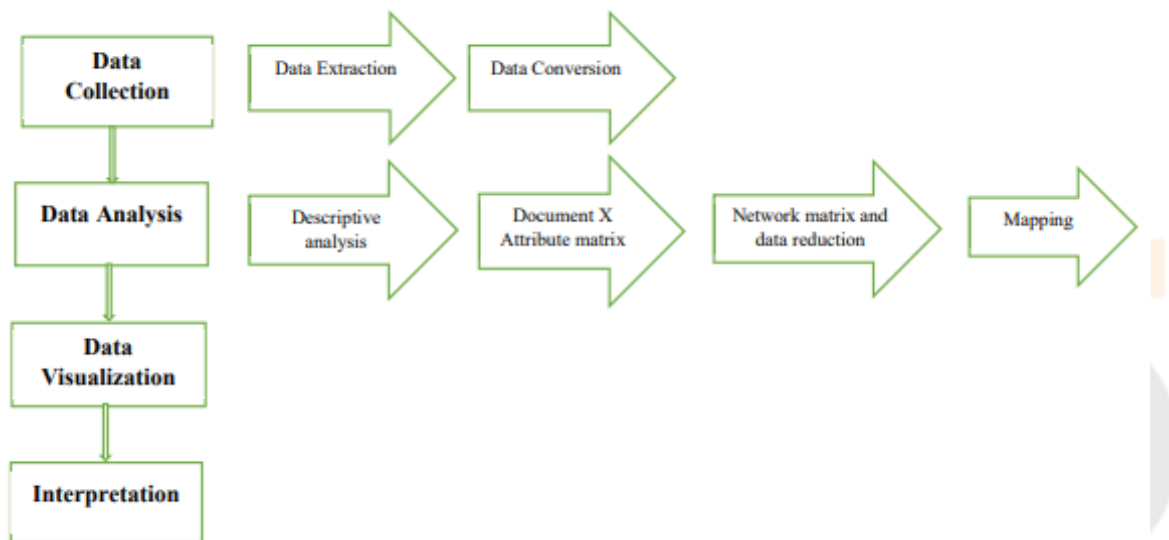
The advantages of fintech were covered in the paragraph above, whereas the risks are covered here. E. Jones et al. (2019), M. H. Uddin et al. (2020), and K. Nazaf et al. (2021) assert that the collaboration between banks and fintech firms poses a serious cybersecurity risk. The main factor contributing to the detrimental effects of

cybertech spending on bank stability is cybertech. The authors claim that studies by H. Nabilou et al. (2020), M. Hodula et al. (2022), and F. Carlini et al. (2022) look at the potential effects of central bank digital currency issuance, particularly on banking and financial stability, the effective use of resources, and the conduct of monetary policy. Since they might ultimately call for modifications to the way the treaty operates, such legal challenges might be challenging to overcome.

We talk about fintech policies towards the conclusion of the review of the papers. The conclusions are that customers, technology companies, and banks are not "fintech" ready, that bank and fintech companies have intricate interactions, and that policies and regulations influence how fintech develops, according to authors JI. Hung et al. (2016); Zalant T, et al. (2017); Demertzis M, et al. (2018); and Db. Kharisma, et al. (2020). At that time, the nation's fiscal policy was modestly expansionary.

Methodology

The report uses 307 publications that were pulled from the WoS database between 2006 and 2022 and analyses them using the bibliometric analysis approach. We rigorously evaluated Fintech research using bibliometric and VOS viewer software since bibliometric analysis is an advanced and scientific way to fully grasp any subject of study. The schematic representation of the chosen methodology is depicted in the image. The approach is broken down into four parts, as shown in the figure: data gathering, data analysis, data visualisation, and interpretation.



Selection of database and data collection

The two most important and complete databases for large-scale bibliometric analysis and methods of research evaluation are WoS and Scopus. Data for this study was gathered from WOS since it has stricter peer review and, as a result, higher quality than Scopus. In titles and abstracts from WOS, the search for the keywords "Fintech" as specified above turned up 307 articles (excluding conference papers and book chapters) that were published in the English language between 2006 and 2022.

Analysis

One of the thorough science mapping tools used for bibliometric analysis is an open-source programme called the Bibliometric package of R software. Similar to that, a bibliometric network is built using VOS reader software. For bibliometric and network analysis, respectively, we used the "bibliometric" package of the R software and the VOS viewer application.

Results

Sources

Descriptive analysis of sources reports the results of the total number of articles, year-wise growth pattern, most relevant journals, h index, and source growth. The table-1 shows that the search produced 307 articles from 782 authors and 528 keywords published in the English language between 2006 and 2022.

Figure-1 shows the number of articles published in those years. We saw in 2006 only 1 article is published but after a decade 7 articles in published in 2016 in the last 4-5 years, many articles have been published. It's become a huge growth in the sector of fintech.

Figure-2 provides information about the top twenty journals publishing articles on fintech. It is evident from the figure that the Sustainability, Finance Research Letters, Financial Innovation, Journal of Economics and Business, Cogent Business & Management, and Journal of Risk and Financial Management are amongst the top six journals that have published the maximum number of articles.

In addition, the information provided in figure-2 and table-2 provides the details of the most cited journals. Sustainability, Finance Research Letters, Financial Innovation, Journal of Economics and Business, Cogent Business & Management, and Journal of Risk and Financial Management are the top six journals cited.

Figure-3 presents the detail of the journals having a high h-index. For example, three journals with an h-index of more than 4 are the Sustainability, Finance research letters, and Financial innovation.

Table-1 (Summary of data)

Time horizon	2006:2022
Total documents	307
Keywords plus ID	528
Authors	782

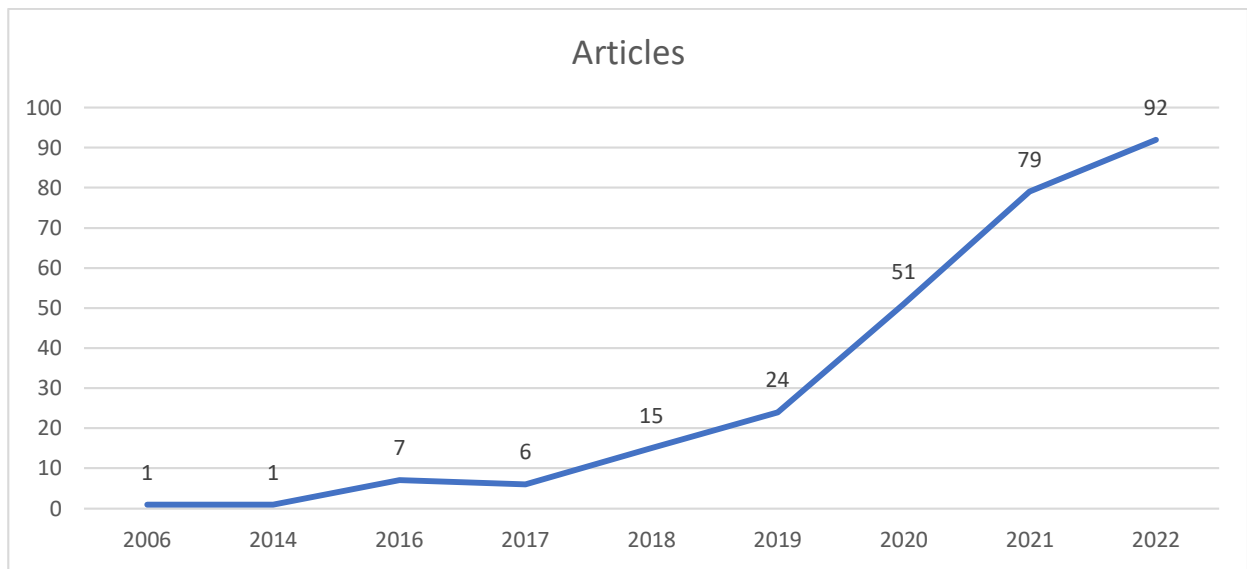


Figure -1 (Publication trend in Fintech)



Figure-2 (Top relevant Journals)

Table-2 (Most Cited Journals)

Sources	Articles
Sustainability	11
Finance Research Letters	8
Financial Innovation	7
Journal of Economics and Business	6
Cogent Business & Management	5
Journal of Risk and Financial Management	5
Cogent Economics & Finance	4
International Review of Financial Analysis	4
Journal of Asian Finance Economics And Business	4
Mathematics	4

Annals of Operations Research	3
Financial and Credit Activity-Problems of Theory and Practice	3
International Journal of Finance & Economics	3
International Journal of Islamic and Middle Eastern Finance and Management	3
Journal of Banking Regulation	3
Journal of Financial Economics	3
Journal of Financial Services Marketing	3
Journal of the Knowledge Economy	3
Managerial and Decision Economics	3
Marketing and Management of Innovations	3

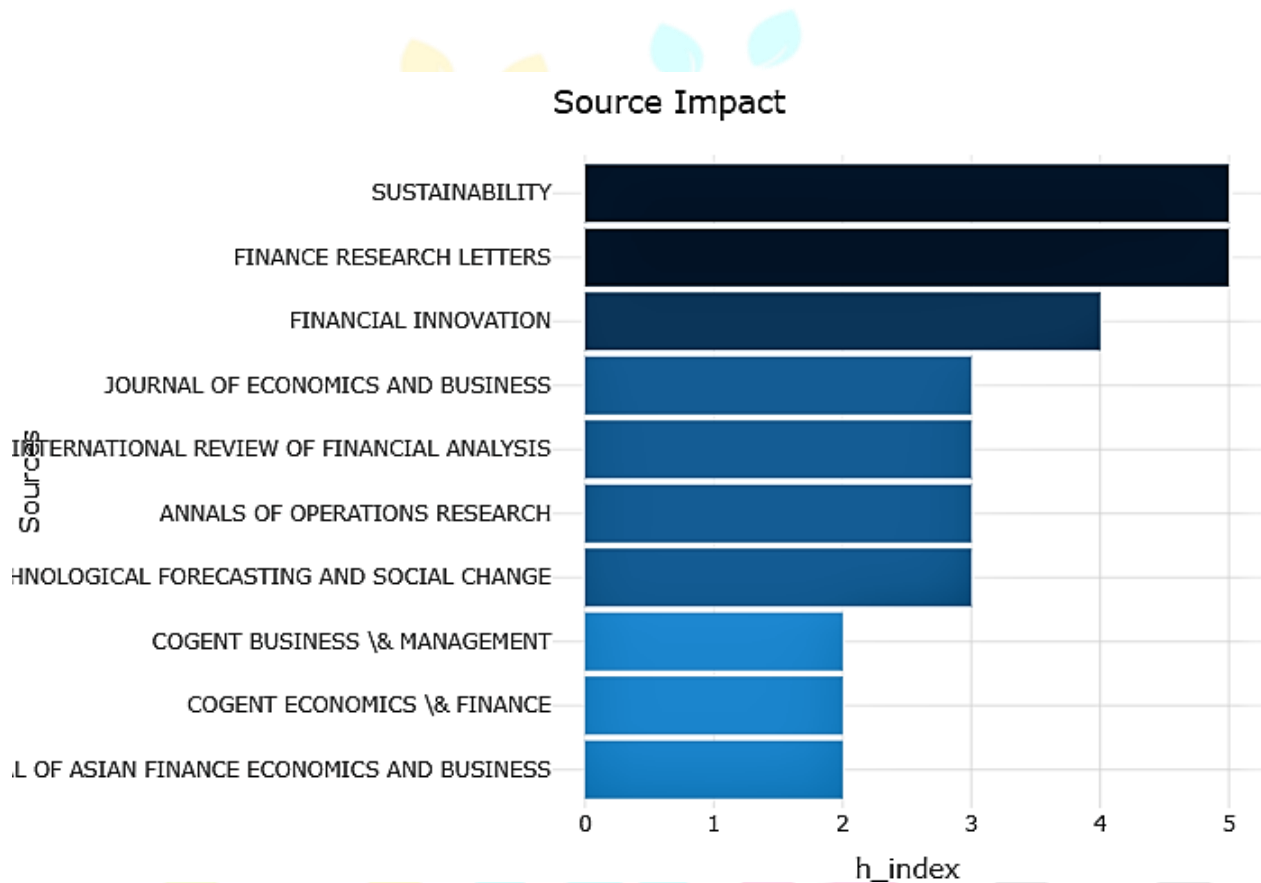


Figure-3 (High impact journals)

Most influential authors and keywords

In addition, Table-3 reports the most frequently cited articles. The results indicate that the document authored by Buchak G et al. 2018 in the Journal of financial economics, Kou G et al. 2021 in the Financial innovation, Hu Z et al. 2019 in the International Journal of Management and Administrative Sciences, Jagtiani J et al. 2018 Journal of Economics and Business are the most cited articles that have helped the field grow.

The co-word analysis is the most helpful method to understand the conceptual structure of the research done in a specific field (BUCHAK G,2018). Co-word analysis reveals, “fintech”, “financial technology”, “financial

inclusion”, “innovation”, “bank”, “banking”, “blockchain”, and “financial services” are the most frequently used keywords in the paper titles and abstract (figure 4).

Table-3 (Top cited documents)

Author	The sum of the Total citation
Buchak G; Matvos G; Piskorsi T; Seru A.,2018, Journal of finance economics	230
Kou G; Akdeniz Oo; Dincer H; Yuksel S.,2021, Financial Innovation	98
Hu Z; Ding S; Li S; Chen S,2019, Symmetry-Basel, International Journal of Management and Administrative Sciences	89
Jagtiani J; Lemieux C, 2018, Journal of Economics and Business	86
Jesus Larios-Hernandez G, 2017, Business Horizons	80
Chen Z; Li Y; Wu Y; Luo J, 2017, Financial Innovation	62
Jaksic M; Marinc M, 2019, Risk Management	57
Demertzis M; Merler S; Wolff Gb, 2018, Journal of Financial Regulation	56
Juenger M; Mietzner M, 2020, Finance Research Letters	54
VAN LOO R, 2018, UCLA LAW REV	53
Dinh Hoang Bach Phan Dhbp; Narayan Pk; Rahman Ar, 2020, Pacific-Basin Finance Journal	51



Figure-4 (Most relevant words)

Conceptual, Intellectual, and Social Structure: Density visualization is a robust way of establishing the strength of interactions among keywords. A density map was created using VOS viewer software because VOS viewer software has a robust graphical user interface. Different colours in the keyword co-occurrence heat map of Fintech (see Figure 5) depict different density values. A higher-density yellow colour indicates the more frequently used concept or topic. For example, Fintech and Innovation are the highest yellow colour density because Financial services are expected to be quicker, more convenient, and more individualised by consumers. By providing digital solutions that can be accessed on mobile devices, fintech companies are able to address these demands and increase the accessibility and convenience of financial services for a wider range of people; hence, they are the main keywords in Fintech scholarship. Apart from these two terms, interestingly, relatively, the higher density yellow colour is also seen on “Financial technology”, “Banking”, and “Financial inclusion”.

Keyword co-occurrence is another way of understanding the knowledge structure and research themes. Based on Figure 6 and subsequent analysis, four themes or clusters emerge prominently. First one includes “Bank performance”, “Big data”, “Competition”, “efficiency”, “financial technology”, “impact”, “performance”, “profitability” and “risk”. The second theme or cluster comprises “banking”, “blockchain”, “financial inclusion”, “financial services”, “fintech” and “innovation”. In the third cluster, “acceptance”, “adoption”, “internet banking”, “trust” and “determinants” are the keywords. Finally, in the fourth and the final cluster, “financial stability” is the key theme.

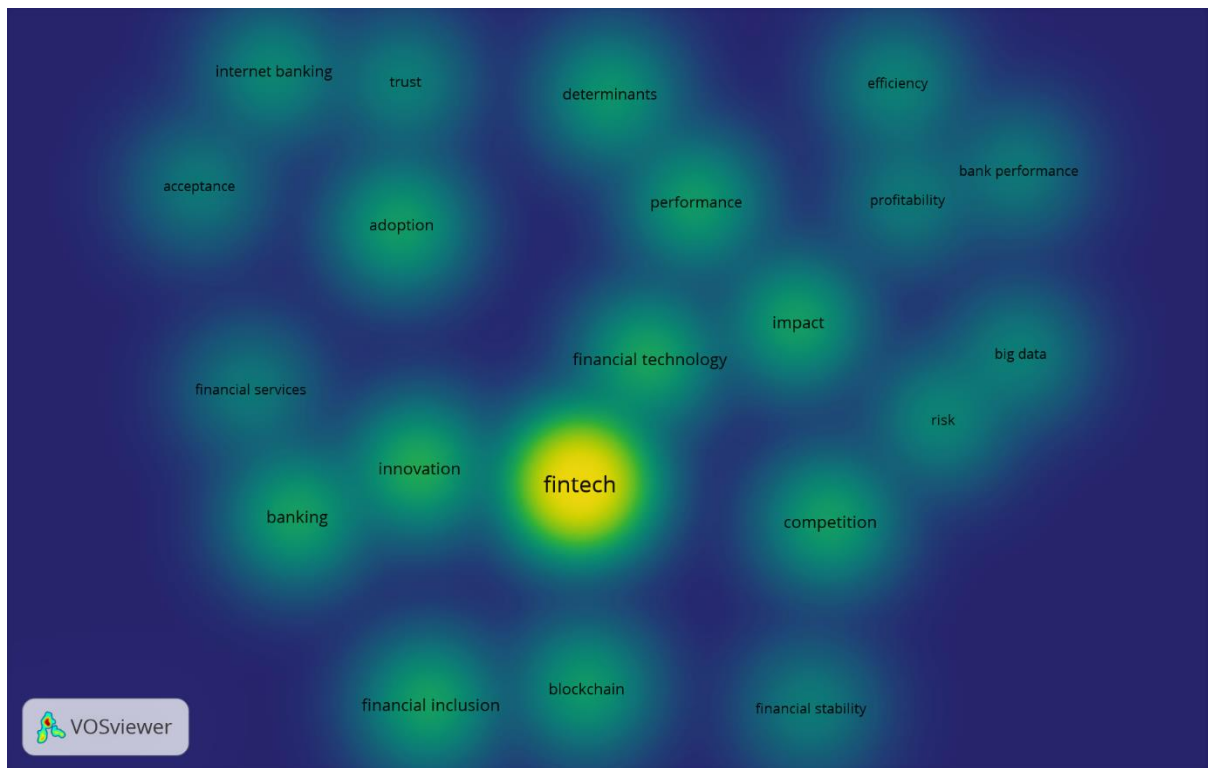


Figure-5 (Keywords co-occurrence heat map of Fintech)

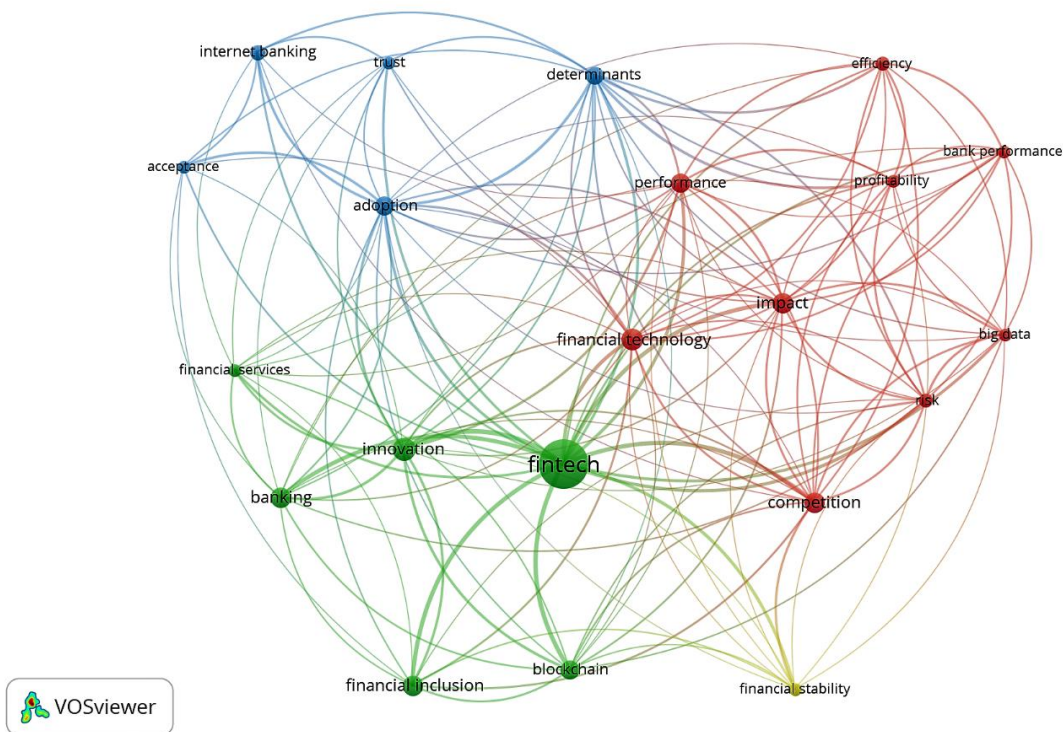


Figure-6 (Keyword co-occurrence heat map of Fintech)

On analysing these four clusters, we can conclude that there are broadly three streams of research in Fintech. The first stream focuses on how financial technology affects banking performance to boost productivity, boost profits, and minimise risk. What financial services are innovative in the banking industry are discussed in the second stream, along with developments in fintech. The third stream measures consumers' adoption and acceptance of new financial services and the degree to which people and financial services are trusted.

We go over each of the three major clusters in the paragraph above. According to Chen Z. et al. (2021), the financial sector has undergone a significant transformation as a result of the development of financial technology in areas such as mobile, the internet, cloud computing, big data, search engines, and blockchain technology. This is in line with what the clusters are saying about the adoption and acceptance of this fintech technology. Drasch B.J., et al. (2018) claim that the digitalization of banking services has resulted in the emergence of new client demands and profound changes in the banking sector. Fintech benefits from the digital era by offering customer-focused solutions, whereas banks struggle with sluggish innovation cycles.

Figure-7 shows which keyword was used more frequently from the previous year to the current. In this graph, we can see that while fintech, innovation, banking, effect are more frequently used words in August 2020 than they are in April 2020, big data, efficiency, bank performance, and acceptability are more frequently used phrases in February 2021.

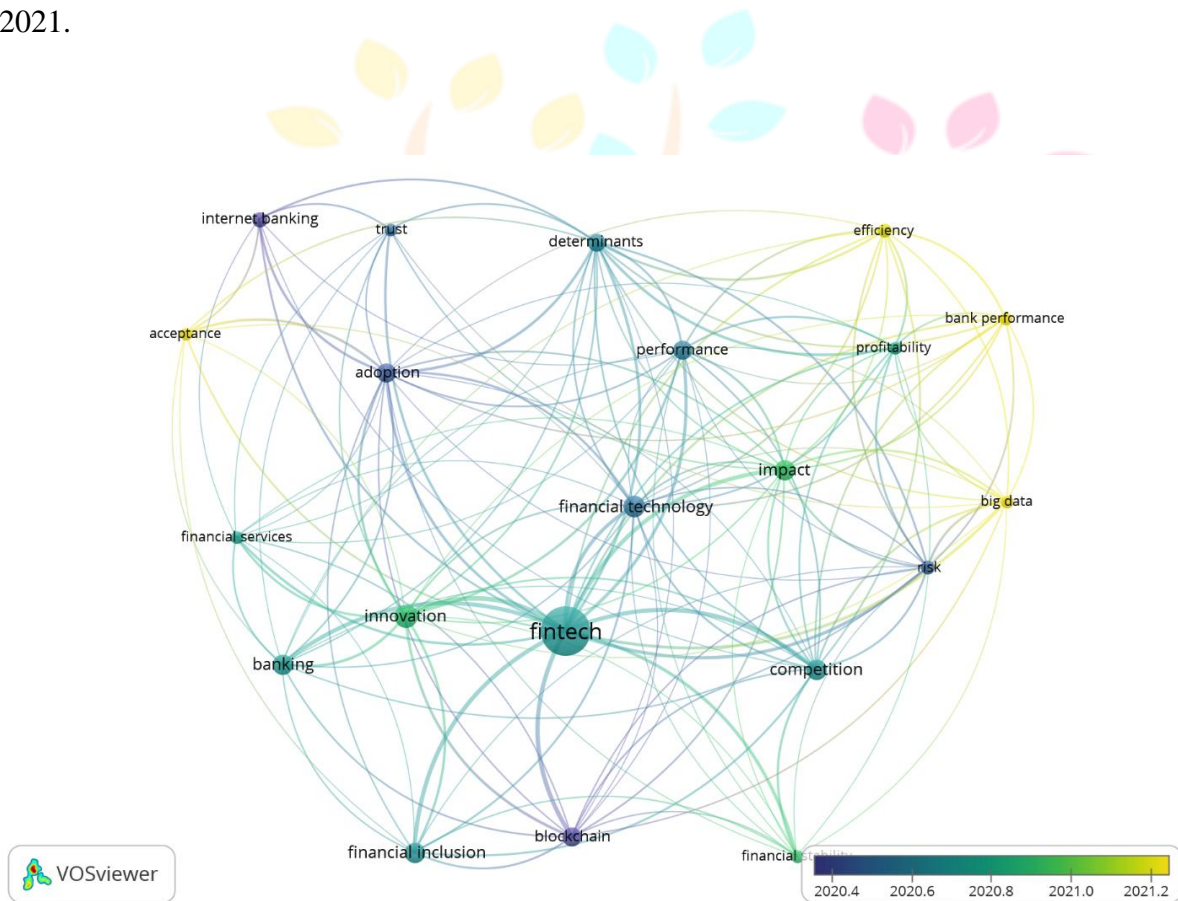


Figure-7 (Keyword co-occurrence heat map of Fintech)

Table-4 (Top universities published the articles)

Name of Institutions	No. of Articles
University of Malaya	13
Xiamen University	11
Chinese Culture University	10
Southwestern University of Finance and Economics	9
International Islamic University Malaysia	8
Peking University	7

The University of Economics Katowice	7
University of Oxford	7
Banking University	6

Table-4 lists the top 10 most productive research institutions in the field of Fintech all over the world. University of Malaya with 13 publications is at the top of the list, followed by Xiamen University, Chinese Culture University, and Southwestern University of Finance and Economics.

According to Table 5, the United Kingdom and the USA are the most productive countries with 42 and 29 publications, followed by China (15).

According to Table 6, the USA and China are the most cited countries with 627 and 484 citations, followed by Germany (178) and the United Kingdom (159).

Table-5 (Top country's published no. of articles)

Country	No of articles
United Kingdom	42
USA	29
China	15
Australia	9
Malaysia	8
Saudi Arabia	7
Vietnam	6
Belgium	5
Italy	4
Netherland	4
South Africa	4
Turkey	4
Germany	3
Poland	3
India	2
Japan	2
Serbia	2
Spain	2
Sweden	2
Austria	1
Korea	1
Nigeria	1
Pakistan	1

Switzerland	1
U Arab Emirates	1

Table-6 (Top cited countries)

Country	Total Citations
USA	627
China	484
Germany	178
United Kingdom	159
Turkey	98
Mexico	80
Australia	74
Malaysia	66
Belgium	59
Slovenia	57

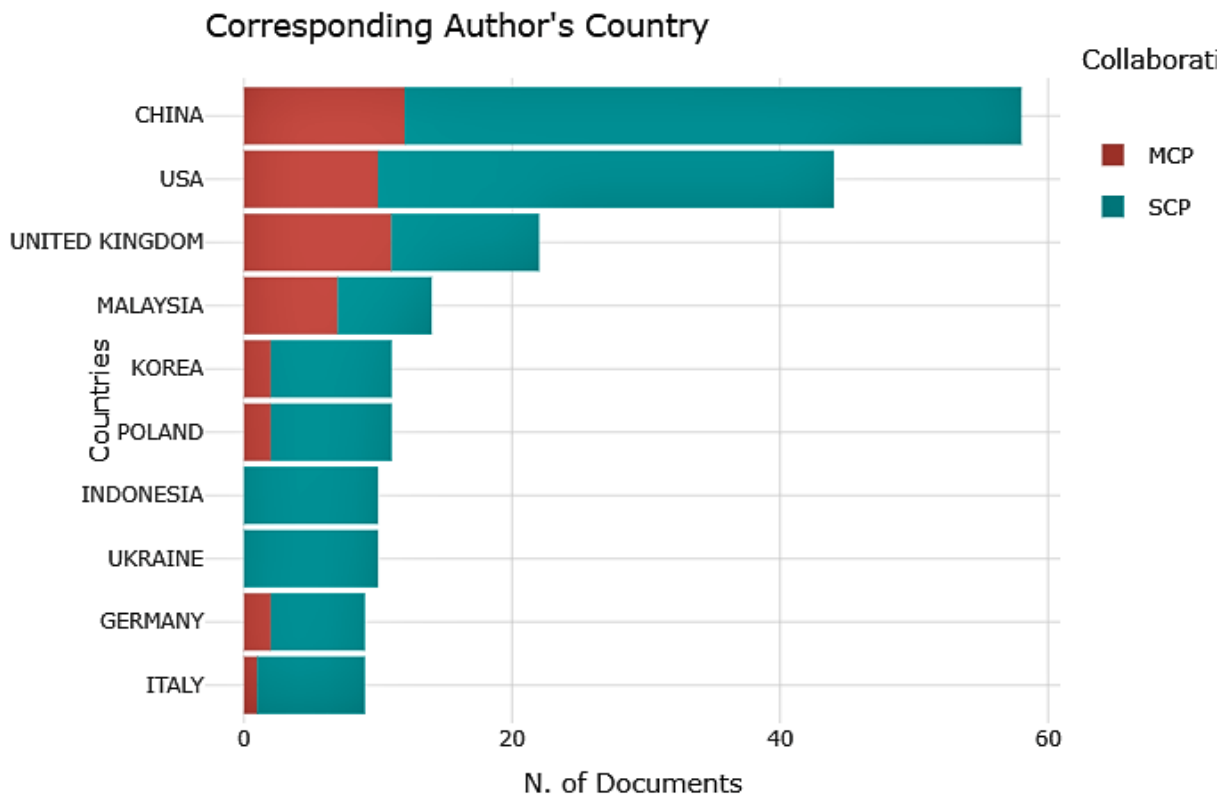


Figure-8 (Top MCP and SCP countries)

Figure-8 represents which countries' authors more contribute to this topic with single-country publications as well as multiple-country publications. We see China and USA authors have more contributions for both (MCP and SCP), but we see China's authors have more contributions in MCP and SCP as compared to the USA.

Findings

After passing through the embryonic stage, the Fintech literature is expanding and gaining the interest of both academics and business. The study significantly extends and adds to the body of Fintech literature. The study adds to and improves the Fintech literature by highlighting significant authors, subjects, and the most significant Fintech periodicals. The findings show that a select group of authors conducted the most convincing investigations. The Sustainability, Finance Research Letters, Financial Innovation, Journal of Economics and Business, Cogent Business & Management, and Journal of Risk and Financial Management emerged as the most influential journals in the field, according to results relating to pertinent authors, journals, citations, and affiliations in the field of Fintech. Figure 7. A heat map of the co-occurrence of keywords in Fintech research. The University of Malaya, Xiamen University, Chinese Culture University, and Southwestern University of Finance and Economics are the institutions that contribute the most, according to an examination of the connections and nations. Furthermore, it is undeniably true that the most significant institutions and writers hail from the USA and the UK. According to cluster analysis, the Fintech literature can be roughly divided into three groups. The first stream is concerned with the impact of financial technology on banking performance in order to increase output, increase profitability, and reduce risk. In the second stream, innovations in fintech are examined along with what financial services are novel in the banking sector. The third stream gauges consumers' acceptance of new financial services as well as their level of confidence in both persons and financial institutions.

Contributions and implications

By offering composite data on the most influential authors, most pertinent and cited journals, most cited papers, emerging keywords, and clusters for Fintech research, this report adds to the body of knowledge already available in the field of fintech. By highlighting the keywords (fintech, innovation, banking, and effect) that make up the core field of fintech research and offer fresh and plausible areas for future study, the review also adds to the fintech literature. By offering thorough details on the authors, papers, journals, and potential future study questions, it aids future research.

Future Research Agenda

There are various potential avenues for further research in fintech. Here are some potential areas of concentration:

Regulation and Policy: The regulatory environment around the fintech industry can be the subject of one field of study. Policymakers and regulators will need to adjust as the business expands and changes in order to safeguard customers and maintain the stability of the financial system. The effects of various regulatory strategies, such as those that emphasize innovation or consumer protection, could be studied.

Cybersecurity: The development of new security solutions to guard against these hazards should be the focus of research because fintech organizations are exposed to cybersecurity risks. Research may also examine how cyberattacks affect the fintech sector and the overall financial system.

Digital currencies and blockchain technology: Traditional financial systems have been challenged by the emergence of digital currencies like Bitcoin and blockchain technology, and there is still much to learn about their

potential effects. The applications and potential advantages of these technologies, as well as the regulatory difficulties they provide, might all be the subject of research.

Consumer behavior and decision-making: Research could examine the elements that affect consumer behavior in this environment as fintech has the ability to alter how people make financial decisions. Studies on the use of fintech products and services by consumers as well as the influence of financial education on their decision-making may fall under this category.

Artificial Intelligence: Fintech companies are increasingly using artificial intelligence to streamline operations, spot fraud, and offer individualized financial guidance. Future studies might look into how AI might be utilized to improve financial judgment, customer satisfaction, and operational effectiveness.

Ultimately, there is a need for multidisciplinary research that integrates skills in finance, technology, and regulation because there are many possible areas of future fintech study.

Limitations

The current study does have some restrictions, much like every previous study. First, while comprehensive, this assessment is not exhaustive. The WOS database is used in this investigation. We advise using Scopus and other databases for comparative and thorough analysis in future studies. Second, we excluded dissertations, book chapters, and books from our study's selection of materials. We only included academic journal articles. By incorporating additional trustworthy sources, more understanding may be acquired. Furthermore, even though we made an effort to be accurate and thorough, a subsequent assessment might be theory-driven. Finally, these results may serve as a guide for future research into the Fintech industry.

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