

The Impact of the COVID-19 epidemic on Fintech

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Abstract. Fintech is a mainstream trend in digital transformation and it is an important strategic goal adopted by countries to help the real economy. The sudden COVID-19 epidemic has a significant impact on the global economy and pushes the development of Fintech to a new stage. This paper tries to explore the impact of the COVID-19 epidemic on Fintech innovation and regulation by collecting relevant literature from China Knowledge Network and Web of Science, and applying bibliometric methods such as literature quantity statistics and keyword mutation. The study found that: 1) after the outbreak of the COVID-19 epidemic, the number of literatures related to financial technology has increased significantly, and Fintech has become a research hotspot for scholars; 2) from the perspective of the research body, scholars have shifted their interpretations of the connotation of Fintech from conceptual analysis to practical exploration; 3) from the perspective of research content, the COVID-19 epidemic has promoted the technological innovation and application of Fintech, and the results of this field of research have been more fruitful. However, the economic downturn crisis brought by the COVID-19 epidemic has forced regulators to adopt loose regulatory policies, which led to a decline in scholars' attention to financial technology regulation for the regulation of financial technology and a slight lack of research enthusiasm. In the future, sustained efforts should be made to pay attention to the research on Fintech regulation, strengthen the connection between macro and micro perspectives of the discipline, and develop a personalized development path for Fintech.

Keywords: Fintech; COVID-19 Epidemic; Bibliometrics.

1. Introduction

The outbreak of the COVID-19 epidemic has had a profound impact on global economic growth and the evolution of the world landscape. With the development of globalization, the world pattern of drastic changes, compared with the 2003 SARS, the COVID-19 epidemic on the global economy is more obvious [1]. In order to restore the economy and help the "war epidemic", the China Banking and Insurance Regulatory Commission (CBIRC) issued the "Notice on Further Improving Financial Services for Epidemic Prevention and Control", which proposes to strengthen the application of science and technology in financial institutions, improve the efficiency of online services, and truly help the real economy. In addition, China is also planning a large number of changes related to the development of Fintech in terms of top-level design, and the development direction of enterprise-led Fintech innovation [2]. 2020 and 2021 Government Work Report both mentioned Fintech innovation, of which 2020 mentions "the use of Fintech and big data to improve the efficiency of services and reduce the cost of services. In 2020, it mentioned "using financial technology and big data to improve service efficiency and reduce service costs", and in 2021, it emphasized "strengthening the supervision of financial technology"[3]. In January 2022, the People's Bank of China issued the "Financial Technology Development Plan (2022-2025)", which puts forward the guidance for the development of financial technology in the new period, and clarifies the overall idea of financial digital transformation, development planning, key tasks and safeguard measures. In November 2022, the China Academy of Information and Communications Technology (AICT) issued the China Fintech Ecology White Paper, which explicitly proposed that under the premise of building a safe and inclusive development environment, Fintech should play a significant role in promoting the

integration of social and economic values by driving the high-quality development of society through innovation.

Since the COVID-19 epidemic, the use of the Internet underlying technology to subvert the traditional financial industry, scientific and technological innovation has profoundly affected the financial technology, so far, financial technology has gradually become a hot issue in the research of scholars, but on the specific form of the impact of the COVID-19 epidemic on the financial technology and commentary, the current relevant academic research is relatively small. Therefore, this paper analyzes the changes in the amount of publications, research subjects and research contents of "financial technology" before and after the COVID-19 epidemic through the Citespace bibliometric tool, summarizes the development trend of financial technology, comprehensively and systematically explains the evolution of the connotation and changes in research hotspots of the COVID-19 epidemic for financial technology, and proposes a post-epidemic era of financial technology through the research. It also proposes the future development direction of financial technology in the post epidemic era, laying a solid foundation for the subsequent research on financial technology in academia.

2. Data Sources and Research Methodology

2.1. Data Sources

Since the research related to "financial technology" gradually emerged in 2015, this paper sets the search time domain of the literature sample from January 1, 2015 to December 31, 2022, in order to ensure the quality of screening literature. In order to ensure the quality of the screened literature and exclude the interference of related terms, the Chinese literature collection adopts the advanced query mode of China Knowledge Network (CNN), and source categories were set as "EI", "Peking University Core", "CSSCI" and "CSCD". The title, abstract and keywords containing "Fintech" were searched, and 458 records of Chinese journals were obtained. Interfering documents such as reports, conferences and dissertations were removed manually, so that 450 pieces of sample documents were obtained in the end. For the English literature search, using the core database of Web of Science, selecting the citation index of SCI-EXPANDED and SSCI, setting the query mode as title, author's keywords and abstract, using "Fintech" as the search term, and deleting the duplicated and redundant literature. Finally, we obtained 906 records of the English journals. After deleting duplicates and redundancies, 906 records of English journals were obtained.

2.2. Research Methods

Bibliometrics is a kind of quantitative analysis method combining mathematics and statistics, and its main advantages are: 1) It can visually and effectively compare data and literature through the number of papers and keyword changes as well as comprehensively show the current status and development trend of research in this field. 2) It collects, arranges and analyzes all kinds of data and literature, and provides holistic references to scholars of the subsequent research.

3. Analysis of the Results of the COVID-19 Epidemic on Fintech Research

3.1. Trend Analysis of Publication Volume

The publication volume in different years can roughly reflect the basic characteristics of Fintech development and research, we firstly compare and analyze the publication volume in 2015-2019 (pre-epidemic) with that in 2020-2022 (post-epidemic), and make the trend charts of the annual publication volume of Fintech respectively (Figures 1 and Figure 2).

From Figure 1, the overall growth trend of the publication volume of Chinese and English literature is the same, showing an upward trend. From the degree of increase in the number of publications, it can be seen that the number of publications is low in 2015-2019, but there are relevant papers

produced every year, indicating that both the theory and practice of Fintech at this stage have not yet been widely disseminated, and belong to the gestation period. The reason for this phenomenon is that "financial technology" is a new concept at this stage, and most scholars are in a wait-and-see state for the new thing, and have not yet found the practical development opportunities of financial technology.

The emergence of the COVID-19 epidemic in 2020 is an important time point. 2020-2022, the number of papers published mainly on "Fintech" shows explosive growth and the increase in English literature is more significant, which indicates that the emergence of the COVID-19 epidemic promotes the attention of academics to Fintech. This indicates that the emergence of the COVID-19 epidemic has promoted the attention of academics to financial technology. This is related to the current development of the epidemic and the economic recovery policies at home and abroad. The epidemic has challenged the financial industry's ability to provide efficient, accurate, and "non-contact" services, but also provided an opportunity for Fintech to take advantage of its intelligence and cross-spatialization.

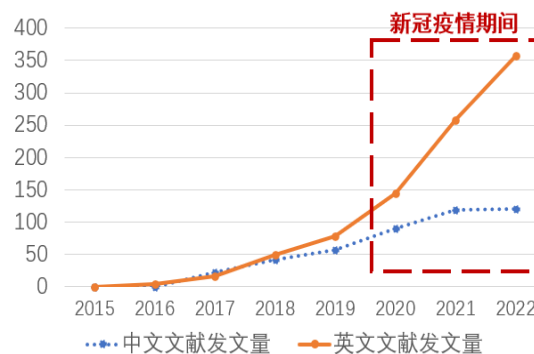


Figure 1. Number of publications in core Fintech journals from 2015 to 2022

3.2. The Main Body of Research: Analysis of Changes in the Definition of the Connotation of Fintech

Combing through the existing literature, before and after the outbreak of the COVID-19 epidemic, scholars' research focus on Fintech is different. Before the outbreak of the COVID-19 epidemic, scholars' exploration of the connotation of Fintech innovation was more fragmented, focusing on one aspect of technology and finance: 1) technology: Chen MA and other scholars believe that as long as the newly developed technology to provide support for financial services can be called Fintech [4]. 2) finance: Puschmann proposes that Fintech is essentially a kind of financial service innovation, and its ultimate goal is to realize the rapid iteration of financial products as well as the high-frequency push of financial service models [5]. After the COVID-19 epidemic, scholars have expanded the connotation of Fintech innovation more deeply, extending its research focus to the combination of finance and technology. For example, Thakor et al. believe that the core of Fintech is to use technology to create products and improve financial services and technology is only a means to provide development power for Fintech and to prevent financial risks, and it needs to be applied to the figurative scene in order to reflect the value [6].

Before the COVID-19 epidemic, scholars have explored less about the specific application of Fintech and lack of empirical evidence. After the emergence of the COVID-19 epidemic, scholars have gradually shifted their research focus to the practice of Fintech. Scholars have mainly studied the impact of the COVID-19 epidemic on Fintech in two aspects: 1) For the impact mode, Wu Zhenyu et al. from a macro perspective, argued that the overall impact of the COVID-19 epidemic on the financial market has a superimposed nature, and in general, it will form the three impact stages of the expected impact, entity conduction, and policy digestion [7]. Faria, Zhang Xiaojing examined the impact of hurricanes, epidemics, and other financial environment sudden changes on economic growth and Fintech market impact and shock [8]. From a micro perspective, Lu Minfeng summarized the new difficulties of production, operation and risks faced by small and micro enterprises under the

COVID-19 epidemic with a basic problem-oriented method [9]. (2) At the level of countermeasures, Guo Pin et al. systematically deduced the mitigation effect of Fintech innovation on the impact of sudden public events through empirical research, and proposed that commercial banks should accelerate the construction of Fintech and actively promote digital transformation and upgrading [10]. The COVID-19 epidemic is a typical class of public health emergencies, presenting a wide range of impacts, generating a random time period and other characteristics. Tong Jiadong and other scholars suggest that differentiated and graded response policies should be adopted to ensure that the maximum degree of restoration of enterprise production in the short term and the momentum of economic growth in the long term [11].

3.3. Research Content: Hot Spot Evolution and Hot Word Tracking

In order to explore the hotspot evolution of the COVID-19 epidemic on the research of financial technology innovation and regulation, this paper adopts CiteSpace to produce a mutation map, analyzes the keyword evolution of all the collected literature, and merges the keywords with similar meanings, and takes the first 25 keywords with the most obvious mutation effect, and finally obtains the Chinese and English mutation analysis maps shown in Fig.3 and Fig.4. Keywords are important indicators reflecting the research hotspots of academic papers, and their changes can reflect the dynamic process, characteristics and laws of the development of the discipline by studying them. Mutation strength is an important indicator to reflect the hotness of keywords, the higher the value means the more times the keyword appears in a short period of time. The word 'Begin' indicates the starting time of keyword hotness enhancement, and the word 'End' is the ending time.

3.3.1. Mutation Dimension Analysis

We take the time period of before and after the outbreak of the COVID-19 epidemic as the main node, and we can find that before and after the COVID-19 epidemic, there are three obvious changes in the main body of research on Fintech.

(1) Dimension of Fintech technology innovation application

Before the epidemic, "blockchain" and "big data" were the two words with the highest mutation intensity in Chinese literature (Figure 2), reaching 3.62 and 3.08 respectively, both of which belong to the technological innovation category of Fintech, indicating that before the epidemic, the research focus of domestic scholars was generally on the bottom line of Fintech. The research generally focused on the underlying technological innovation of Fintech. Similarly, the research hotspots of English literature on the development of Fintech are also mainly focused on the field of technological innovation (Figure 3). After the outbreak of the COVID-19 epidemic, the digital transformation of various countries accelerated, the demand for cross-spatial online business surged and the application of new technologies such as online banking and insurance inspired scholars to think deeply about the direction of the application of technology in the financial market. After the COVID-19 epidemic, scholars' research topics no longer appear single and clustered, but expand in a more multidimensional direction, from technical studies such as "text mining" and "blockchain" to financial interdisciplinary studies such as "rural finance", "green finance" and even "financial geography", which shows that the boundaries of financial technology innovation are slowly opening up.

(2) Dimension of Fintech Regulation

The emergence of Fintech has increased the complexity of the financial market, and the security risks associated with business and operational processes are becoming more and more difficult to deal with [12]. Therefore, as an important branch of Fintech, Fintech regulation has rightly received extensive attention from scholars at home and abroad. It is worth noting that before the epidemic, "financial regulation" and "regulatory technology" have high research intensity, and the econometric analysis shows that the mutation intensity is high, respectively 1.85 and 1.67. However, after the epidemic, "financial regulation" and "regulatory technology" have high research intensity, respectively 1.85 and 1.67. However, after the epidemic, "financial regulation" and "regulatory technology" have high

research intensity, respectively 1.85 and 1.67. However, after the epidemic, the keywords of "financial regulation" and "regulatory technology" appear to be significantly reduced in the mutation map (Figure 2). This shows that the attention of domestic scholars to Fintech regulation has decreased after the epidemic, which may be related to a series of facilitating policies launched by the country to cope with the epidemic, avoiding too tight regulation and resulting in lower market demand. Similarly, after the epidemic, the research hotspots of foreign scholars also focus on other areas (Figure 3) and only "systemic risk" related to Fintech regulation, appears in the mutation map, which suggests that foreign scholars also have a declining trend in the degree of research and attention to financial regulation and risk prevention. This is basically the same as the above analysis of domestic scholars.

(3) Fintech Policy Dimension

For domestic scholars, their research topics are strongly policy-oriented. For example, at the beginning of 2022, the State Council put forward the "14th Five-Year Plan" for the development of the digital economy, which explicitly put forward the concept of strengthening the construction of digital infrastructure, and collaborating to promote the digital industrialization and digitalization of industries. Therefore, domestic scholars began to pay attention to "digital finance" and other topics in 2022. On February 22, 2022, the Central Committee and the State Council put forward in the "Opinions on Doing a Good Job in Comprehensively Promoting Key Work of Rural Revitalization in 2022" that it is necessary to promote the green development of agriculture and rural areas, and take environmental development into account in the process of poverty alleviation. In this context, topics such as "rural finance" and "green finance" have emerged in 2021-2022. These reflect the strong concern of domestic scholars for the direction of national policy and practice, and their research hotspots have been greatly influenced.

3.3.2. Keyword Timeline Analysis

Taking the outbreak of the COVID-19 epidemic in 2020 as the main time node, the Chinese and English literatures show different stage characteristics.

(1) Stage analysis of Chinese literature

The first stage (2015-2019) is the exploration stage of domestic scholars for the new concept of Fintech. At this stage, there are not many empirical results of Fintech-related research, mostly for conceptual analysis and some studies fully refer to the results of foreign scholars. However, Figure 3 shows that the core keywords in this field have appeared, such as "blockchain" and "big data" in the field of technology, "financial regulation", "financial risk" in the field of supervision, and "intelligent investment" in the field of application.

The second phase (2020-2022) will see a rapid leap in the depth and breadth of domestic research. The COVID-19 epidemic is driving the global digital transformation, and financial technology is helping the high-quality development of China's economy. Since then, as can be seen in Figures 2 and 3, the research on Fintech in terms of technology, service, regulation and other aspects has gradually increased, and many new keywords have emerged, such as "technological innovation", "digital finance" and so on. This shows that scholars' research has shifted from conceptual definition to theoretical innovation, and from theoretical innovation to practical exploration.

(2) Stage Analysis of English Literature

The first stage (2016-2019) is the exploration stage of foreign scholars on the application of Fintech, which is different from the domestic one. Foreign scholars first focus on the specific application scenarios of Fintech, including "shadow banking", "business model", "equity crowdfunding" and so on.

In the second stage (2020-2022), the COVID-19 epidemic has made financial institutions pay more attention to digital transformation and remote services, which makes researchers focus on the technical logic of Fintech and the overall application logic again. In addition, the research direction of foreign scholars in this phase is more diversified, and the interdisciplinarity of disciplines is more

and more prominent, with the emergence of "financial geography" and other interdisciplinary subjects (Figure 3).

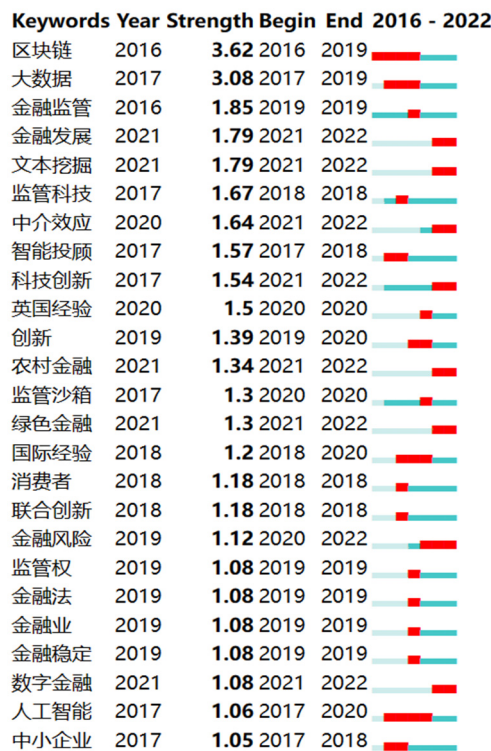


Figure 2. Chinese Literature Mutation Mapping from 2015 to 2022

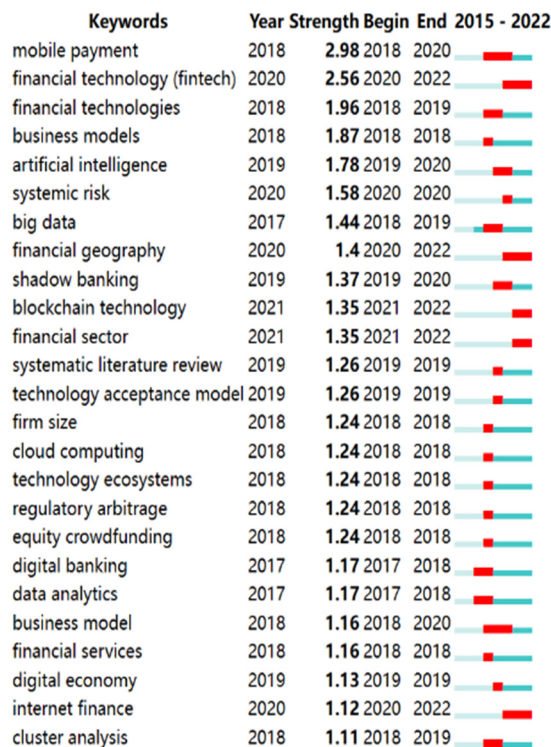


Figure 3. Mutational mapping of the English literature from 2015 to 2022

4. Research Conclusion and Outlook

4.1. Research Conclusion and Contributions

This paper explores the impact of the COVID-19 epidemic outbreak on Fintech through bibliometric analysis. It is found that: 1) The number of literatures on Fintech-related research has increased significantly after the outbreak of the COVID-19 epidemic. The demand for digital transformation and remote services has made Fintech a research hotspot for scholars. 2) From the perspective of the research subject, scholars' interpretation of the connotation of Fintech has shifted from conceptual analysis to practical inquiry. 3) From the perspective of the research content, no matter whether it is cut by horizontal or vertical panels, scholars' inquiry on different issues has received the influence of the broader environment of the COVID-19 epidemic. The COVID-19 epidemic has promoted the technological innovation and application of financial technology, and the research results in this field are more fruitful and the research hotspots are diversified, which are not only limited to the underlying technologies such as "blockchain" and "big data", but also give rise to "financial geography", "rural development" and "financial technology". Moreover, it has also given rise to the emergence of cross-disciplines such as "financial geography" and "rural finance". However, the economic downturn brought about by the COVID-19 epidemic has forced regulators to adopt relatively loose regulatory policies to facilitate the development of Fintech, which has led to a decline in the attention paid by scholars to the regulation of Fintech and a slight lack of research enthusiasm.

Through the above analysis, it is found that there are still some shortcomings in the current research, which needs to be further deepened.

(1) In analyzing the existing literature, it can be found that affected by the epidemic, countries have adopted loose policies to stimulate demand, so scholars have also relaxed the research on Fintech regulation. It should be noted that in the trends of global economic recovery, ignoring the research of Fintech regulation will lead to many new types of risks cannot be effectively controlled.

(2) From a research perspective, the current level of literature analysis is fragmented, and the macro, micro, and individual consumer behavior studies of Fintech are not interrelated. As an overarching concept, Fintech is interrelated and interlocked at every level, from macro-regulation to micro-enterprises to individual consumers. If each level is analyzed independently, it will lead to a less comprehensive and accurate analysis.

4.2. Future Research Direction

The "14th Five-Year Plan" development plan clearly puts forward the strategic goal of accelerating digitalization and upgrading the level of financial technology. Combined with the national documents and the previous research results, future research on financial technology can be explored in depth in the following aspects:

(1) Continuously improve the theory and practice of Fintech regulation. By studying the impact of Fintech on the development of the financial industry in 31 provinces in China, Muganyi et al. found that the simultaneous development of Fintech and regulation can significantly improve the effect of financial development [13]. Therefore, the role of prudential regulation of Fintech in enhancing market efficiency, preventing financial risks and maintaining market stability is self-evident. In the stage where Fintech is about to enter into full integration and development, the relevant theoretical mechanism is still immature, and we must pay attention to the security risks behind its rapid development. How to standardize Fintech regulation, break through technical barriers and reduce regulatory costs, and realize the synergistic development of Fintech innovation and regulation as well as to construct a benign ecology of Fintech innovation and development under the digital economy, will become a key topic for the future discussion of the academia and the industry.

(2) Multi-level and diversified perspectives to sort out the connection between the macro-level and micro-level of Fintech. In the global economic recovery, Fintech as an important hand, we should understand it more thoroughly and comprehensively. We should consider macro-market and pay

attention to the individual feedback on the market situation at the same time. In addition, we should consider the overall impact of multiple individuals on the macro market while studying individuals.

(3) According to the national conditions of each country, the development of financial technology is characterized by the development of the road, and truly serve the real economy. In China, for example, the research results in the field of financial technology are of great practical significance and theoretical value in promoting the level of financial technology innovation, accelerating the process of digitization, reconstructing the ecology of the financial industry, establishing the "four pillars and eight pillars" of the top-level design of financial technology, and enhancing the power of the economic "internal cycle". Therefore, scholars should focus on exploring what organizational forms are needed to support the development of Fintech, and what standards are needed to enhance financial professional services to a higher degree and promote the circulation of the market and other issues in the next step.

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