Financial technology amid the COVID-19

by Riduan Mas'ud

GENERAL MANAGEMENT

Financial technology amid the COVID-19: a bibliometric approach

Muhammad Muhajir AMINY[1*], Riduan MAS'UD[2]

[1]Department of Islamic Banking, Faculty of Islamic Economics and Business, Universitas Islam Negeri Mataram, Indonesia, Email: azeer.elkhawarizm@uinmataram.ac.id
[2]Department of Islamic Economics, Faculty of Islamic Economics and Business, Universitas Islam Negeri Mataram, Indonesia, Email: riduanmasud@uinmataram.ac.id
*Corresponding Author

Abstract

This paper aims to investigate publications' metadata, in terms of sources, authors, countries, affiliations, and keywords, relating fintech with the COVID-19 pandemic using a bibliometric approach. We conducted a bibliometric analysis by employing VOSviewer application as the tool. The published documents were extracted from the Dimensions.ai website by filtering keywords "Fintech" and "COVID-19" in their titles or abstracts. 266 documents were retrieved as the dataset from January 2020 to May 2022 with none in previous years. The majority of publications were in the form of articles (n=166 or 62.4%). The most prolific university in this study was Amity University (n=6), while the most prolific country was Indonesia (n=34). The most productive country, Indonesia, occupied the last position of nine most cited states within the dataset. SSRN Electronic Journal was the most cited source with 349 times. We found that research in Indonesia was more concerned to the relationship of COVID-19 with SMEs and people's financial condition, while research in India and China was more concerned to the development of technology implemented within financial services. This study provides broader picture of COVID-19-related fintech research during the pandemic period which may be beneficial for academics and researchers to carry out further studies in this field.

Keywords: *bibliometric analysis, COVID-19, fintech, metadata*

Introduction

World Health Organization (WHO) announced the Chinese outbreak to be a global health threat for all countries on 30th January, 2020 (Sohrabi et al., 2020). This respiratory infection coronavirus, called as the COVID-19, is communicable between humans. It was caused by the coronavirus SARS-CoV-2 and belongs to the same coronavirus family as the coronaviruses responsible for the outbreaks of Severe Acute Respiratory Syndrome (SARS) in 2003 and Middle East Respiratory Syndrome (MERS) in 2012. This pandemic began in Wuhan, Hubei Province, People's Republic of China (PRC). COVID-19 has already spread globally through human-to-human contact, despite having started in animal hosts (Abiad, Arao, & Dagli, 2020; Baldwin & di Mauro, 2020; for Disease Control, (CDC), & others, 2020; McKibbin & Fernando, 2021).

This pandemic not only affected global health of world societies, but also their financial condition. Due to the lockdown condition in several countries which restricted human economic activities, many Small Medium Enterprises (SMEs) were unable to obtain sufficient funds to cover their operational costs. To overcome this problem, most SMEs depend on loans and financing schemes offered by financial services industries, which one of them is financial technology (fintech). Fintech, in Islamic way, can assist SMEs and save poor people during the pandemic period through Qardh al-Hasan Islamic transaction (Khan, Hassan, Rabbani, & Atif, 2021). Fintech in the form of Peer-to-Peer (P2P) lending platform is found to be one alternative option for people to borrow money during the outbreak (Najaf, Subramaniam, & Atayah, 2022).

The COVID-19 also encouraged fintech industries to make innovations as the mobility of people during the outbreak was restricted in several countries. The COVID-19 has increased daily downloads of finance-related mobile apps by 21 to 26%. This trend has mostly persisted and will result in an increase of around 900 million app downloads during the time of COVID-19. Mobile application-based services are an intriguing option for gaining access to financial services during the pandemic, given self- or government-imposed travel and social distancing restrictions, as well as the danger of contamination associated with physically handling cash (Sahay et al., 2020).

This fact encouraged academics and researchers to conduct studies by relating fintech with the COVID-19. The objective of this study is to analyze publications' metadata (sources, authors, countries, affiliations, and keywords) which are relating fintech to the COVID-19.

Literature review

This research is the first bibliometric analysis relating fintech to the COVID-19. To the best of our knowledge, no articles have discussed similar topic to this paper. This study will significantly contribute to the existing literatures by visualizing studies conducted by academics and researchers throughout the world in response to the current global pandemic. In broader academic disciplines, bibliometric analysis had been used to map and visualize such publications' metadata (sources, authors, affiliations, countries, and keywords).

By employing bibliometric analysis, (Handoko, 2020) found that halal tourism has been a topic of interest in recent years, making it a suitable topic for future research. (Hota, Subramanian, & Narayanamurthy, 2020) employed bibliometric analysis, specifically citation analysis, document co-citation analysis, and social network analysis, to unravel the structure or intellectual basis of social entrepreneurship research. They organize research on social entrepreneurship into nine separate divisions that characterize the conceptual structure of the topic. The findings provide a complete perspective on social entrepreneurship by identifying noteworthy publications and analyzing the scholarly communication between these works.

(Aminy, Fahdiansyah, & Hasanah, 2021) conducted a study employing this kind of analysis to identify the most cited author, article, journal, and institution among all Islamic economic publications indexed by dimensions.ai. In this study, the results indicated that Hafas Furqani was the most cited author, that the most cited article was "Corporate social responsibility, waqf system, and zakat system as faith-based model for poverty reduction," that Jurnal Ekonomi Syariah (JES) was the most cited journal, and that Airlangga University in Indonesia was the most cited institution. (Sithas & Surangi, 2021) conducted research on 174 publications on ethnic minority business published between 2010 and 2020. Citation analysis was used to analyse research articles in order to identify and classify the key areas of ethnic minority entrepreneurship on which the academic community is currently concentrating and doing research. (Saikia AS & Saikia US, 2020) analyzed 13,057 citations connected with 34 Chemistry PhD dissertations submitted between 2015 and 2019 to Dibrugarh University, Assam. The analysis found that more than three writers contributed 44.93 percent of the total 10,446 journal citations, while two authors contributed 22.83 percent.

Method

This research is descriptive-quantitative research with bibliometric analysis. Most researches can benefit from bibliometric analysis for a variety of reasons, including general overview of a study topic and analysis of researchers (Bjork, Offer, & Söderberg, 2014).

Bibliometrics, according to (Pritchard, 1969), is the application of mathematical and statistical techniques to books and other forms of communication. In comparison to the current definition, (Mulet-Forteza, Genovart-Balaguer, Merigó, & Mauleon-Mendez, 2019) claim that bibliometric analysis is the tool for assessing the evolution of disciplines based on their intellectual, social, and conceptual frameworks and for detecting the dominant trends. Bibliographic mapping is an essential study issue in the field of bibliometrics. (Börner, Chen, & Boyack, 2003).

Two distinguishable bibliometric aspects are the construction of the bibliometric map and the graphical representation of the map. In the bibliometric literature, the greatest concern is in the construction of the bibliometric map (Rusydiana, Sanrego, & Rahayu, 2021).

Publications in this study were extracted from the Dimensions.ai database. The extraction was processed by filtering keyword "Fintech" and "COVID-19" in the dimensions.ai website. All observed documents should have these terms within their title or abstract. After the Dimensions.ai website showed the filtered documents, all these publications should be exported using dimensions.ai feature and downloaded in "csv" format for bibliometric analysis purposes. Publications' metadata extracted for bibliometric analysis purposes are authors' names, sources, affiliations, and countries.

266 filtered papers have been downloaded and used as the observed documents in this study, ranging from the year of 2020 to 2022 with none in previous years due to the spread of COVID-19 beginning in 2020. We found 58 publications in 2020, 151 documents in 2021, and 56 documents in 2022 (still increasing as this study was conducted in May 2022).

Bibliometric mapping was performed by inserting a "csv" format file consists of 266 filtered documents into VOSviewer application. Three analyses used in this study, namely: co-authorship analysis, citation analysis, and text data mapping. Co-authorship analysis was used to rank the most collaborative authors, the most prolific authors, the most productive affiliations, and top productive and cited countries. Citation analysis was used to visualize the most cited documents and sources discussing topic of fintech related to the COVID-19 during the pandemic period. Text data mapping was used to group most occurring keywords within the whole publications.

Result and discussion

Publication type

266 documents found in this study consists of six types of publications: 166 articles (62.4%), 38 preprints (14.3%), 36 chapters (13.5%), 12 proceedings (4.5%), nine edited books (3.4%), and five monographs (1.9%).

Type of access

The publications were classified into six types of access: Open Access (191 documents or 71.8%), Closed (75 documents or 28.2%), Gold (73 documents or 27.4%), Green (45 documents or 16.9%), Hybrid (43 documents or 16.2%), and Bronze (30 documents or 11.3%).

Co-authorship analysis

Co-authorship analysis in Figure 1 showed the collaborations of authors in writing publications related to fintech and COVID-19. 24 clusters were created using VOSviewer application with the minimum of two documents written by a single author. The number of publications with this threshold reached to 56 documents in all types of publications.
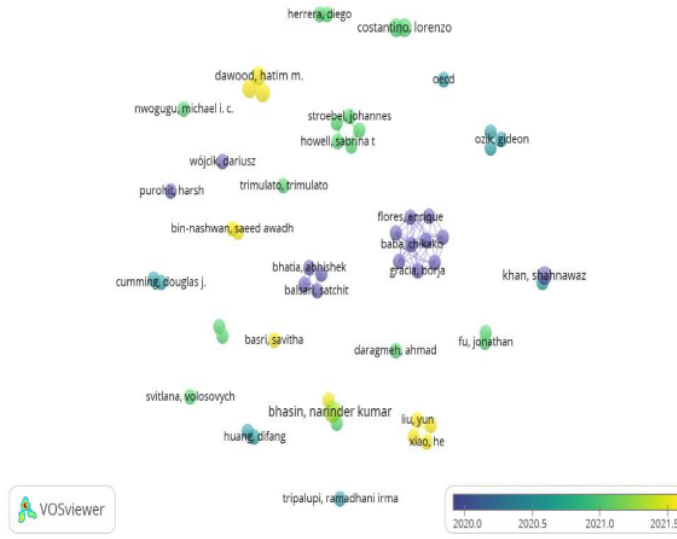
Figure 1. Co-authorship map of authors' names

The most collaborative authors were Chikako Baba, Cristina Batog, Enrique Flores, Gracia Borja, Izabela Karpowicz, Piotr Kopyrski, James Roaf, Anna Shabunina, and Xin Cindy Xu as shown in Figure 2. They were classified into cluster 1 with total link of co-authorship is eight links for each author. The number of links indicated that these authors have collaboratively produced documents with eight others in specific topic of fintech and COVID-19. The colour of link showed year of publication in 2020.
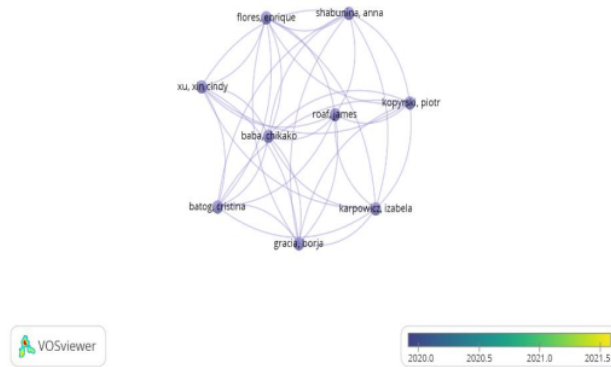

Figure 2. Co-authorship map of the most collaborative authors

With a minimum threshold of three published documents, we found that there were seven authors as the most prolific authors in this field. They are Hatim M. Dawood, Teck Chai Lau, Chee Yoong Liew, Lorenzo Costantino, Maurizio Pompella, Narinder Kumar Bhasin, and Shahnawaz Khan (n=3 for each). The nodes colours showed the year of publication. All their writings are published in 2021 and none in other years.
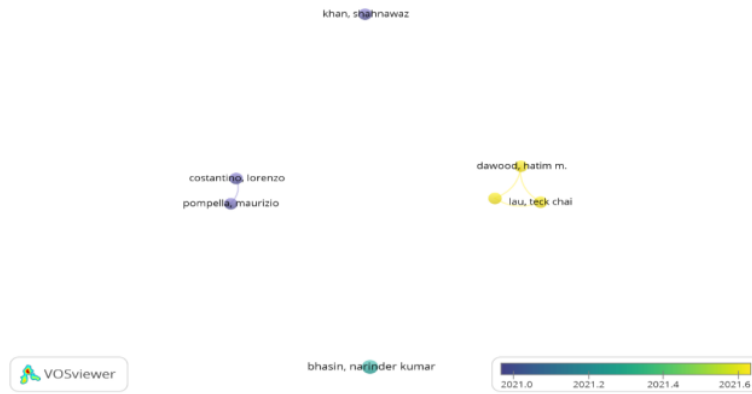
Figure 3. Co-authorship map of the most prolific authors

We also found that there were eight affiliations as the most productive institutions. They are Amity University (n=6) and Edhec Business School, Florida Atlantic University, New York University, Northern University of Malaysia, Padjajaran University, Universiti Brunei Darussalam, and University of Siena (n=3 for each).

No.	Name of affiliations	Total published documents
1	Amity University	6
2	Edhec Business School	3
3	Florida Atlantic University	3
4	New York University	3
5	Northern University of Malaysia	3
6	Padjajaran University	3
7	Universiti Brunei Darussalam	3
8	University of Siena	3

Table 1. Eight most productive affiliations

Nine countries were found to be the most active countries in producing publications related to fintech and COVID-19. The density of nodes in Figure 4 depends on number of publications produced by each participating country. Indonesia was at the top with 34 published documents, followed by United States (n=20), China (n=13), United Kingdom (n=11), India (n=11), Malaysia (n=9), Italy (n=7), Australia (n=5), Russia (n=5). Furthermore, the most cited country in this study is United States with 161 citations, while the most prolific country, Indonesia, occupied the last position with only 7 citations.
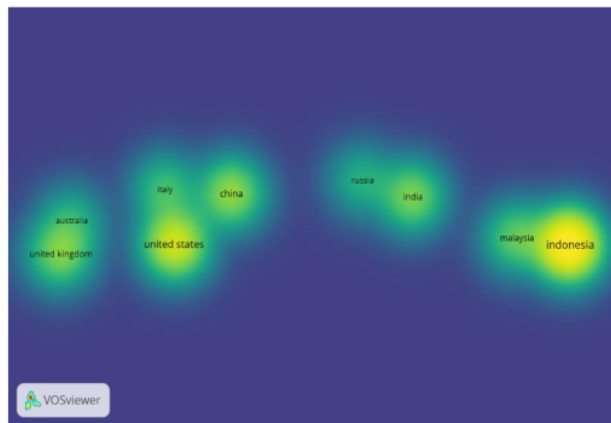

Figure 4. Density visualization of the most prolific countries

No.	Country	Total citations
1	United States	161
2	United Kingdom	149
3	China	79
4	Italy	44
5	Malaysia	34
6	India	30
7	Australia	16
8	Russia	9
9	Indonesia	7

Table 2. Nine most cited countries

Citation analysis

We used citation analysis to rank publications' metadata based on the number of citations within the dataset. Of 266 observed documents, the most cited document is an article entitled "Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lesson from the COVID-19 pandemic" with 69 citations. The following table provides 10 most cited publications within the dataset.

No.	Title of publications	Total citations	Year of publication
1	Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic	69 times	2020
2	COVID-19 and finance: market developments so far and potential impacts on the financial sector and centres	40 times	2020
3	How should we understand the digital economy in Asia? Critical assessment and research agenda	32 times	2020
4	The value of employee satisfaction in disastrous times: evidence from COVID-19	29 times	2020
5	Does fintech substitute for banks? Evidence from the paycheck protection program	25 times	2020
6	Flattening the illiquidity curve: retail trading during the COVID-19 lockdown	22 times	2020
7	Fintech in COVID-19 and beyond: what factors are affecting customers' choice of fintech applications?	19 times	2020
8	The global impact of COVID-19 on fintech adoption	18 times	2020
9	Understanding the implications of fintech Peer-to-Peer (P2) lending during the COVID-19 pandemic	18 times	2021
10	Financial transactions using fintech during the COVID-19 crisis in Bulgaria	12 times	2021

Table 3. 10 most cited documents during January 2020 to May 2022

Table 3 above showed that the majority of cited documents were published in year of 2020 (n=8 or 80%) when the global pandemic began to spread over the world. There were only two documents ranked as the top 10 most cited publications in the year of 2021, and none in 2022.

Documents retrieved as the dataset were published in several type of sources. With a minimum threshold of 20 citations, SSRN Electronic Journal with 349 citations was the most cited source among 24 others. We also found that 25 publication sources are citing one another within four clusters.
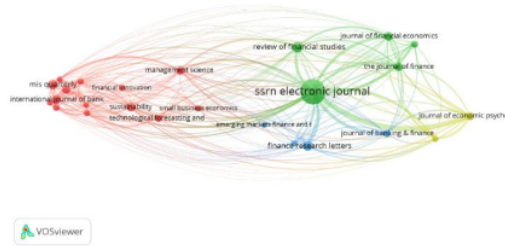
Figure 5. Network visualization of cited sources

No.	Name of sources	Total citations
1	SSRN Electronic Journal	349
2	Review of Financial Studies	63
3	Finance Research Letters	57
4	MIS Quarterly	51
5	Journal of Financial Economics	46
6	The Journal of Finance	43
7	Sustainability	43
8	International Journal of Bank Marketing	42
9	Journal of Economic Psychology	39
10	Management Science	39

Table 4. 10 top cited sources with threshold of 20 citations

Text data mapping

Text data mapping aims to visualize keywords frequently used by publications in the dataset. With a minimum threshold of 20 co-occurrences, we found that there were 50 most co-occurring keywords classified into five clusters.
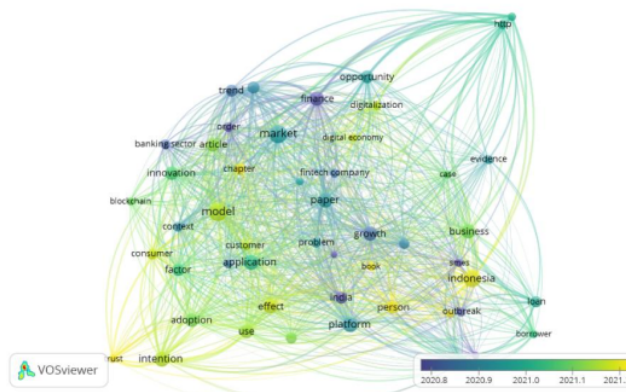

Figure 6. Text data mapping of keywords

Cluster one consisted of "application", "artificial intelligence", "blockchain", "book", "chapter", "china", "digital economy", "emergence", "financial inclusion", "government", "growth", "india", and "problem". Cluster two consisted of "adoption", "banking sector", "consumer", "context", "customer", "effect", "factor", "innovation", "intention", "model", "trend", "trust", and "use". Cluster three consisted of "borrower", "business", "indonesia", "loan", "msmes", "outbreak", "p2p", "peer", "person", "platform", and "smes". Cluster four consisted of "article", "finance", "fintech company", "market", "opportunity",

"order", "paper", and "regulation". Cluster five consisted of "digitalization", "evidence", "http", and "org".

The colours of links and nodes showed year of publications for these keywords, while the size of dots determined number of occurrences within the dataset. The year of publications is ranging from 2020 to 2021, and three most occurring keywords in the dataset were "model" (n=117), "market" (n=111), and "Indonesia" (n=110).

Discussion

This paper attempts to map and visualize metadata from studies relating fintech with the COVID-19 as the global pandemic. By filtering with two specific keywords, namely "Fintech" and "COVID-19" sourced from the Dimensions.ai website, we found 266 publications were relevant to be the observed documents in this research, ranging from January 2020 to May 2022.

There were several findings in this study. First, publications with topic of fintech and COVID-19 were most found in the form of articles (n=166 or 62.4%). This indicates academics and researchers were interested to conduct studies and publish their findings in articles instead of other type of publications (preprints, chapters, proceedings, edited books, or monographs). Second, we found that most publications can be freely accessed by readers. It was proven by Open Access (OA) which dominated the type of access for general readers (n=191 or 71.8%). Third, the most productive country in publishing documents related to fintech and the COVID-19 was Indonesia with 34 documents, followed by United States in the second position, China, United Kingdom, India, and other countries. Interestingly, the most cited country is United States with 161 citations, while Indonesia as the most prolific country was ranked at the last position with only 7 citations. It means that Indonesian researchers were more concerned with this phenomenon compared to authors from other countries, but have low dissemination and readability of publications.

Fourth, an article entitled "Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lesson from the COVID-19 pandemic" as the most cited document indicated that most researchers were interested to conduct studies on the relationship between SMEs, fintech, and COVID-19. Fintech can be alternative financing for SMEs in Indonesia during the COVID-19 pandemic (Rasidi, Budi, & Hatmoko, 2021). Fifth, SSRN Electronic Journal was the most cited source with 349 citations. SSRN Electronic Journal published preprints or non-peer-reviewed articles. Surprisingly, only 38 preprints (14.3%) are included in the dataset. This finding suggested that preprints have more citations than peer-reviewed articles of one journal in this study.

Sixth, several keywords appearing in cluster three: "borrower", "indonesia", "business", "loan", 'msme", "outbreak", "p2p", "peer", "person", "platform", "smes" which indicates research on fintech during the COVID-19 in Indonesia was predominated by the relationship of fintech, in the form of Peer-to-Peer (P2P) lending platform, with MSMEs, SMEs, and people in general. This finding suggested that research in Indonesia is to explore the impact of fintech on MSMEs, SMEs, and individual financial condition during the COVID-19. Cluster one provides several keywords: "application", "artificial intelligence", "blockchain", "book", "chapter", "china", "digital economy", "emergence", "financial inclusion", "government", "growth", "india", "problem" which indicates research in China and India was more focused on developing technology

implemented into fintech industries during the COVID-19. Seventh, three countries were appeared in the keywords: "indonesia", "china", and "india". Research on fintech during the COVID-19 was more popular in Indonesia, China, and India compared to other countries.

Conclusion

Based on the findings of this study, there were several facts discovered by employing a bibliometric analysis. The results were involving publications' metadata in terms of authors, sources, affiliations, countries, and keywords. Of 266 documents retrieved and grouped as the dataset, we found the most prolific and collaborative authors, the most productive and cited countries, and topics of fintech related to the COVID-19. We also found that research in Indonesia was more focused on the relationship of fintech with people and SMEs financial condition, while in research in China and India was more concerned on the development of technology applied within fintech services.

This study provides broader picture on the current studies of fintech undertaken by researchers and academics, presenting several findings which may be beneficial for further research. We recommend further researchers in Indonesia to conduct more studies on how to develop more advanced technology in fintech industries instead of only focused on the relationship between fintech with people and Small Medium Enterprises. This needs to be carried out to fill in the gap between studies of fintech in Indonesia with other countries.

Acknowledgement

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