Article

Fintech As a Financial Disruptor: The Bibliometric Analysis

Zhamal **Nanaeva * and** Ahmet F. **Aysan ***
Hamad bin Khalifa University, QA
* Correspondence: zhna33940@hbku.edu.qa, aaysan@hbku.edu.qa

Abstract: The present-day financial system is being influenced by the rapid development of Fintech (financial technology), which are technologies created to improve and automate traditional forms of finance for businesses and consumers. The topic of Fintech as a financial disruptor is gaining popularity in line with the swift spread of digitalization across the banking industry, whereby this paper contributes to the field by presenting a novel bibliometric analysis of academic literature related to Fintech as a financial disruptor. The analysis is based on metadata extracted from the Scopus database through the VOSviewer and Biblioshiny software. The bibliometric analysis of 363 documents identified the most impactful sources of publication, keywords, authors, and most cited documents on the topic of Fintech as a financial disruptor. As our analysis demonstrates the number of publications on the given topic increases, defining both the interest among academia and potential for future research.

Keywords: Fintech, disruption, transformation, bibliometric analysis

1. Introduction

Fintech, short for financial technologies, can be defined as exploiting innovative technologies to deliver financial services (Cai, 2018). The term is broad and suggests a digital product, a startup or even a legacy provider (PwC, 2016). Fintech has gained momentum in the last quarter of the 20th century and has been rapidly expanding across the globe. The outbreak of the COVID-19 pandemic, while negatively affecting many industries, became a catalyst for the rapid digitalization of various businesses, including financial services. According to Deloitte (2020), the pandemic contributed to the generation of the second wave of development and penetration of new financial technologies into traditional sectors. Since September 2018, the performance of Fintech company shares has outperformed their traditional counterparts, and the gap has increased significantly since the outbreak of COVID-19 (Deloitte, 2020). According to Statista (2021),

 doi:10.20944/preprints202212.0015.v1

total investments in Fintech reached USD 33.9 billion by the first quarter of 2019. Moreover, almost 75% of global consumers had some interaction with Fintech in 2019 (Statista, 2021), while Deloitte (2020) predicts that the global revenue of Fintech companies will grow by 11.7% from 2019 to 2024.

The rapid expansion of Fintech companies has been achieved by successfully targeting unbanked customers, which incumbent financial institutions often overlook. At the same time, through the digitalization of financial services, Fintech has been targeting a broader customer base through providing more convenient, diverse, and affordable financial services. Thus, innovation and new business models have allowed Fintech to spread across the industry and enter the customer segment of the existing financial service providers. Hence, Fintech represents an excellent illustration of the disruptive innovation theory, introduced by Clayton M. Christensen in 1995 (Christensen & Euchner, 2015). According to this theory, disruptive innovation is a process that occurs when a small enterprise with limited resources enters the market by targeting customers neglected by incumbents. In doing so, the small enterprise adopts innovative solutions and gradually expands its customer base into the business of the incumbent enterprise (Christensen & Euchner, 2015).

Similarly, Fintech creates a customer-centric environment, disrupting the traditional product orientation of incumbent banks (Siek & Sutanto, 2019). According to Deloitte (2021), Fintech already laid the ground for further successful industry disruption, whereby 86% of financial institutions believe that Fintech threatens various areas of their business (Lee & Shin, 2018). Moreover, Gomber et al. (2018) argue that drastic changes in financial services signal a looming financial revolution. Technology innovation, process disruption, and transformation of services are the main driving forces behind such a revolution (Gomber et al., 2018). Recent rapid advancement of Metaverse adds to further technological and financial disruption (Sahni & Lyne-Smith, 2022). Anticipating the growing interest in academia to research the disruption of the incumbent financial system by the rapid advancement of Fintech, this paper aims to identify the scope, the main contributors and sources shaping the research in the field of Fintech.

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The paper conducts a bibliometric analysis to approach the topic of the Fintech as a financial disruptor. Bibliometric analysis is a relatively new research method which has gained popularity in several academic fields, including finance. It is part of a broader scientometrics discipline, which can be defined as the study of quantitative features of science and scientific research (Biancone et al., 2020). A methodology of the bibliometric analysis implies processing of bibliometric data, such as sources of publication or documents, using quantitative techniques (Donthu et al., 2021). The bibliometric analysis allows for better envisioning and grasping of the research topic through the systematization of relevant academic literature (Aria & Cuccurullo, 2017). Consequently, the researcher can effectively sort the information through visual mapping of the published literature. Moreover, this type of analysis allows for the easy identification of critical research trends, the most cited authors, and papers within the large pool of academic publications in any given subject.

The range of newly developed and specialized software allows for the convenient and effective execution of bibliometric analysis. The open-source bibliometrix R-package, used in this paper, allows data analysis to be run and provides data visualization through different types of mapping (Aria & Cuccurullo, 2017). It offers various statistical and graphical techniques to analyze existing academic literature, for example, the presentation of scientific collaboration units can be performed by citation and co-citation analysis (Janik et al., 2020).

VOSviewer is another software that can help with the visualization of bibliometric analysis results. This software works with different data sources and generates data-reflecting images with various features. The software organizes data into clusters represented by the nods and connected lines (Janik et al., 2020). VOSviewer's clustering technique is based on the local smart moving algorithm introduced by Waltman and Van Eck (Janik et al., 2020). This algorithm allows for the construction of connected networks based on the selected data. Generated by the software, the networks of authors, citations and countries are

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presented as maps. This paper used Biblioshiny (the lighter version of bibliometrix R-package) to generate figures and VOSviewer (version 1.6.16) for mapping presentations to perform comprehensive bibliometric analysis.

The growing number of scholarly publications on the subject of Fintech has generated several bibliometric analyses. While some studies have covered the literature on Fintech in general (Wu, 2017, Chen & Peng, 2019, Sarhan, 2020), a growing number of bibliometric analysis concentrates on specific areas of Fintech, such as Fintech regulations (Lakhe & Kulkarni, 2020), crowdfunding (Martínez-Climent et al., 2018, Buttice & Ughetto, 2021), Fintech and Islamic finance (Aysan et al., 2022; Abubakr & Aysan, 2022) and cryptocurrencies and blockchain (Firdaus et al., 2019; Jiang et al., 2021; Nasir et al., 2021; Dosso & Aysan, 2022; Aysan et al., 2021). Nevertheless, to the best of the authors' knowledge, academic literature on Fintech as a financial disruptor has not been reviewed bibliometrically. Consequently, at the time of writing this work, it has been the first one to present bibliometric analysis on the given topic, contributing towards the originality of the work. This paper attempts to fill this gap by exploring the extant literature on Fintech as a disruptor and transformer of the incumbent financial system. Through the analysis performed on Biblioshiny and VOSviewer the paper attempts to answer the following research questions: what is the scope of the academic literature on the given topic; what are the main contributors towards the given topic; what are the main trends within the given topic. The authors believe that the topic of Fintech as a financial disruptor is emerging but promising area of the research and the paper can be a good starting point in this endeavour.

The paper is organized as follows. Section 2 discusses the data collection and methodology. Section 3 presents the results of the bibliometric analysis, including an overview of extant literature, document types, trending words, and evaluation of authors' impact. A discussion of the results of the bibliometric analysis as well as the conclusion are followed in section 4.

2. Methodology and data collection

2.1 Data collection

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To conduct the bibliometric analysis the authors chose the Scopus database due to its robust reputation as a leading multidisciplinary abstract and citation database. Scopus, which is part of a larger Elsevier analytics and information company, provides easy access to academic peer-reviewed publications, including books, journals and conferences. Metadata used in this paper can be defined as basic summarized information about the data (Opendatasoft, 2016). The publishers provide metadata, which includes the author(s), affiliation(s), document title, year, electronic identification (EID), source title, volume/ issue/ pages, citation count(s), source, document type, digital object identifier (DOI), among others. According to the Elsevier website, the Scopus content repository stores 3.7TB of data, corresponding to 1.4 billion cited references. Considering the above mentioned information, Biancone et al., (2020) state that the Scopus database provides a quality and reliable basis for the bibliometric analysis .

The bibliometric analysis in the paper represents a snapshot of the research data on the topic of Fintech as a financial disruptor, as retrieved on February 24th, 2021. To collect the applicable data, the following keywords were entered into the Scopus database: “Fintech” OR “FinTech” OR “Financial technologies” AND “Disrupt*” OR “Transform*.” Asterisk (*) was added after the words “disrupt” and “transform” to allow for a wider variety of these words. The search was conducted on titles, abstracts and keywords of published articles in the Scopus database. All types of documents, such as articles, book chapters, conferences papers, books and reviews, were included in the analysis. Publications were limited to those published in English in their final publication stage. The output dataset of 363 documents was extracted in .cvs format to run analysis in VOSviewer, and in .bib format for analysis in Biblioshiny.

2.2 Methodology

To answer the research question, the paper employs three types of the techniques of the bibliometric analysis: performance analysis, science mapping, and network analysis (Donthu, 2021). The performance analysis defines the contribution of research factors (authors, journals, countries) towards the topic of Fintech as a financial disruptor based on the number of relevant publications and citations (Donthu, 2021). This technique defines the most cited or productive journals, authors, papers. Applying the science mapping

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technique, the paper demonstrates the relationship among different research factors on the given topic. This technique defines the relationship among publications, foundational themes and relationship among the topics, employing citation and co-citation analysis, co-word and co-authorship analysis among others (Donthu, 2021). Finally, the last technique, network analysis, allows to visualize various results through clustering and network metrics. The following diagram (Figure 1) demonstrates the methodological process of data extraction and bibliometric analysis.

	Data mining and extraction	
	Scopus	Entering the keywords (“Fintech” OR “FinTech” OR “Financial technologies” AND “Disrupt*” OR “Transform*)
		363 documents were extracted
Tools		
Process		**Bibliometric Analysis**
Outcome		Performance analysis
	Scopus	Total publications
	Scopus	Number of active years of publications
	Scopus	Number of contributing authors
	Scopus	Productivity per active year of publication
	Scopus	Total citaion
	Scopus	Collaboration index
	Scopus	Number of cited publicaitons
	Biblioshiny	h-index
		Science mappinig
	Biblioshiny	Relationship among publications
	Biblioshiny	Most influential publications
	Biblioshiny	Foundational themes
	Biblioshiny	Exisitng or future realtionship among topics
	Biblioshiny, Vosviewer	Written content (words)
	Biblioshiny, Vosviewer	Realtionships among authors
	Biblioshiny, Vosviewer	Authors and author affiliations
		Network analysis
	Biblioshiny	Degree of centrality
	Vosviewer	Clustering
	Vosviewer	Visualization

Figure 1. Overview of the working process

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The results of the bibliometric analysis and discussion around these results are presented in the following sections.

3. Results of the bibliometric analysis

The number of the extracted documents might not be large due to the novelty of the given topic; however, the publications of bibliometric analysis conducted on similar emerging topics such as Open Banking and Non-Fungible Tokens prove that the scope of the documents is sufficient (Briones de Araluze & Cassinello Plaza, 2022; Nobanee & Ellili, 2022). The conducted search resulted in 363 documents, which represented 18% of publications related to Fintech as identified when searching for keywords of "Fintech" OR "financial technology" (1,963 publications). The resultant number reflects the substantial academic interest on the topic of Fintech as a financial disruptor. The general information about collected data is presented in Table 1, which shows that most of the identified documents are articles (46% of all documents) and conference papers (33%). Books constitute only 2% of all documents, which might indicate the relative novelty of the topic.

Table 1. Main information about the data, timespan 1984-2021

Description	Results
Document types	
Article	166
Book	9
Book chapter	39
Conference paper	120
Conference review	4
Editorial	6
Review	19
Document contents	
Keywords Plus (ID)	1207
Author's Keywords (DE)	1029
Authors	
Authors	896
Author Appearances	970
Authors of single-authored documents	83
Authors of multi-authored documents	813
Authors collaboration	
Single-authored documents	91
Documents per Author	0.405
Authors per Document	2.47
Co-Authors per Documents	2.67
Collaboration Index	2.99

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Source: Scopus, elaborated in Biblioshiny

While no restriction was applied to the timespan of the published documents, the results yielded documents with the combination of words shown in section 2.2 from 1984 to 2021. According to the Scopus search results, the earliest article which included the terms "Fintech" and "disruption" / "transformation" was "Meeting the challenge of Fintech startups: The development of dynamic capabilities at incumbent banks" by Muthukannan and Gozman,(1984). The next paper was by Seibel & Khadka titled "SHG banking: A financial technology for very poor microentrepreneurs", published in the journal Savings and Development (Seibel & Khadka, 2002). At this early stage from 1984 to 2016, the number of publications was insignificant, after which their quantity started to increase and reached its peak in 2020 (Figure 2). Despite a slow start, the annual growth in the number of publications accelerated after 2016 and almost doubled in 2020 on a year-on-year basis.

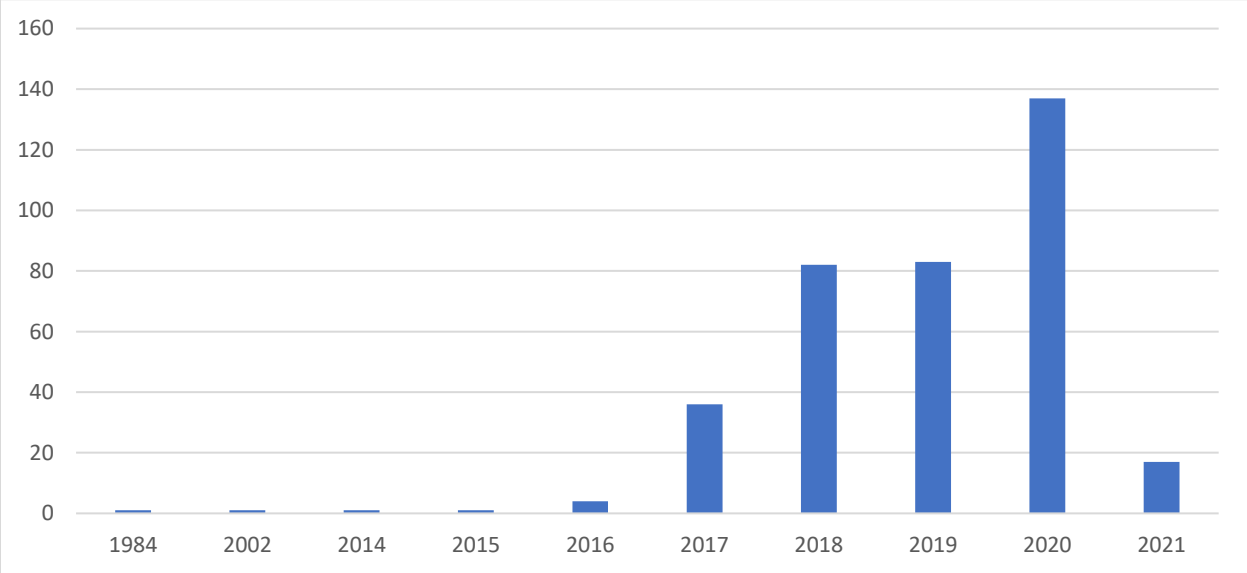

Figure 2. Annual scientific production
Source: Scopus, elaborated in Excel

3.1. Analysis of the sources of publications

Areas of publications

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As anticipated, the subject of Fintech as a financial disruptor is diverse and includes various areas (see Table 2). The majority of publications (22%) are in the area of Computer Science, followed closely by Business, Management and Accounting (19%), and Economics, Econometrics and Finance (13%). This distribution confirms PwC's definition of Fintech being a combination of technology and financial services, where it is difficult to define where the technology ends and financial services begin (PwC, 2016).

Table 2. Subject areas of the publications

Subject area	# of results	%
Computer Science	165	0.22
Business, Management and Accounting	144	0.19
Economics, Econometrics and Finance	98	0.13
Social Sciences	80	0.11
Engineering	77	0.10
Decision Sciences	51	0.07
Mathematics	31	0.04
Environmental Science	27	0.04
Energy	24	0.03
Biochemistry, Genetics and Molecular Biology	6	0.01
Earth and Planetary Sciences	6	0.01
Pharmacology, Toxicology and Pharmaceutics	5	0.01
Physics and Astronomy	5	0.01
Materials Science	4	0.01
Multidisciplinary	4	0.01
Psychology	4	0.01
Others	12	0.02

Source: Scopus, elaborated in Excel

Most cited sources of publication

Figure 3 presents the twenty most cited sources of publications about Fintech as a financial disruptor. The three most cited sources are the Journal of Management Information Systems, Management Information Systems Quarterly (MIS Quarterly) and Harvard Business Review, each with more than 60 citations in this analysis. The first two journals cover research in management information systems and information technologies, once again defining Fintech as "technology" rather than "finance." Overall, the publication of documents in reputable journals such as Harvard Business Review and Journal of Management Information Systems confirms the interest of academia in the given topic.

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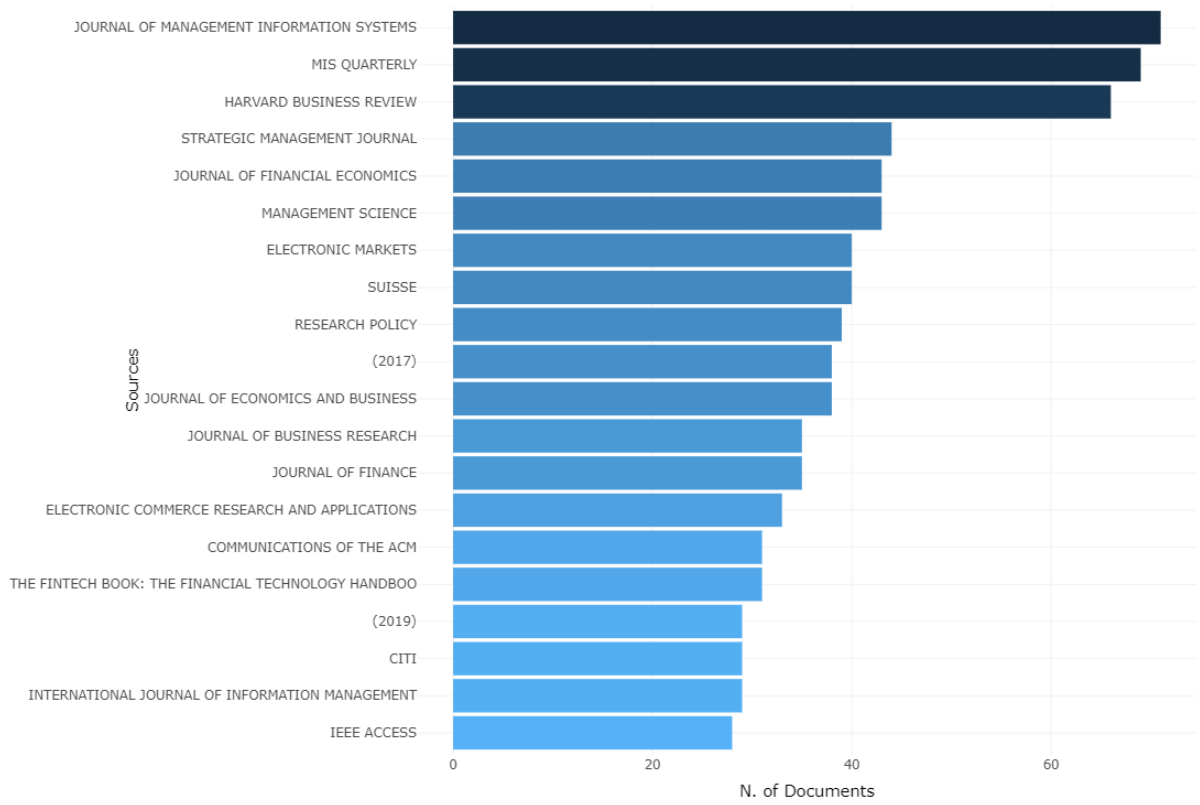

Figure 3. Most cited sources of publications
Source: Scopus, elaborated in Biblioshiny

Most productive sources of publication

Figure 4 presents the twenty most productive sources of publications with the largest number of documents on the given topic. Interestingly, the most cited sources (as shown in Figure 2) are not included in Figure 3. For example, the most cited source, Journal of Management Information System, published only two documents on the given topic. However, it was cited in 71 papers. On the other hand, ACM International Conference Proceeding Series published 11 articles on the chosen topic but has been cited in only one document. Hence, the quantity of publication does not necessarily reflect the number of citations.

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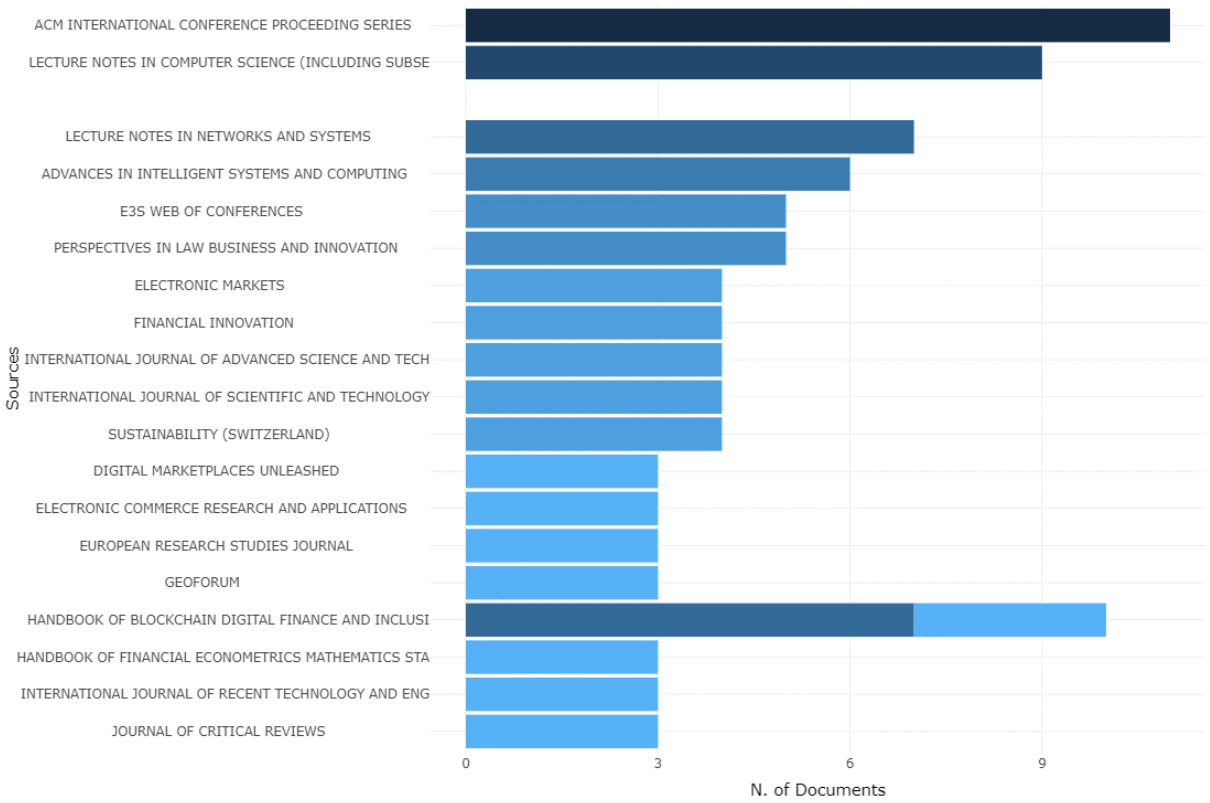

Figure 4. Most relevant sources
Source: Scopus, elaborated in Biblioshiny

3.2. Analysis of the documents

Most cited documents

Figure 5 presents the list of the most cited documents on Fintech as a financial disruptor. The most cited article was by Lee and Shin, "Fintech: Ecosystem, business models, investment decisions, and challenges" (Lee & Shin, 2018). The article was published in 2018 in the Business Horizons journal, and generated 128 citations. The article discusses different Fintech business models as well as the challenges of Fintech startups and incumbent financial institutions. The second most cited article (with 126 citations) is "On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services" by Gomber, Kauffman, Parker and Weber (2018).

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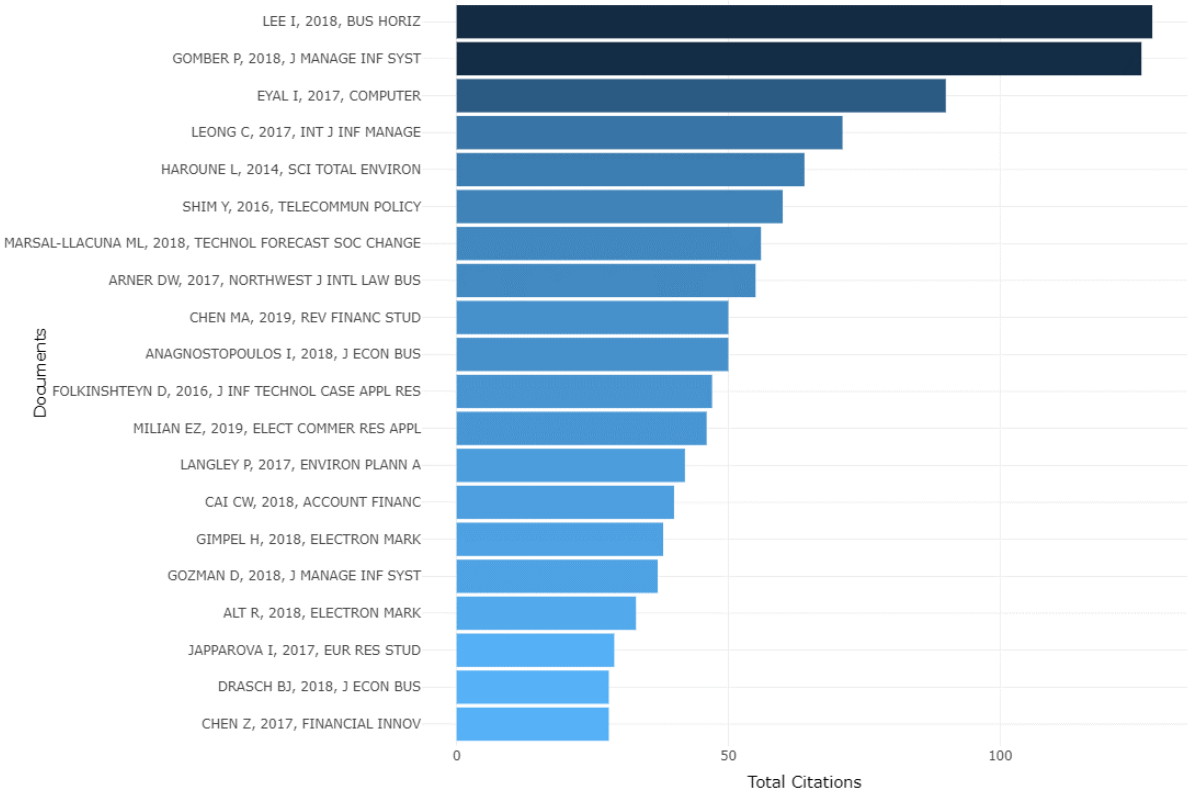

Figure 5. Most cited documents
Source: Scopus, elaborated in Biblioshiny

VOSveiwer map of document citations (Figure 6) groups the 73 most cited documents into 17 clusters. The size of the bubble illustrates the number of citations, while its color refers to the year in which the document was published. As mentioned earlier, the most cited documents of Lee and Shin (128 citations) and Gomber et al. (126 citations) were published in 2018, which allowed sufficient time to produce a high number of citations. The earliest of the most cited documents is “How signaling and search costs affect information asymmetry in P2P lending: the economics of big data” by Yan J. et al., which was published in 2015, generating 28 citations (Yan et al., 2015). The most recent of the most cited documents is “Blockchain disruption and decentralized finance: The rise of decentralized business models” by Chen and Bellavitis, which was published in 2020 in the Journal of Business Venturing Insights, and has already gained 23 citations.

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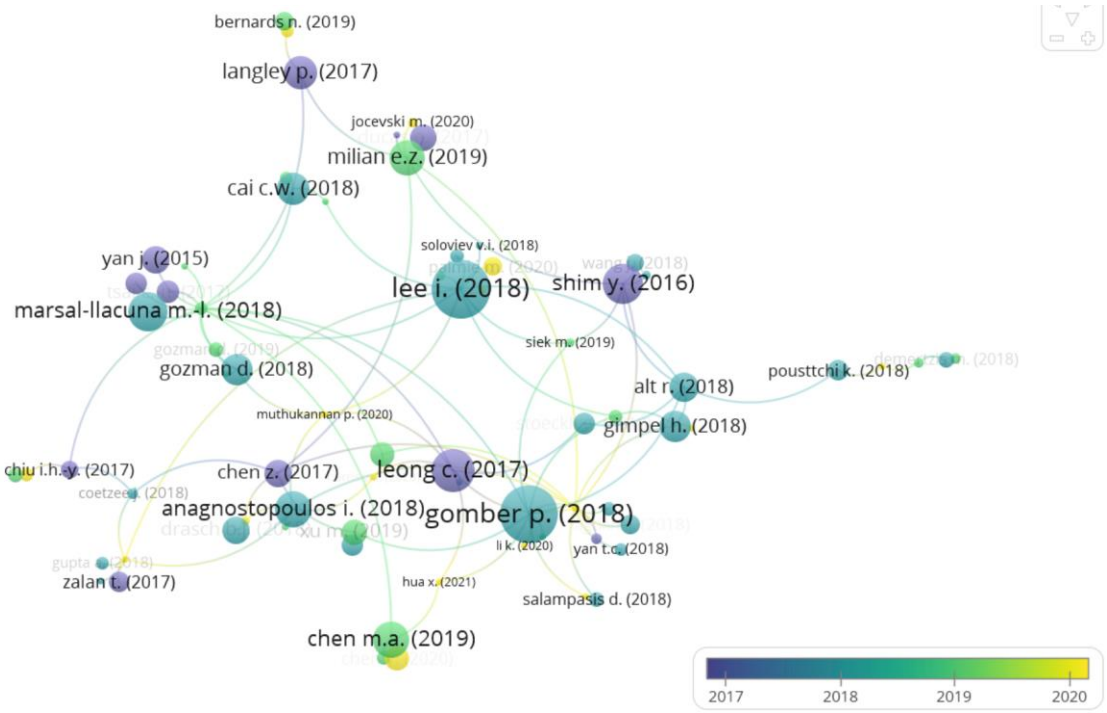

Figure 6. Citations of the documents
Source: Scopus, elaborated in VOSviewer

Most used keywords

Figure 7 presents the 20 words most frequently used by the authors. As expectedly, the word “Fintech” was the most popular, with a frequency of 155 (25%). “Blockchain” and “digital transformation” followed with corresponding frequencies of 53 and 22 (8% and 3%). The words “disruption,” “disruptive innovation,” and “digital disruption” were not used frequently and together comprised 3% of the 20 most frequently used words. The analysis of the most frequently used words indicates that despite certain interests, there is a scope for further academic research in the area of Fintech as a financial disruptor.

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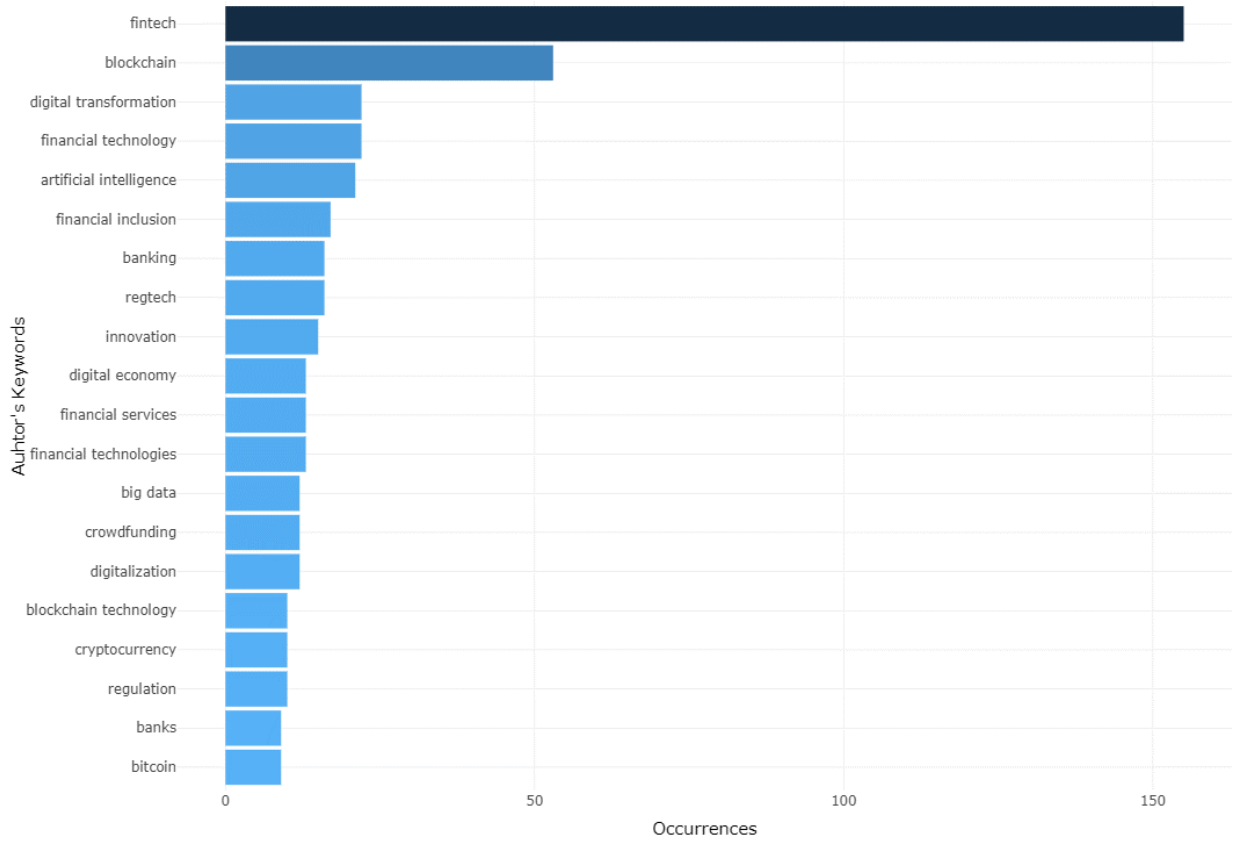

Figure 7. Most frequented author's words
Source: Scopus, elaborated in Biblioshiny

VOSviewer's map of weighted occurrence of authors' key words is presented in Figure 8, which clusters the 50 most popular key words used by the authors. The words "fintech," "blockchain" and "digital transformation" are indicated as the most popular. The map's color scheme allows for tracking changes in the popularity of the words over time. Thus, such words as "financial services," "disruption" and "big data" were popular before 2018, but since, the popularity is shifting away from "crowdfunding," "blockchain" and "innovation" towards "digital economy," "financial inclusion," and "artificial intelligence." This tendency might reflect the shift in academia and industry interests towards broader and more social-oriented impacts of Fintech on the economy and society.

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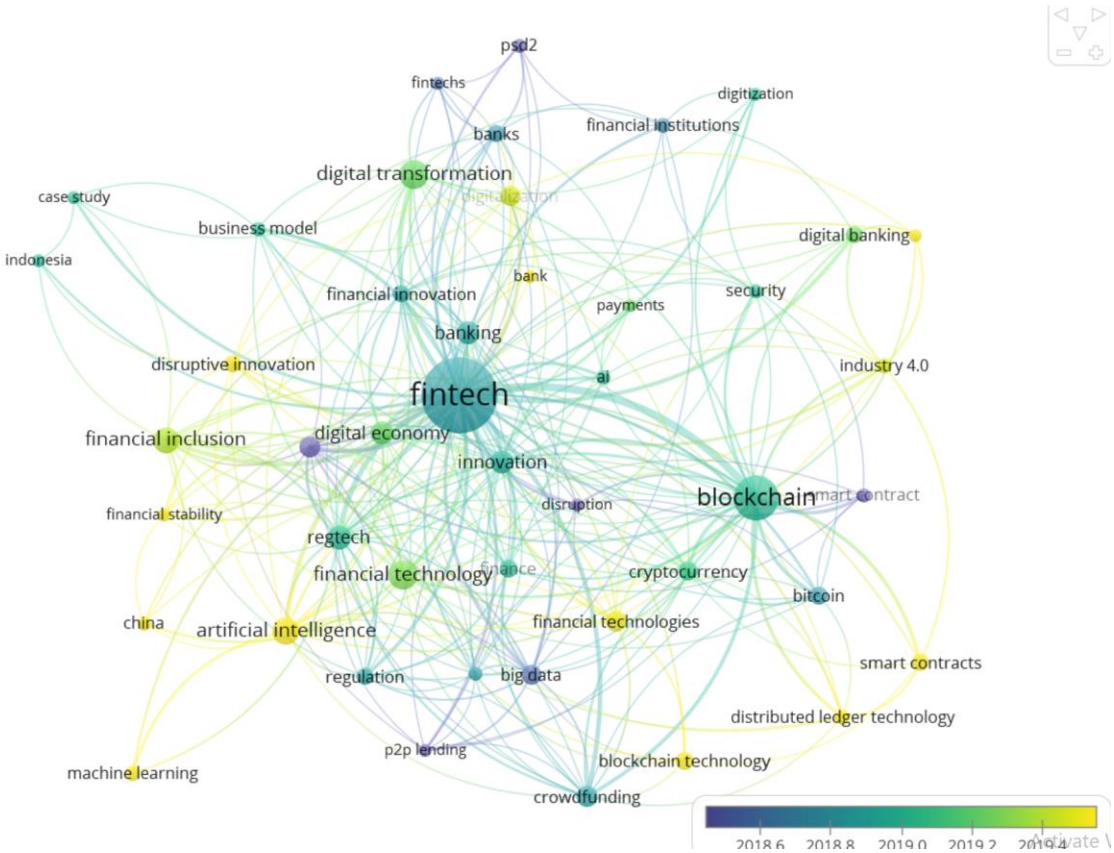

Figure 8. Weighted occurrences of the words
Source: Scopus, elaborated in VOSviewer

Most trending topics related to Fintech as a financial disruptor

Biblioshiny produces similar outcomes for the most trending topics, which are illustrated in Figure 9. By defining the frequency of word use in the documents published each year, the software produces the spread of the most popular themes. As can be seen in Figure 8, the interest of academia seems to be shifting from "fintech disruption" and "PSD2" (Payment Services Directive 2) in 2018 towards "digital transformation" and "disruptive innovation" in 2020. The relative popularity of the word "PSD2" can be explained by the fact that PSD2 regulations came into effect in the EU in 2018. Another observation concerns the shift from more general terms, such as "financial institutions" and "financial services," to more specific terms such as "blockchain technology" and "artificial intelligence." "Fintech" and "blockchain" have been the two most popular topics in the last few years (2018-2020).

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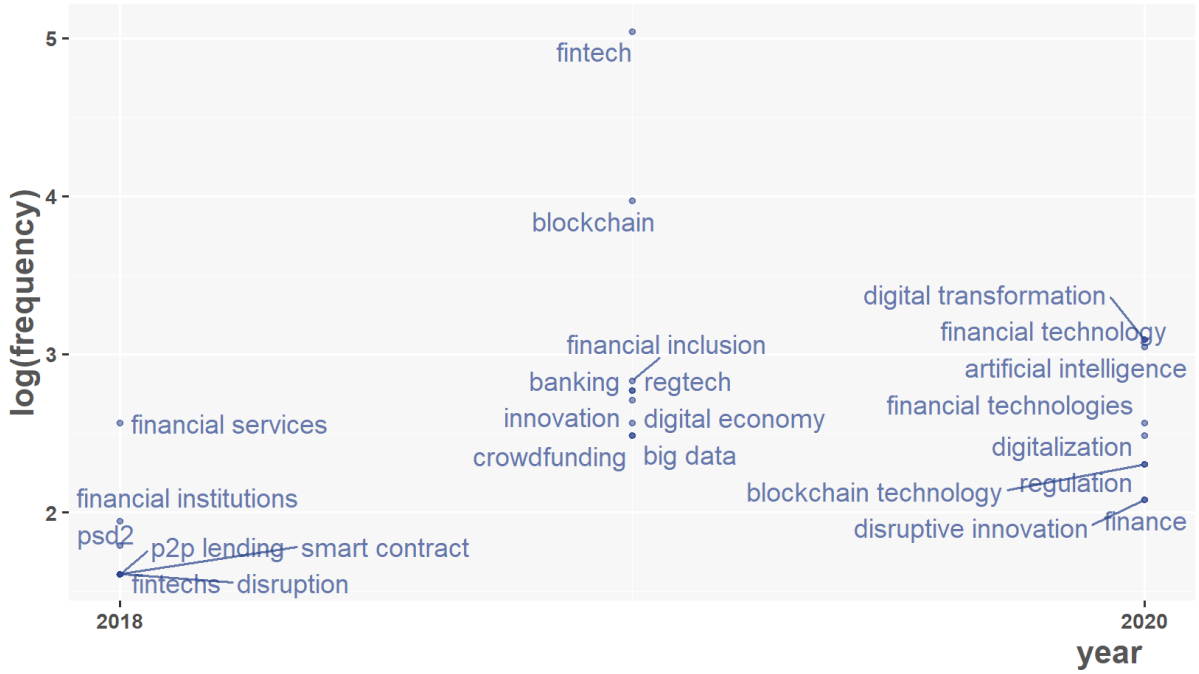

Figure 9. Trend topics
Source: Scopus, elaborated in Biblioshiny

Figure 10 demonstrates the annual occurrence of the ten most popular keywords in this analysis. The word "fintech" has had a steep and steady growth since 2010; "Blockchain" follows with a steady but less steep increase since 2011; although the occurrence of "Digital transformation" and "artificial intelligence" increased up to 2012, their growth has since flattened out.

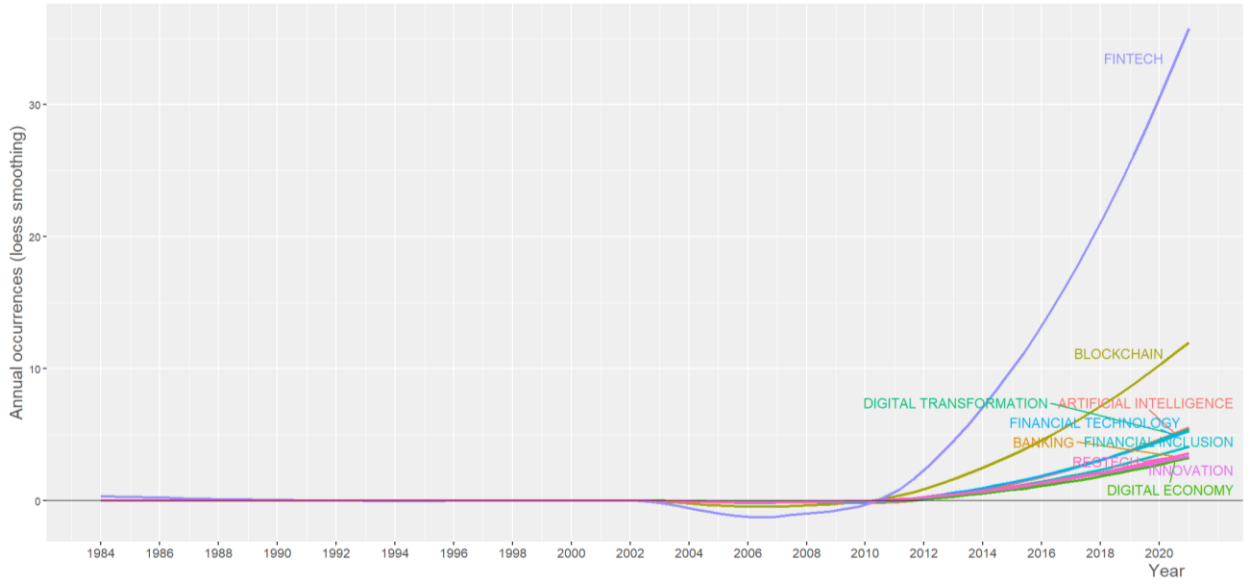

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Figure 10. Word growth
Source: Scopus, elaborated in Biblioshiny

Figure 11 presents a thematic map of the conceptual structure of the keywords. Biblioshiny defines different themes using the clustering algorithm of the network of keywords. Centrality in the map depicts the importance of the theme, while density defines the level of the theme's development. Consequently, the clusters "fintech," "banking" and "digital transformation" are the basic themes on the defined topic, and whose importance requires further development. "Decision making" and "service industry" are the niche and isolated clusters with minimal importance for the defined topic. "Artificial intelligence" is a motor-theme, which can be defined as important as well as well-explored.

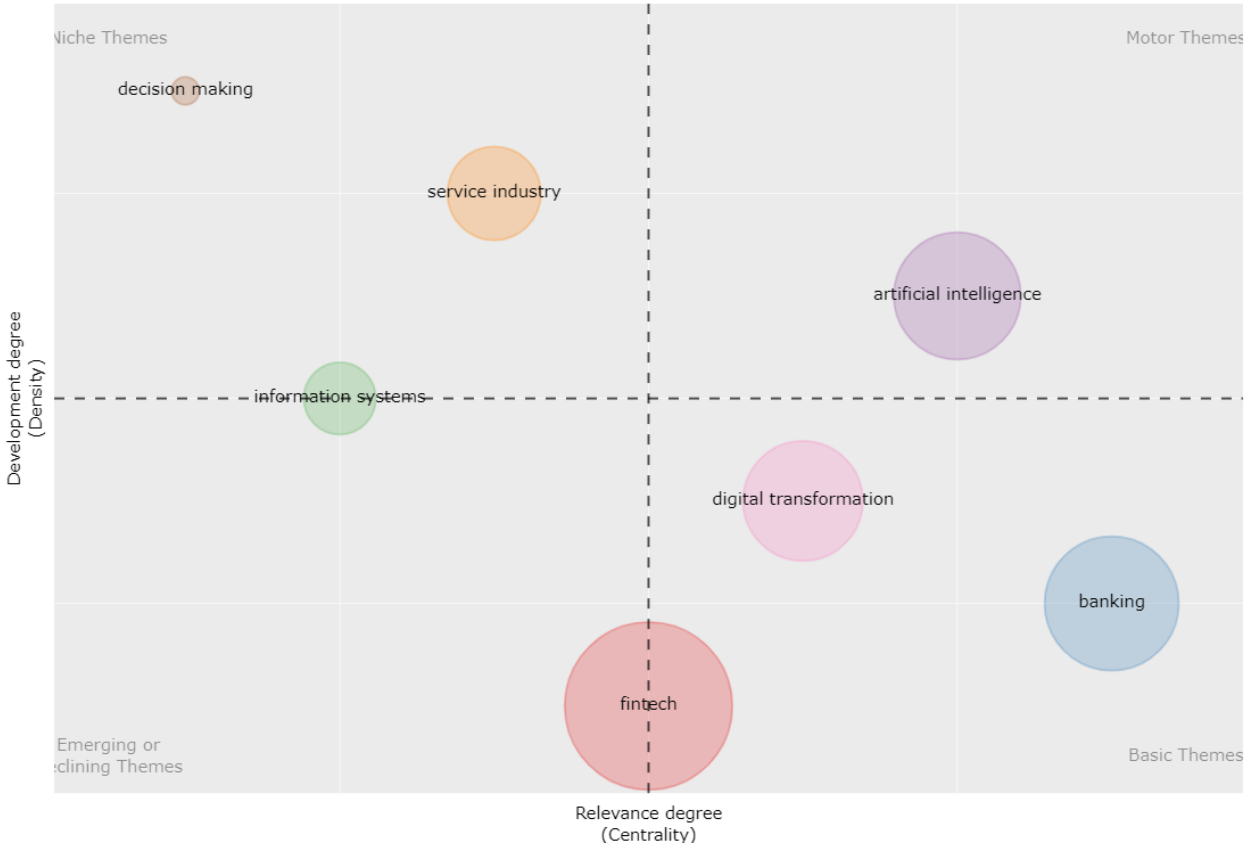

Figure 11. Thematic map
Source: Scopus, elaborated in Biblioshiny

3.3. Analysis of authors

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The most productive and most cited authors

This section discusses the results of the bibliometric analysis of authors published on the defined topic. As demonstrated in Figure 12, the most productive authors are Gozman D. and Lee Kuo Chuen, each with five publications in the defined topic. They are followed by Bataev A., Fenwick M., and Na Na, with four publications each.

The most cited authors, Lee I., Shin Y. and Kaufmann R. J., are presented in Table 3. As mentioned earlier, Lee and Shin's paper "Fintech: Ecosystem, business models, investment decisions, and challenges" (Lee & Shin, 2018) is the most cited document on the topic of Fintech as a financial disruptor.

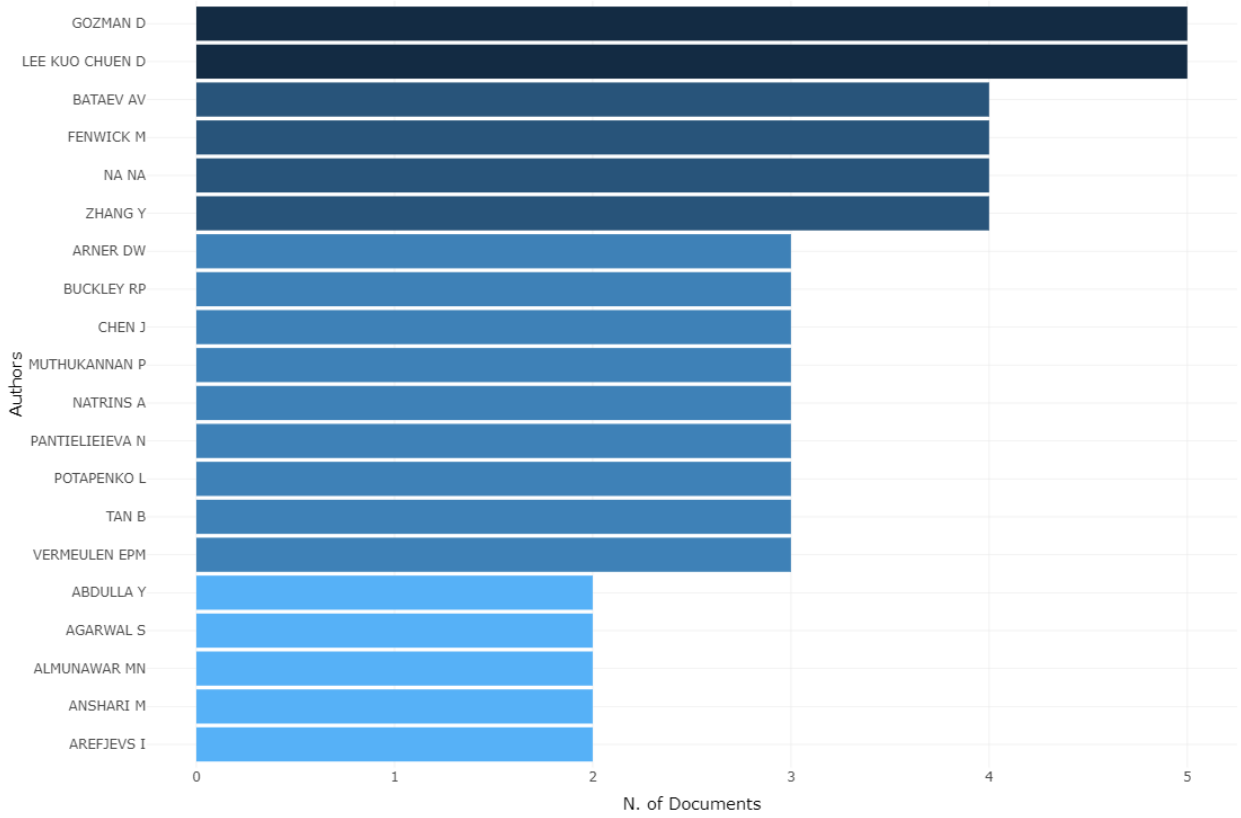

Figure12. Most relevant authors

Source: Scopus, elaborated in Biblioshiny

Figure 13 shows the VOSviewer graph with the most cited authors, the number of citations per author and the connection among these citations. The 29 most globally cited authors are presented as a network of 19

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clusters with 1,446 links. Lee Kuo Chuen, Gozman D. and Zhang Y. have the heaviest presence on this map, reflecting their high number of citations.

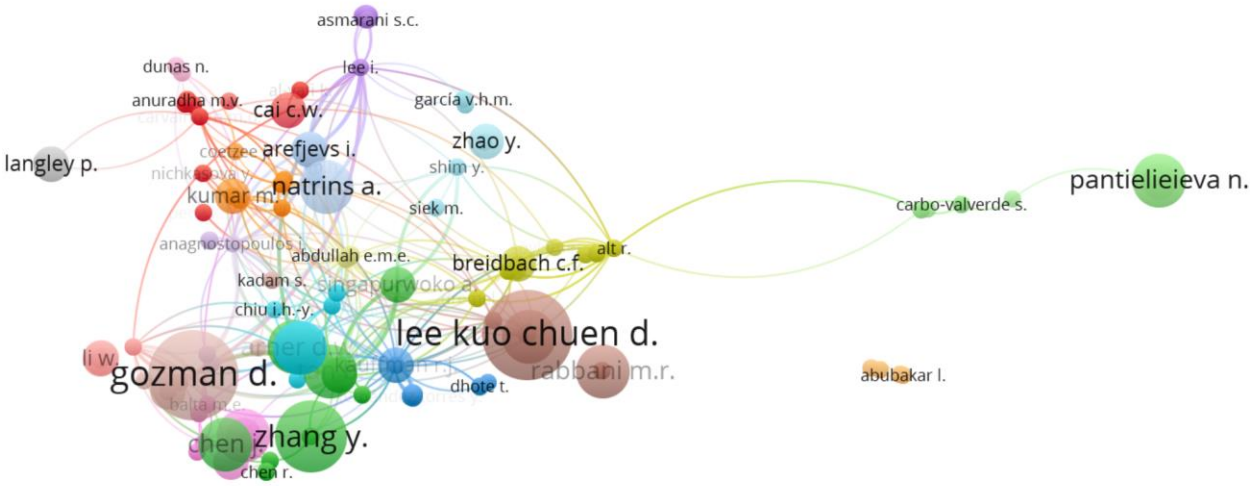

Figure 13. Most globally cited authors
Source: Scopus, elaborated in VOSviewer

Authors' h-index

Figure 14 presents the h-index as a measure of the authors' impact. The H-index combines the author's productivity with the impact of citations, thus offering a balanced measure of an author's overall influence. According to Figure 13, Lee Kuo Chuen, Arner D. and Buckley R. have the highest h-index of 3. It should be noted that the h-index in this analysis is restricted to the defined topic of Fintech as a financial disruptor, and does not represent an overall h-index of the authors mentioned in this study. As such, Google Scholar identifies Lee Kuo Chuen D.'s overall h-index as 17, Arner D.'s h-index as 26 and Buckley R.'s - as 23.

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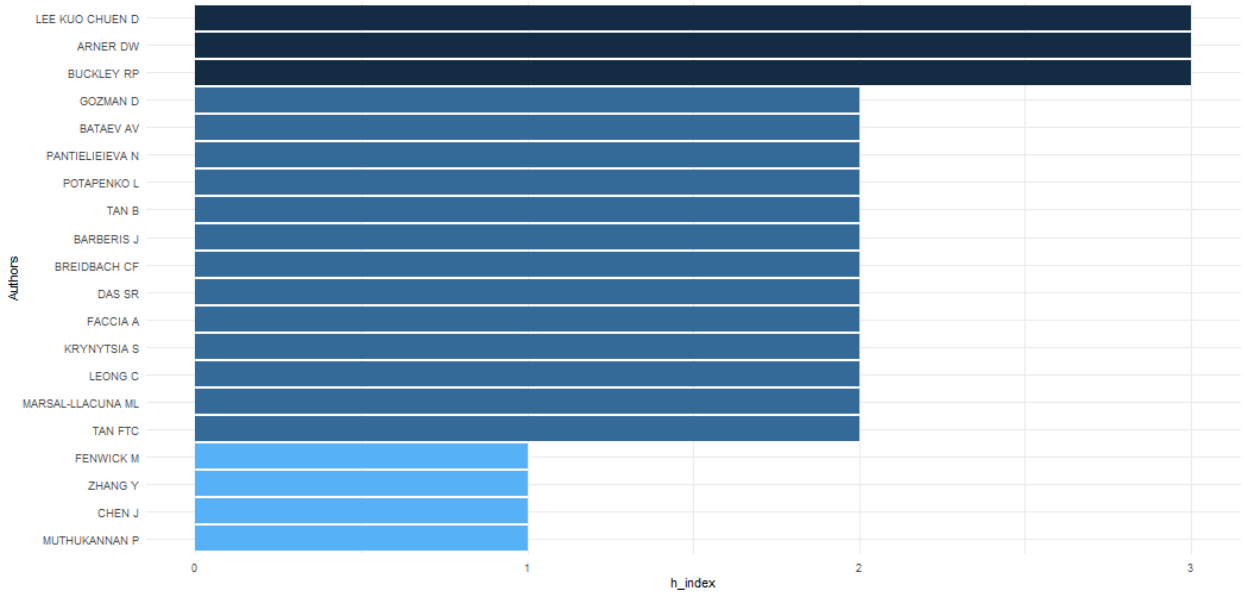

Figure 14. Author impact
Source: Scopus, elaborated in Biblioshiny

Figure 15 demonstrates the activities of the authors with the most impact during the given timespan. The size of the bubble represents the number of publications in a given year, while the intensity of color reflects the number of citations. However, bigger bubbles with lighter colors and smaller bubbles with more intense colors suggest that a higher number of publications does not guarantee more citations. Gozman D. and Muthukannan P. have the most extended history of publishing on the given topic, having co-authored the earliest article in 1984, as defined by Scopus, while the other authors started publishing in 2017-2018.

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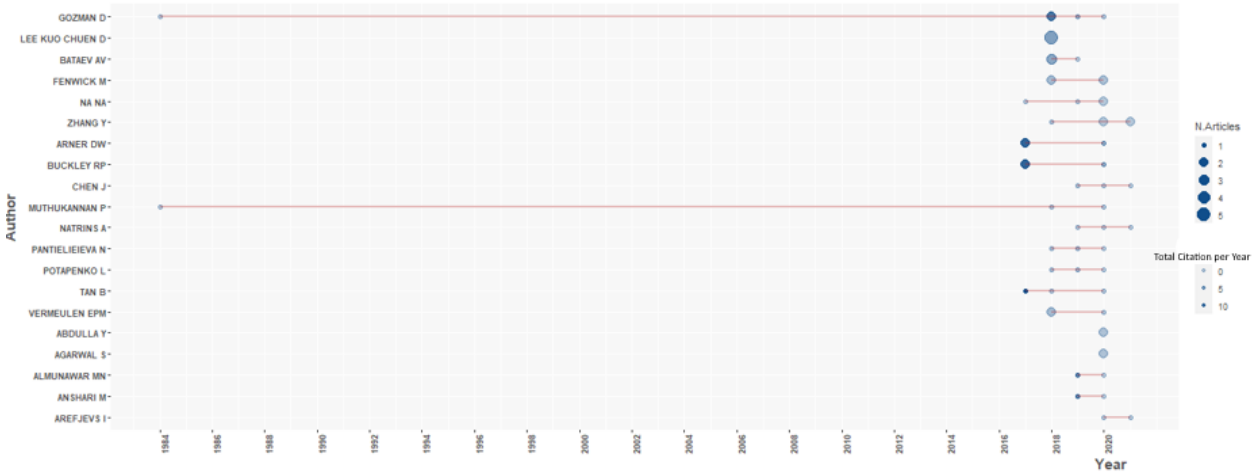

Figure 15. Top-Authors' production over time
Source: Scopus, elaborated in Biblioshiny

Furthermore, 94.3% of all authors published only one document on the given topic (Table 4). Of all the authors, 1% published three documents, and only 0.2 % of authors published five papers. This observation can be explained by the relative novelty of the topic of Fintech as a financial disruptor. The proportion of authors who published more than one document on the given topic will likely increase in the future.

Table 4. Authors' productivity

Documents written	No. of Authors	Proportion of Authors
1	845	0.943
2	36	0.04
3	9	0.01
4	4	0.004
5	2	0.002

Source: Scopus, elaborated in Biblioshiny

Co-authorship of authors

Figure 16 represents VOSviewer's mapping of co-authorship. Thirty-seven co-authors were grouped in seven clusters, with Zhang Y. having the most significant number of co-authorships. He published four documents in co-authorship with 16 authors. Co-authorship in academia is growing, suggesting that studied topics are becoming more interdisciplinary and thus require expertise from different fields.

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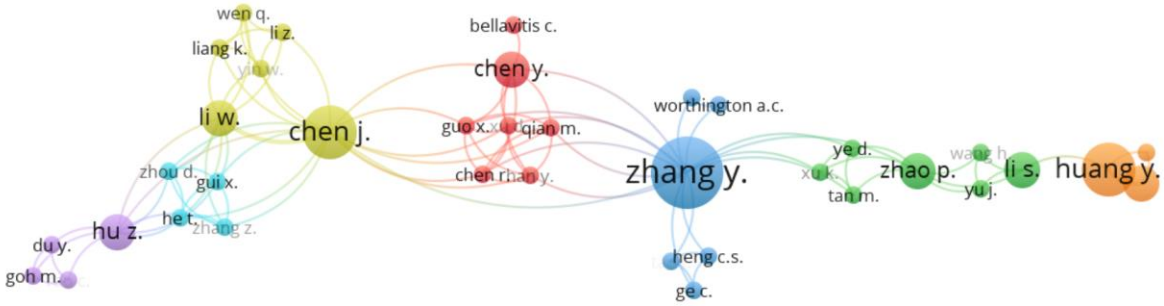

Figure 16. Co-authorships of the authors
Source: Scopus, elaborated in VOSviewer

Authors' affiliation

The most productive authors were affiliated with the University of Indonesia (nine documents) and Amity University from India (eight documents) (Figure 17). The BA School of Business and Finance (Latvia), the National University of Singapore, Singapore University of Social Science, the University of Hong Kong, and the University of Sydney follow with six documents each. As can be observed from Figure 16, the productivity of authors associated with the topic of Fintech as a financial disruptor is higher in Asian Universities.

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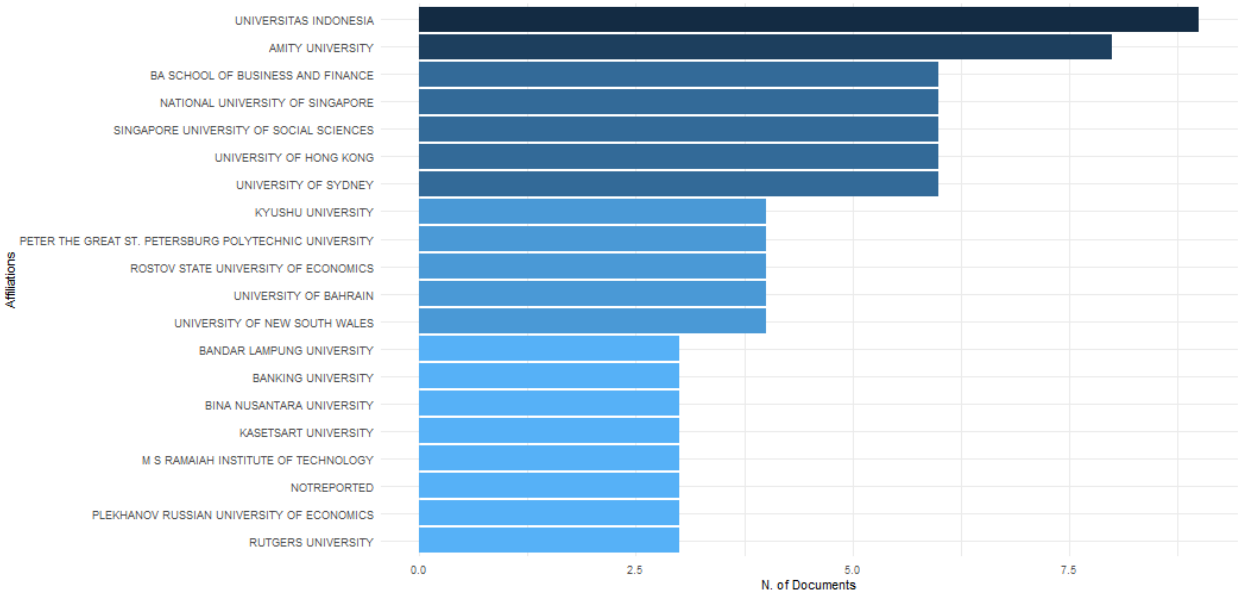

Figure 17. Most relevant affiliations
Source: Scopus, elaborated in Biblioshiny

Countries of publications

According to Figure 18, the majority of authors published on the topic are from the USA (19 documents), China (17 documents), UK (13 documents), and India (9 documents). Multiple Countries Publication (MCP) indicates the number of articles per country in which at least one co-author is from a different country. Figure 17 demonstrates that the authors from China established the highest number of international collaborations. Authors from Japan published all of their documents with the international team of authors. In contrast, researchers from Indonesia, Thailand, South Africa and Spain published papers written only by local authors.

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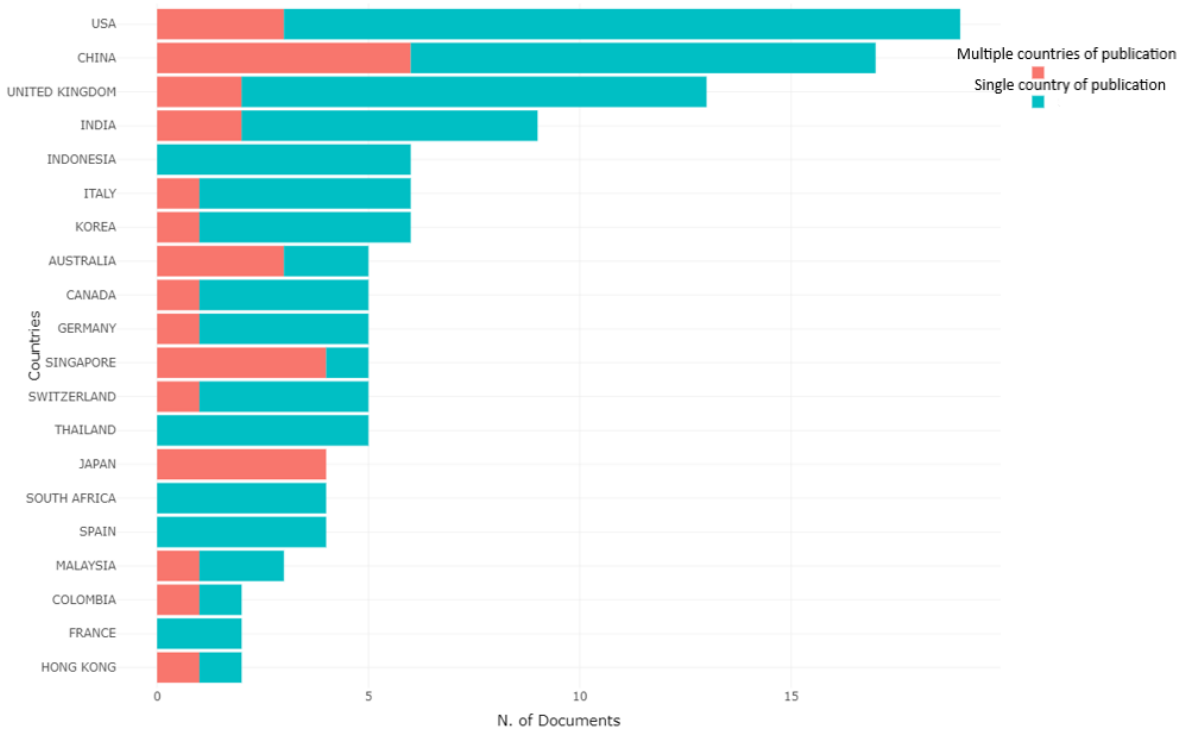

Figure 18. Corresponding author's country
Source: Scopus, elaborated in Biblioshiny

Out of the 73 countries represented by the authors, VOSviewer identified 51 countries with international co-authorship and grouped them into 11 clusters (Figure 19). It demonstrates that the USA, UK and China have the highest number of collaboration of authors. The USA, for example, published 46 documents in co-authorship with 18 countries. China published 37 documents with ten countries, while the UK published 99 papers in co-authorship with 17 countries. The color scheme of the bubbles demonstrates that Australia, Germany and Switzerland were the leaders in collaboration among authors before 2018; the USA was the leader during 2018-2019. Since 2019, China, India and Russia have become the leaders in collaboration among their authors.

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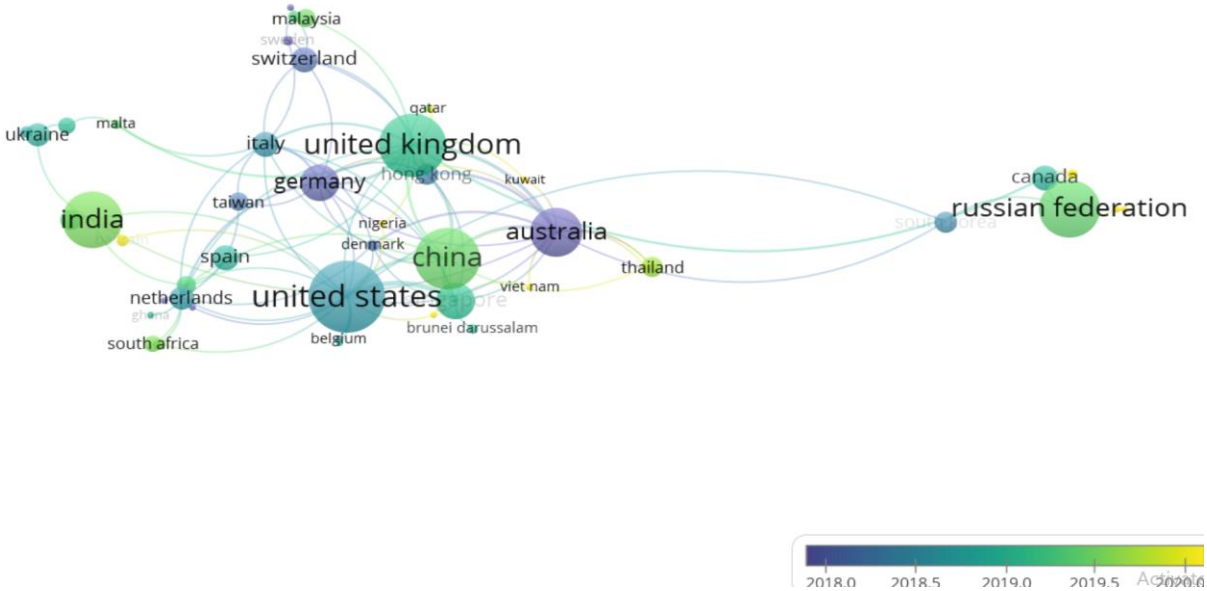

Figure 19. Co-authorships of countries
Source: Scopus, elaborated in VOSviewer

Sankey Plot

The relationship among top authors, the top keywords they used, and authors' affiliation are summarized by a Sankey Plot in Figure 20. The three main metadata fields - keywords, authors and affiliations - have been chosen. The keywords define the research content, while the affiliations define the intellectual roots of the authors. The height of each rectangle represents the number of connections of each element with other elements. On the left side of the plot, the “Fintech” keyword has the highest number of connections with the authors, followed by “digital economy”, “financial services” and “regtech”. The authors with the most substantial connections with the main research topics are Pantielieieva and Potapenko from Banking University in Ukraine, followed by Lee Kuo Chuen from the Singapore University of Social Science.

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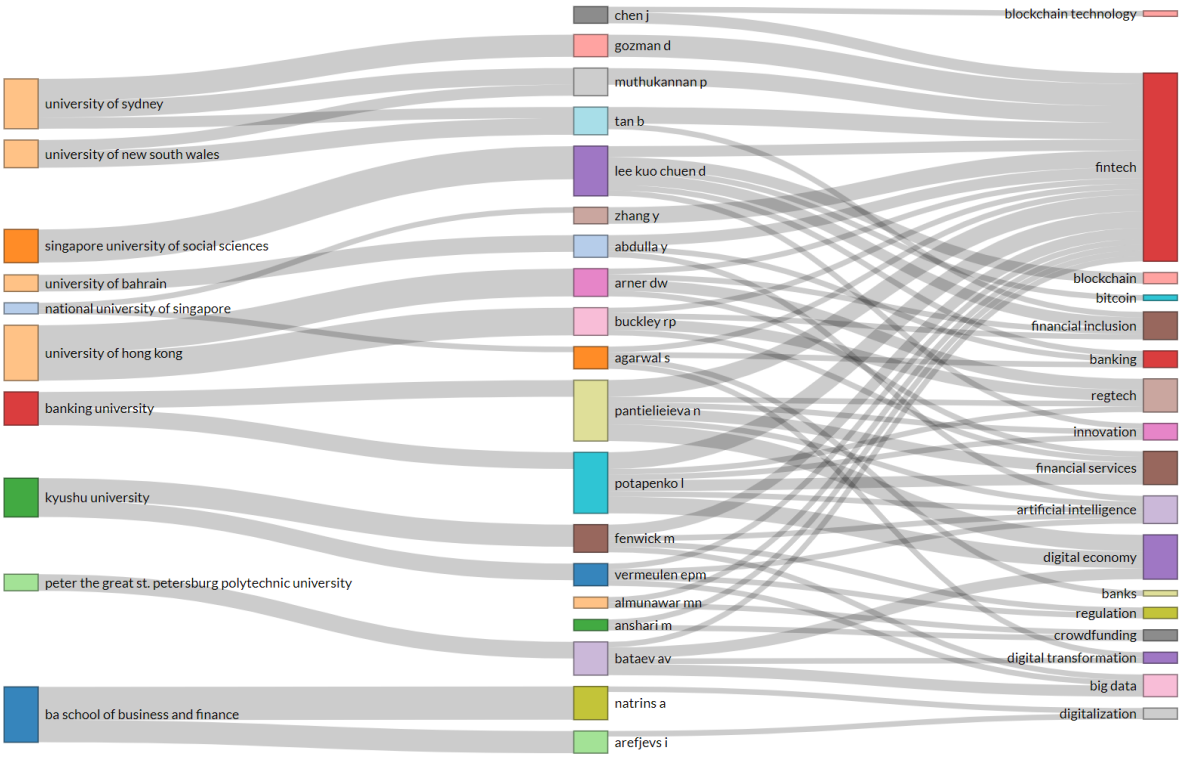

Figure 20. Three-Fields plot (20 authors, keywords, affiliations)
Source: Scopus, elaborated in Biblioshiny

4. Discussion and conclusion

The paper has conducted a bibliometric analysis on the topic of Fintech as a financial disruptor based on 363 documents identified in the Scopus database and published during the period from 1984 to February 2021. The key takeaway of the analysis is that the given topic of Fintech is relatively new, but with a strong potential for further development. These takeaways, along with some additional findings, are discussed below.

First, the increasing number of publications during the last few years, especially in 2020, demonstrates the growing popularity of the Fintech topic. This popularity may be explained by the rapid advancement and penetration of Fintech solutions, which was accelerated during the COVID-19 pandemic. Publications in reputable journals such as the Journal of Management Information Systems and Harvard Business Review

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indicate the strong interest of academia. However, such interest is still nascent, resulting in a relatively low number of books published on the topic, especially when compared to the higher number of published articles and conference papers. One might expect more books and book chapters on the given topic to be published in the near future. The fact that the most productive sources of publications were identified as conference proceedings and lecture notes is another argument for the novelty of the topic.

Furthermore, the fact that the majority of publications are in the area of computer science reflects the dual nature of Fintech - an amalgamation of technology and finance. This observation is supported by the fact that the two most cited publication are in journals related to information systems. At the same time, the most cited document - authored by Lee and Shin (2018), was published in the Business Horizons journal, which covers articles in the field of business, confirming the above-mentioned duality of the defined topic.

Analysis of the most frequently used words reveals that “Fintech”, “blockchain” and “digital transformation” are the most popular keywords. The relative popularity of the keyword “blockchain” might be explained by the association of authors between financial disruption and the advancement of blockchain technology. Furthermore, Biblioshiny mapped the term “digital transformation” among the primary themes that require further research. Similarly, a shift of the trending topics towards “digital transformation” and “disruptive innovation”, as observed in VOSviewer , indicates the relatively recent interest of academia towards the topic.

The popularity of such terms as “blockchain technology” and “artificial intelligence” might reflect further advancement of Fintech towards more specialized topics. At the same time, the emerging popularity of the terms “financial inclusion” might demonstrate interest of academia in such dimensions of Fintech as social impact.

Furthermore, the bibliometric analysis revealed that Lee Kuo Chuen, Arner D. and Buckley R. are the

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authors with the highest impact, as measured by h-index. The relatively high h-index of these authors can be explained by the fact that Lee Kuo Chuen is also the most productive author, while Arner and Buckley are among the top 10 authors with the highest number of publications. The fact that the vast majority of authors have published only one document on the given topic, may explain the nascent phase of the topic; more publications can be expected from these authors.

The fact that the most productive authors are affiliated with relatively unknown universities can be explained by the fact that "most productive" does not necessarily mean "the most cited", whereby, the analysis demonstrates that the higher number of publications does not guarantee more citations. The novelty of the topic might also affect the list of the most productive authors' affiliations. As interest increases on the FinTech topic, this might lead to more published documents from leading institutions.

Most of the articles were published by several co-authors, including all of the top-cited articles. Furthermore, many articles were the result of international collaboration. For example, the paper by Lee and Shin (2018) was produced in collaboration with authors from Western Illinois University, USA and Hankyong National University, South Korea. The paper by Gomber et al. (2018) was written by four authors from universities in Germany, Singapore and USA. China had the largest number of articles on the given topic produced by teams of international authors.

A limitation of this study is that the analysis was based on a relatively limited number of publications, which is a potential shortcoming that may be attributed to the nascent stage of the subject. This limitation may potentially affect the results of the bibliometric analysis compared to if it had been conducted on a larger sample size. It is also possible that there are publications in languages other than English that were not taken into account.

The advancement of Fintech and its increasing impact on the financial system are expected to generate

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further academic interest and publications on the topic. Therefore, a similar analysis may be conducted at a later date which will have a greater number of observations to compare the validity of the results presented in this paper, and new trends and tendencies.

The results of the analysis described in this paper represent an overview of the topic of Fintech as a financial disruptor. In doing so, the objective and hope of the author of the paper is to generate further interest and catalyze more in-depth research on the topic. The social and economic impacts of the financial disruption caused by Fintech are particularly promising areas for future studies.

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