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BANKING FINTECH ADOPTION: SYSTEMATIC REVIEW WITH BIBLIOMETRIC AND CONTENT ANALYSIS

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Abstract

This study presents a comprehensive overview of the impact of Financial Technology (FinTech) on the banking sector, scrutinizing key trends and proposing future research directions to address the evolving challenges and opportunities in the field. Utilizing the PRISMA Flowchart, the study analyzes 93 papers on FinTech in banking published between 2016 and 2022 from the Web of Science database. Employing bibliometric and content analysis methodologies, RStudio, VOSviewer, and NVivo are used for descriptive, keyword co-occurrence, and content analyses, respectively. China leads in FinTech and banking research publications, while the United States surpasses all other nations in total citations. Word cloud charts and frequency analyses reveal that "Banks" and "FinTech" are frequently mentioned. The study identifies "Adoption," "Innovation," "Artificial Intelligence," and "Crowdfunding" as primary research topics. Emphasizing the global integration of blockchain, cloud computing, and big data into FinTech research, the study provides valuable insights into the possibilities and risks associated with technological advancements in the financial sector.

Keywords: FinTech, adoption, bibliometric analysis, SLR, innovation, VOSviewer

1. INTRODUCTION

FinTech is a disruptive innovation that leverages the latest digital technology for the activities of the financial services industry. Over decades of its existence, FinTech has exclusively overhauled traditional banking practices making it more competitive, altogether redefining old business models and changing the behaviour of consumers in

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their approach to utilizing financial services and related products (Bower & Christensen, 1995; Elia et al., 2022; Tajudeen et al., 2021). The advent of FinTech can be traced back to the adoption of handheld calculators and the installation of ATMs by banks in the early 1970s. Later on, it went through many stages of advancements, such as the conversion of traditional banking to digital mode with the introduction of mainframe and networked computer systems, the use of the internet for the expansion of digital banking across the globe and the introduction of online banking as early as 1990. In the current century, FinTech has taken another leap forward by integrating new digital technologies such as artificial intelligence, blockchain, cloud computing and big data (ABCD of FinTech), which has introduced a whole new digital-based financial market and has proven to be highly valuable for the financial sector (Financial Stability Board, 2017; Shaydullina, 2018).

Banks are the incumbent of the financial sector and the backbone of any economy's financial system (Akbar et al., 2020). Moreover, they hold immense importance for the general public since they play a mediatory role in the financial aspect of an individual's life. Although banking practices have witnessed many changes and adoptions due to political, geographic and legislative influences, the rise of FinTech is the most significant revolution and a new epoch in the banking industry (Berger, 2003; Mareev, 2016; Milian et al., 2019; Shim & Shin, 2016). FinTech has benefited both the customers and the financial services providers due to the diversity, flexibility and cost-effectiveness of the technological solutions provided for financial services. Whether it is the use of a smart-phone to access a banks mobile app or the use of a credit card to make purchase a point of sale, this new era of digital transformation and high-speed internet has set in motion the incumbent financial intermediaries to compete with for each other to develop unique and innovative solutions for selling financial products and services to the customers (Schena et al., 2018; Spender et al., 2017). All of the banks are now FinTech operators, and are developing new strategies to provide digital and user-friendly financial products and services (Corvello et al., 2021; Temel et al., 2021).

Using data from the Web of Science, this study used bibliometric and content analysis with VOSviewer, RStudio, and NVivo. The study integrates qualitative theme investigation with quantitative findings from citation network analysis. Citation trends were found by bibliometric analysis using VOSviewer and RStudio. NVivo made content analysis easier by highlighting themes in the text data that was extracted. This methodology guarantees a thorough analysis of banking and FinTech studies retrieved from Web of Science (Mitrofanova et al., 2022).

While FinTech offers a meaningful growth opportunity for the financial market and unprecedented technological innovation, it also makes the banking industry vulnerable to new risks. The management of the banks should be ready to negotiate with unforeseen challenges to safeguard the interest of customers, build their trust and enhance the effectiveness of the entire financial sector (Elia et al., 2022). Although a plethora of research has been conducted to study various aspects of determinants and outcomes of FinTech in general, limited studies have comprehended the existing research to understand the current trends of FinTech in the banking sector. Undiscovered trends in

current academic literature regarding the impact of FinTech on the banking sector represent a significant cluster of challenges for the management of banks as well academics (Dapp et al., 2014; DeYoung, 2005; Gábossy, 2016). To fill this research gap, the current study has performed a bibliometric analysis and a systematic literature review based on current literature of FinTech in the banking industry. Our research aims to map the current trends and identify the main subjects, issues and categories associated with FinTech in the banking sector. This research aims to provide answers to the following questions.

RQ_1. How do author countries, prolific authors, and keywords contribute to bibliometric insights?

RQ_2. Who are the prominent contributing countries in terms of number of publications and citations?

RQ_3. What are the hottest topics in FinTech domain?

RQ_4. What significant trends are discernible, foreshadowing future research directions?

This five-chapter study adheres to a systematic framework. In order to lay a foundation, Chapter 2 includes a thorough overview of the literature, which summarises current theories and studies. The approach used is described in Chapter 3, along with the steps used to gather and analyse the data. The study findings are presented in Chapter 4. Deeper understandings and ramifications arise from the discussion and contextualization of these results in Chapter 5. Chapter 6 concludes by providing a summary of the main findings and the overall importance of the study.

2. LITERATURE REVIEW

FinTech in the banking industry is the application of information technology tools and techniques to transform the conventional banking systems into digital banking and improve the delivery of financial services to customers. FinTech is not an ordinary innovation as it has revolutionized the banking system during the last few decades and can be termed a breakthrough innovation (Kim et al., 2016; Legowo et al., 2020). The main objective of financial technology is to improve service providing quality and work efficiency of the financial sector by applying information technology applications, and these applications can be used in peer-to-peer (P2P) lending, distributed ledger technology and third-party payments (Acar & Çıtak, 2019; Chen et al., 2021). FinTech has played a vital role in improving service delivery standards in the banking industry. Due to digital finance, hard days ended when customers were forced to stand in a queue in the bank halls to pay their cash, utility bills, school fees and other financial transactions (Berger & DeYoung, 2006; Bett & Bogonko, 2017).

FinTech solutions are more efficient than traditional banking system and other lending institutions for quick access to reserve cash and loans to those with low or no income (Ozili, 2018). The peer-to-peer digital lending platform acts as an exchange medium between debtors and shareholders. An individual can lend his money to an insolvent through a digital platform and earn interest on lending money (Kumari & Devi, 2022).The FinTech ecosystem consists of innovations in business infrastructure, core services and their components, which generates value addition mechanism through competition by redirecting, redesigning and

reorganizing the stream of financial services among market stakeholders (Gozman et al., 2018; Sangwan et al., 2019). It also has paved the way for internet-only banks, where all the transactions are done online because these banks have no physical branches and provide high-interest rates and low lending rates, and consumers enjoy these financial services (Ahn & Lee, 2019). Due to technology, banks have availed the opportunity to exploit new geographical markets, thus securing more customers all over globe and more sustainable growth (DeYoung, 2005).

Beyond doubt, FinTech has played a key role in improving service delivery standards (Schueffel, 2016; Ya, 2020). With new financial technology and innovations in place, it has also introduced new methods of operations for banks and enhanced customer expectations from the financial sector (Dwivedi et al., 2021; Goel et al., 2012). All over the world, governments have paid attention to this challenge and modified policies and regulations to support FinTech in the banking sector (Wonglimpiyarat, 2017). However, financial managers must understand that FinTech not only creates opportunities but also there are many potential risks for the banking sector. For instance, one important challenge for fintech providers is developing customers' trust in the technology (Kiburu et al., 2023). Trust is a multidimensional and complex trend that plays a key role in business relationships. A large number of elements influence trust in FinTech innovation adoption, such as data confidentiality, availability, integrity, mobile application usability, transaction security, cultural influences, the trustworthiness of the organization and constant wireless connection (Lewis & Weigert, 1985; Stewart & Jürjens, 2018; Whitman et al., 2014; Zhang et al., 2003). In conclusion, FinTech is now part and parcel of the banking sector. Therefore, by applying bibliometric and content analysis techniques, the current study analyses the existing studies about Fintech in banking to highlight the current direction of literature and provide a networked visualization of frequently used themes in the existing literature. This also helps us to identify the limitations of the recent research and recommend the future directions of the study.

3. METHODOLOGY

Systematic literature review methodology is used in this study to evaluate the direction of FinTech in the banking sector. A systematic literature review is a method for classifying, appraising and synthesizing the existing work produced by scholars, practitioners and researchers (Okoli, 2015). Reviewing the current literature makes it easy to comprehend the breadth and depth of existing publications and identify potential gap to be explored (Xiao & Watson, 2019). The basic objective of a systematic literature review is to assemble and measure the available research related to the subject of interest. A systematic literature review is an accurate methodological review of research results whose objective is not to divide the existing work in various groups but also to develop proof-based guidance for researchers and professionals involved in the domain of study (Kitchenham, 2004). The systematic literature review was performed using two popular methodologies; bibliometric analysis and content analysis

3.1. Bibliometric analysis

Bibliometric analysis is a statistical analysis of published data that presents a quantitative approach to academic literature (Benckendorff & Zehrer, 2013). The bibliometric analysis classifies the most productive and leading journals, authors, studies, countries and universities (Tepe et al., 2021). In addition, the bibliometric analysis presents a visual demonstration of published literature such as words, journals, documents and authors broadly used for business and academic purposes.

3.2. Content analysis

The use of the content analysis technique aims to achieve the requirements of RO 2. This technique presents flexibility in defining a coding scheme for the various themes and contents of research in FinTech and the research objectives contained in the sample (Milian et al., 2019). This technique is then used in the frequency statistics to detail these codes and their relationships (Duriau et al., 2007).

3.3. Data Analysis

This analysis comprised two steps: the selection of keywords and database to extract the requisite documents and the literature analysis to identify the literature characteristics and describe the main trends from the extracted documents using bibliometric analysis and content analysis.

The first step is related to the identification of keywords and databases to extract the required documents. For this purpose, the search string consisted of "FinTech and Banks" within the title of documents indexed on the Web of Science. The most essential and informative part of the study is the title of the articles because it holds imperative topics related to research (Ahmi et al., 2020). The search process extracted 122 articles related to the research topic from 2016 to 2022.

The flowchart of the selection process of the studies adopted from PRISMA 2020 (Page et al., 2021) is shown in Figure 1. PRISMA Flowchart consists of four phases of the studies selection process, namely 1) Identification, which provide the information of the total papers extracted from various databases and duplicate records removed before the screening. 2) Screening, the process of exclusion and inclusion of the paper abstracts to select the relevant studies according to the criteria. 3) Quality assessment, in this phase, all the articles which met the study criteria are checked by reading the complete text, and excluded papers are justified. 4) Final papers, final phase informs the total of the papers to review by the author (Zuhroh, 2021).

The PRISMA Flowchart of the study reveals the selection process of articles as follows: initial searching process (122 documents), exclusion of duplicate records (5 records), exclusion of records if automation tool is used (0 papers), in quality assessment phase 15 papers were excluded with reasons (unavailability of full text 11 articles, Slavic language 1 article and book chapters three records) and finally 93 articles included in the review.

The SLR analysis of "FinTech and banks" has been performed by using three software; Bibliometrix package of RStudio (Aria & Cuccurullo, 2017), VOSviewer (Van Eck & Waltman, 2010) and NVivo 12. The software tool Bibliometrix is used to provide a descriptive analysis of three fields plot, corresponding author's country analysis, the

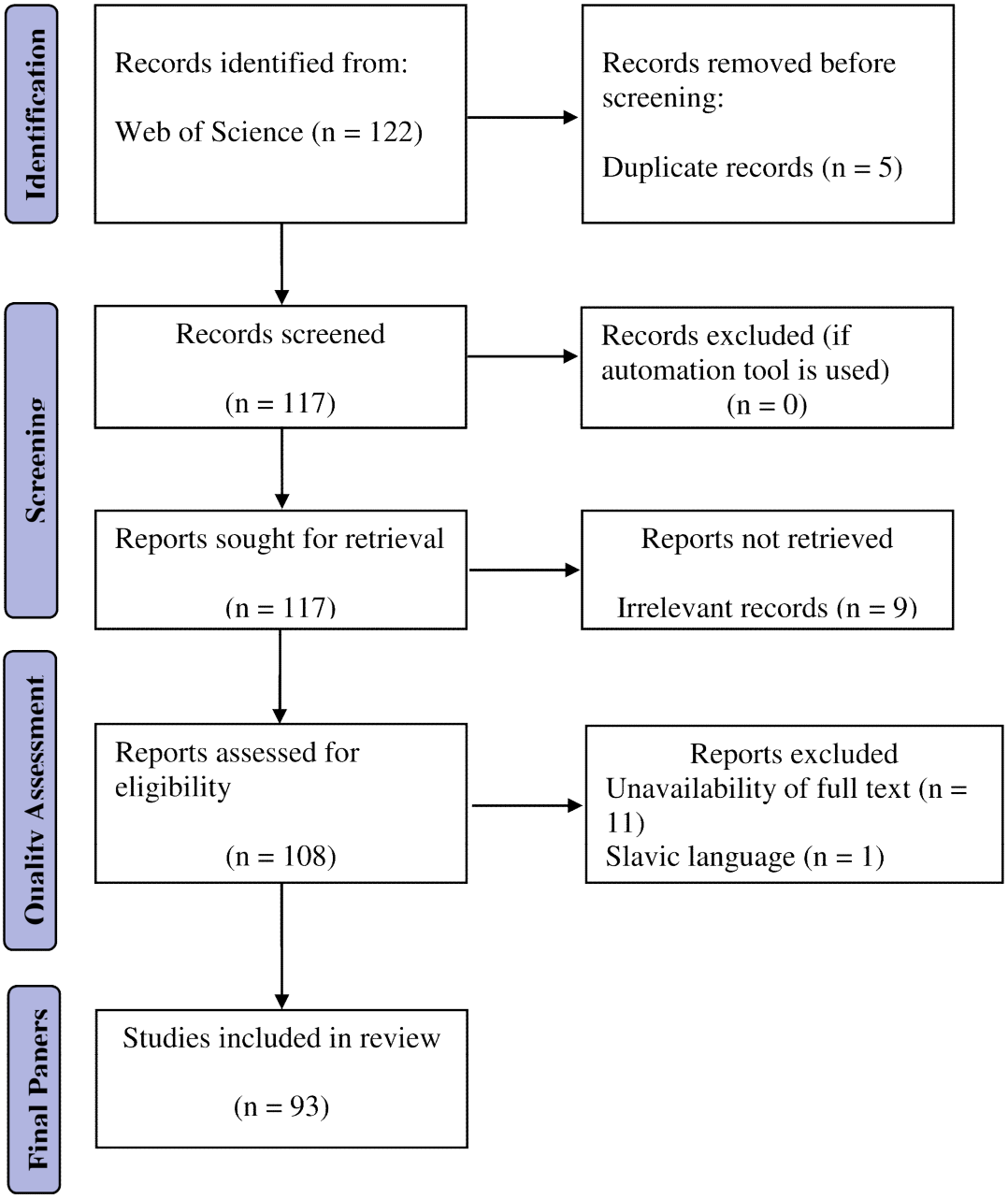

Figure 1. PRISMA Flowchart

most cited countries and analysis of word cloud (Aria & Cuccurullo, 2017; Chambers & Hastie, 1992; Elia et al., 2022). The VOSviewer is used to perform keywords co-occurrence analysis and the strength of the links. The results are shown through network visualization and overlay visualization (Eck & Waltman, 2009). Furthermore, NVivo 12 software was applied for the content analysis.

4. FINDINGS

4.1. Bibliometric analysis

4.1.1. Analysis of three fields plot (RQ1)

Figure 2 consists of a collaboration of authors' country, author name and keywords are shown in three fields plot. The factors of the three fields plot are linked with grey lines that represent their relationship with each other. The direction of this relationship starts from left to right, connecting important keywords on the left side with authors at the centre point, and then authors connect with the country name on the right side. The size of the rectangle in the list reveals the number of papers connected with the elements. There are fifty figures of each element in the three fields plot having published papers on the topic of "FinTech and Banks" and the United Kingdom produced maximum articles which connect with a number of authors namely Stulz rm, Chen xh, Chang V, Berdyshevav, Avang z, Ashta a and Bao zy. This three fields plot consists of fifty authors in the middle of the plot who have published papers on the topic of "FinTech and Banks" and the top corresponding authors' countries. The size of the rectangle indicates the number of publications of each author, and Stulz rm, Youxy, Chen xh, Chang v and berdyshevav are the most articles producing authors.

The final and most important element of the plot is the repeated keyword; 28 keywords are listed in the plot "fintech" is the most repeated keyword, as revealed by the size of the rectangle dominated by the other rectangles. Three fields plot shows that almost all the authors used the topic of "FinTech and Banks" because they are associated with the keyword "fintech". Other important topics keywords include commercial banks, customer satisfaction, customer expectations, banks performance

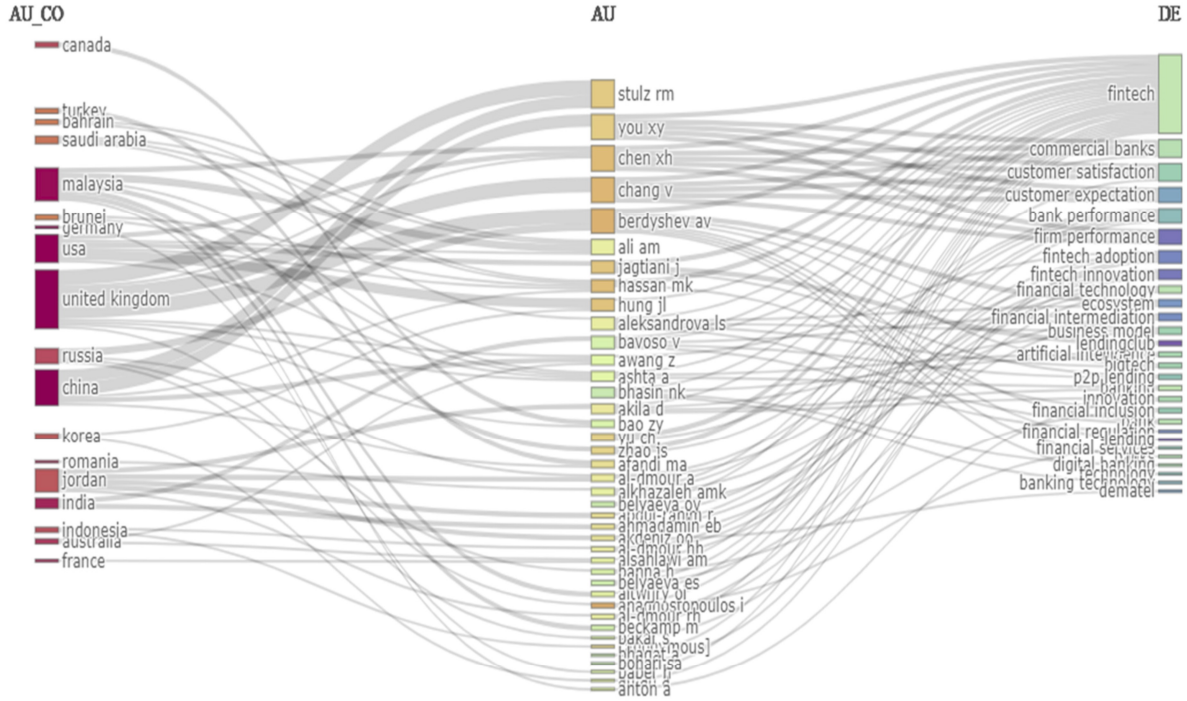

Figure 2. Three fields plot

and firm performance. This shows that there are a considerable number of studies which have focused on customer responses followed by the performance of firms within the umbrella of FinTech.

4.1.2. Analysis of corresponding authors' country (RQ2)

Table 1 and figure 3 represent the regional contribution to the total number of publications.

From the regional point of view, Figure 3 represents the ten most productive corresponding authors' countries in terms of multiple-country publications (MCP) and single-country publications (SCP). Moreover, MCP signifies the relationship of publications with authors from different countries. At the same time, the SCP indicates the number of publications from the association between authors from a single country (Sweileh et al., 2016; Wang et al., 2013). According to table 1and figure 3, China is foremost in terms of the most productive country, with 22 publications which consist of 5 multiple-country publications and 17 single-country publications. 87% of the Chinese population is currently using technology to manage their financial activities and they are paying more concentation on FinTech research. Furthermore, the United States is a step behind China with ten publications, four articles written by authors from different countries, and six from the United States.

Apart from that, United Kingdom, Malaysia and Germany are trying their best to disclose the directions of FinTech in terms of MCP and SCP with 7, 5, 4 and 1, 3, 1 publications, respectively. Finally, India, Indonesia, Romania, Russia and Ukraine are still near the ground, with 3 publications each without multiple country publications. Logically, the top three countries are not only technologically advanced, they also have dominance in the field of technology research in other fields as well. The results of MCP and SCP depict that although there isa limited number of countries related to FinTech in banking, they are not limited to a particular region. We can find well-dispersed research in North America, Europe, and Asia. However, it is also noticeable that there is a severe lack of research from African and South American regions.

Table 1. Corresponding author's country analysis

Country	Articles	Multiple Country Publications (MCP)	Single Country Publications (SCP)
China	22	5	17
United States	10	4	6
United Kingdom	7	1	6
Malaysia	5	3	2
Germany	4	1	3
India	3	0	3
Indonesia	3	0	3
Romania	3	0	3
Russia	3	0	3
Ukraine	3	0	3

Source: Web of Science

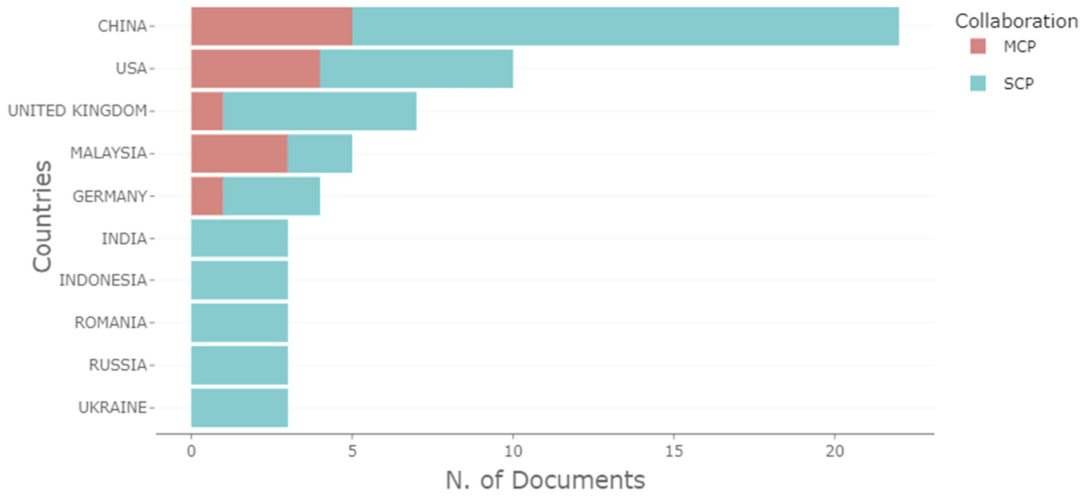

Figure 3. Corresponding author's country analysis

4.1.3. The most cited countries (RQ2)

This section provides the main results obtained from the analysis of the 10 most cited countries listed in Table 2 and Figure 4. The findings draw attention to United States, China and United Kingdom the most cited country with 423, 259 and 105 total citations (TC) and 42.30, 11.77 and 15.00 average article citations (AAC) respectively. Moreover, Germany, Turkey, Slovenia, Thailand, Vietnam, Malaysia and Netherlands having 62, 60, 51, 27, 25, 24 and 22 total citations correspondingly and 15.50, 60.00, 51.00, 27.00, 8.33, 4.80 and 22.00 average article citations in that order. The result of the top three cited countries roughly corresponds to the top three corresponding author countries. However it is interesting to note that although majority of publications emerged from China, USA tops the most cited countries. The reason behind the top citaion of USA is the maximum FinTech organizations estableshid in USA. There are 26,000 FinTech organization exists worldwide and almost 9,000 out of them are in the USA.

4.1.4. Analysis of word cloud (RQ3)

Figure 5 represents the word cloud generated by selecting abstracts of selected articles. The selection of abstracts presents the main topics and research directions and trends of the fintech and banking sector. Figure 5 demonstrates the most frequent keywords and as expected "fintech" is the most frequently used term in word cloud cluster followed by "banks". Although the keyword "financial" is quite evident in the word cloud, the word "technology" is not much prominent. This depicts that financial technology is more commonly referred to as FinTech in the existing literature and this terminology has become more ubiquitous. The remaining keywords are all well-known and generally related to banking. The keyword co-occurrence analysis reveals more details in this aspect.

4.1.5. Keywords co-occurrence analysis (RQ3)

According to the Web of Science (WoS) database, Table 3 lists the most repeatedly

Table 2. The most cited countries

Country	Total Citations (TC)	Average Article Citations (AAC)
United States	423	42.30
China	259	11.77
United Kingdom	105	15.00
Germany	62	15.50
Turkey	60	60.00
Slovenia	51	51.00
Thailand	27	27.00
Vietnam	25	8.33
Malaysia	24	4.80
Netherlands	22	22.00

Source: Web of Science

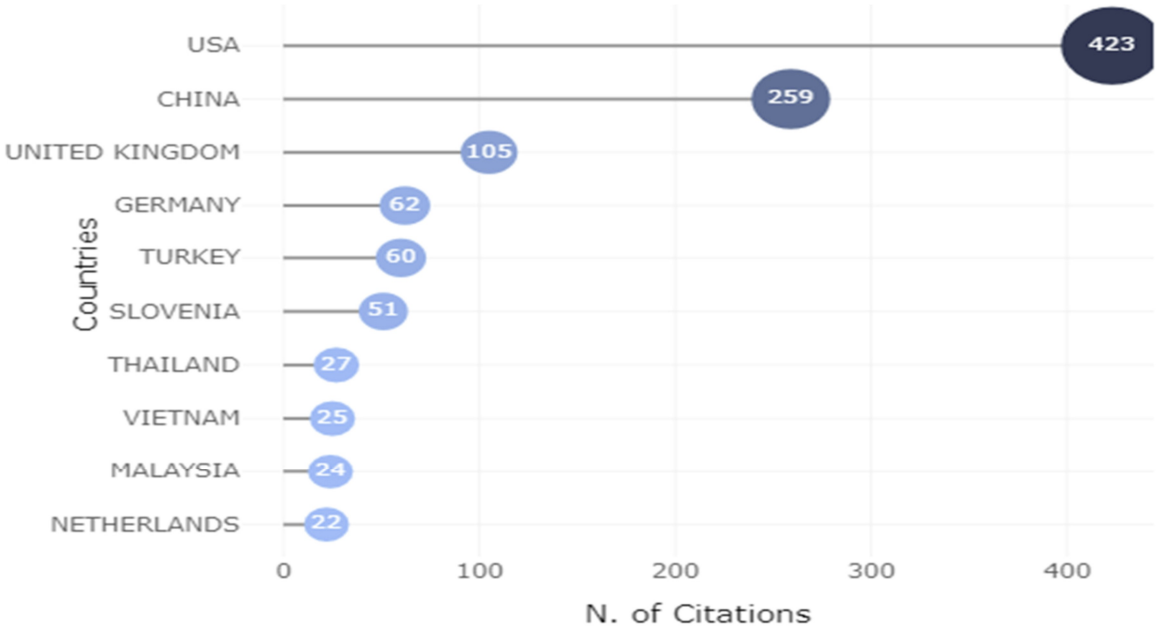

Figure 4. The most cited countries

used keywrods in 93 articles during the period of 2016 – 2022. The most famous term is "Fintech" (in 93 articles with 54 occurrences and 228 total link strength) following keyword "Technology" (with 11 times occurrences and 76 total link strength). In addition, the keywords competition (9 occurrence and 65 link strength), impact (8 frequency and 50 link strength), banking (8 occurrence and 47 link strength), internet banking (8 occurrence and 42 link strength), innovation (8 frequency and 28 link strength), financial technology (7 frequency and 34 link strength), commercial banks (6 occurrence and 54 link strength) and ownership (6 frequency and 42 link strength) are following fintech and technology keywords.

The total link strength attribute points towards the number of articles in which two keywords appear together (Abad-Segura et al., 2020). Hense, the keyword "Fintech" is

Figure 5. Word Cloud

one of the keywords with most frequency (54) and highest total link strength (228). Figure 6 signifies the network visualiztion for the keywords of the articles of "FinTech and Banks" based on keyword co-occurrence analysis. In this figure, the size varies according to the number of reappearance of keywords while the color of the connections differentiate the clusters. The VOSviewer software has identified eight clusters having 112 items with 892 links and 1,150 total link strength.

Cluster 1 (Red) consists of 27 items which represents 24% of total keywords and this cluster is led by "banking" (occurrences 8, links 36 and total link strength 47). Cluster 2 (Green) consists of 17 items which represents 15% of total keywords and is leading by "commercial banks" (occurrences 6, links 38 and total link strength 54). Cluster 3 (Blue) also represents 15% of total keywords having 17 items leading by "China" (occurrences 5, links 29 and total link strength 38). Cluster 4 (Yellow) is the most important part of figure 6 which represents 14% of total keywords leading by "fintech" (occurrences 54, links 100 and total link strength 228). Cluster 5 (Purple) having 10 items signifies 9% of the total keywords leading by "informations" (occurrences 6, links 27 and total link strength 41). Cluster 6 (Sea Green) having 9 items signifies 8% of selected keywords and leading by "financial inclusion" (occurrences 3, links 12 and total link strength 15). Cluster 7 (Orange) is 7% of figure 6 having 8 items leading by "technology" (occurrences 11, links 52 and total link strength 76). Finally, cluster 8 (Brown) represents 7% with 8 items leading by "ownership" (occurrences 6, links 33 and total link strength 42).

Table 3. Top 10 frequently used keywords

Ranks	Keyword	Frequency	Total link strength
1	Fintech	54	228
2	Technology	11	76
3	Competition	9	65
4	Impact	8	50
5	Banking	8	47
6	Internet banking	8	42
7	Innovation	8	28
8	Financial technology	7	34
9	Commercial banks	6	54
10	Ownership	6	42

Source: Web of Science

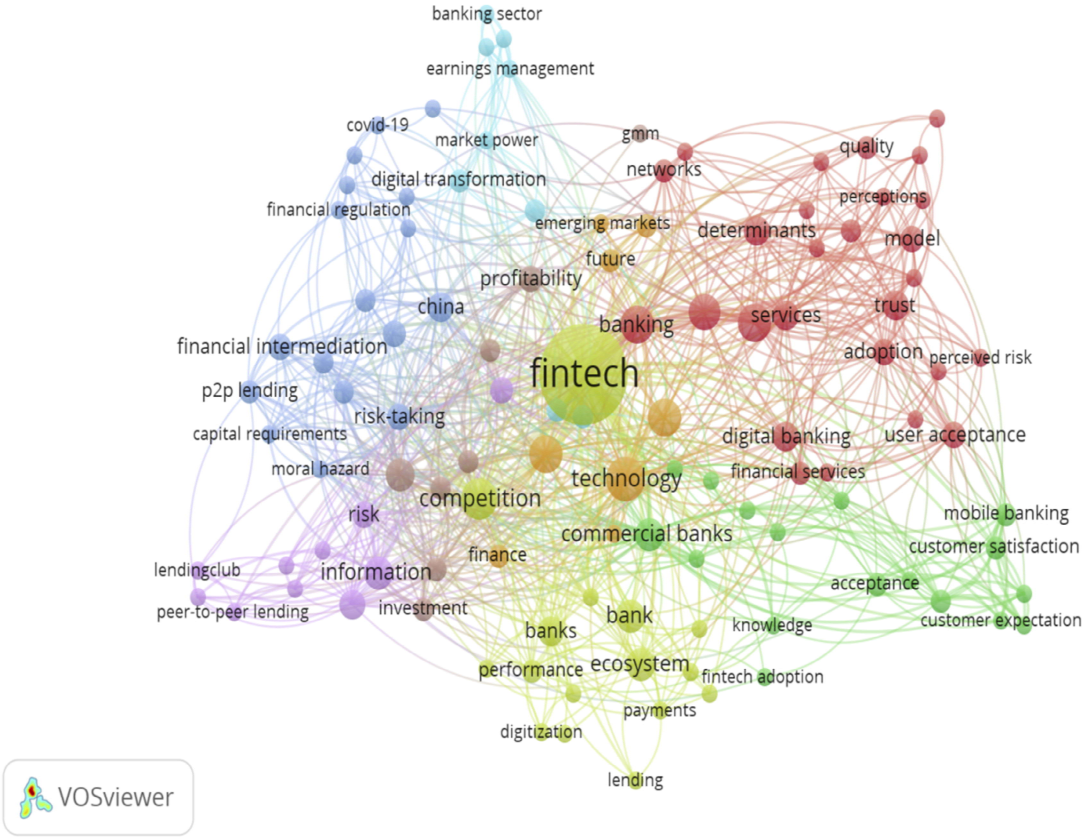

Figure 6. Co-occurrence of keywords

4.2. Content analysis (RQ4)

The content analysis technique was applied on 93 articles extracted from Web of Science to fulfill RO2. As a result of content analysis and categorizetion of topics, we can group the previous literature into four additional sub sections. The categories of sub sections are 1) Adoption of FinTech (30 articles), 2) FinTech innovations (23

articles), 3) The role of artificial intelligence (AI) (21 articles) and 4) Crowdfunding (19 articles).

4.2.1. Adoption of FinTech

Adoption of FinTech was the most commonly found theme in the literature. This section includes 30 articles. Fintech services have enlarged the awareness of the consumers and adoption as well. According to FinTech Adoption Index 2019, the average FinTech adoption rate has touched 64% across the world with much of the gorwth rate in China and India with 87%. There is an increasing trend in the number of FinTech users because of numerous FinTech services. There is frequent FinTech services at present but only few of them are successful (Singh et al., 2020). Mobile payment is one of the FinTech services from banks or FinTech companies where customers can use smartphones or other mobile devices to buy merchandises or to pay utility bills (Hasan et al., 2021; Lee et al., 2019). Table 4 represents the top ten most commonly words by applying NVivo 12. The words "Fintech" and "Banks" are leading words in adoption of FinTec section with 4.11% and 3.70% respectively. Figure 7 represents word cloud of adoption of FinTech section by applying NVivo 12. This figure revelas that "fintech" and "banks" are most repeated terms used in banking sector. Furtherore, Figure 8 indicates adoption of FinTech word tree covering various research areas of the FinTech and banking sector that research scholars have investigated. This figure accumulated on NVivo 12 using 30 articles of adoption of FinTech extracted from Web of Science. The trending aspects relating to adoption in this tree chart are users' attitures for adoption, technology adoption, risks affect fintech services adoption, fintech adoption contributes to sustainability, fintech adoption has a positive linkage with financial risk and fintech adoption significantly affects sustainability.

4.2.2. FinTech Innovations

This section encompasses 23 articles that belong to FinTech innovations. The challenges for the banking sector is how to renovate existing monumental information communications technology system to be competible with possible extentions that can be extended in an open-source architecture (Milošević et al., 2022). In banking sector, new approaches require that every employee

Table 4. Word Frequency Query Results

Word	Length	Count	Weighted Percentage (%)	Similar Words
Fintech	7	101	4.11	Fintech
Banks	5	91	3.70	bank, bank', banking, banks, banks'
Study	5	45	1.83	studied, studies, study
Financial	9	40	1.63	Financial
Services	8	40	1.63	service, services
Adoption	8	37	1.51	adopt, adopted, adopting, adoption, adoptions, adopts
Technology	10	35	1.42	technological, technologies, technology
Model	5	26	1.06	model, modeling, modelling, models
Using	5	26	1.06	used, useful, usefulness, uses, using
Findings	8	25	1.02	findings, finds

Source: NVivo 12

Figure 7. Adoption of FinTech Word Cloud

Source: NVivo 12

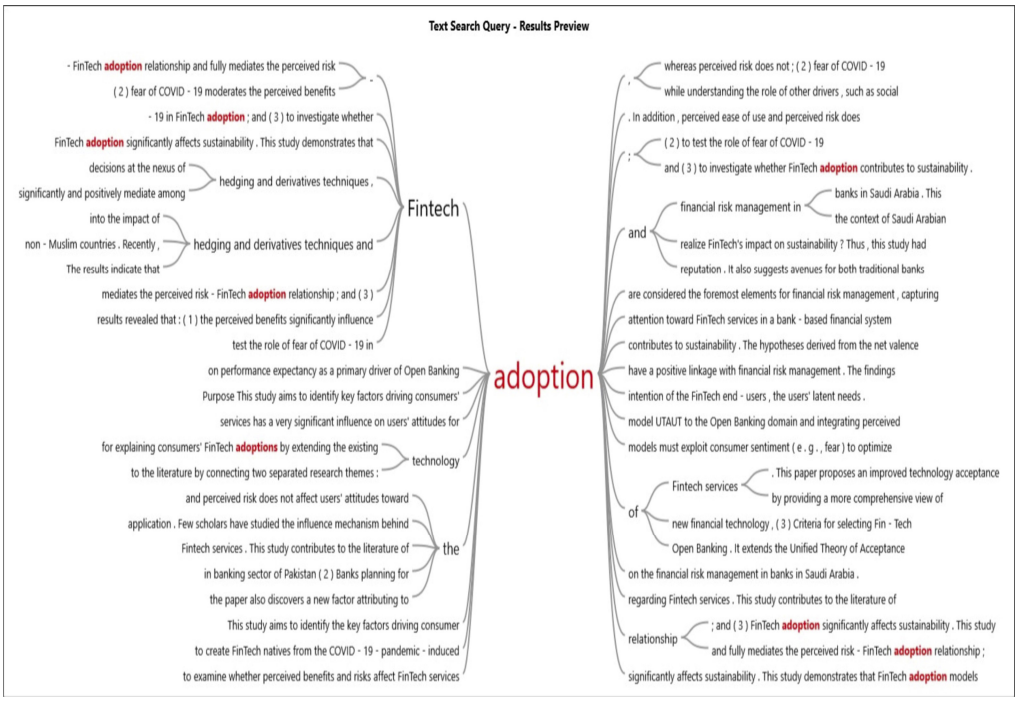

Figure 8. Adoption of FinTech Text Search Querry

Source: NVivo 12

fully knows the new products, not only in the department but also be able to produce new ideas for innovation and demand (Nātriņš et al., 2021). A study conducted by Lee et al. (2021) to evaluate the impact of FinTech innovations on bank efficiency in China. Researchers reveal that FinTech innovations enhance the cost efficiency and technological gap of commercial banks. The results of existing literature show that commercial banks can take pleasures of technology by using FinTech innovations, such as optimizing operating performance and improving risk control capabilities (Li et al., 2022). There are numerous factors of the illegal income legalization such as money laundering which can be prevented through the role of FinTech innovations (Lebid et al., 2018). Table 5 presents the top ten most frequently words by applying NVivo 12. The words "Banks" and "Fintech" are leading words in FinTech Innovations section with 5.54% and 4.36% respectively. Similarly, Figure 9 reveals the word cloud of FinTech Innovations section and indicates that "Bank" and "fintech" are most repeadted terms used by researchers. Figure 10 represents FinTech Innovations word tree covering numerous research areas of the FinTech and banking sector that various research scholars have investigated. This figure assembled on NVivo 12 using 23 articles of FinTech Innovations section extracted from Web of Science. The trending aspects relating to innovations in this tree chart are business process reengineering, commercial banks' efficiency, mediating role of fintech innovation, organizational innovation, technological innovation, innovation and risk management, innovation can improve risk management and innovation can reduces banks' profitability.

4.2.3. The Role of Artificial Intellegence (AI)

Artificial intelligence is one of four ABCDs (Artificial Intelligence, Blockchain, Cloud Computing, Big Data) of FinTech and has received considerable attention in research (Lopes, 2022). The role of artificial intellegence section consists of 21 articles. "Artificial intelligence" means the science and engineering of making intelligent machines(Schuett, 2019). AI has already transformed all kinds of industries such as retail, services and manufacturing. This technological revolution has threatened the economy and labor particularly after growing at the rate of 20% per year (Belanche et al., 2019). In contrasat to the threats created by AI, robo-advisors has

Table 5: Word Frequency Query Results

Word	Length	Count	Weighted Percentage (%)	Similar Words
Banks	5	150	5.54	bank, banking, banks, banks'
Fintech	7	118	4.36	fintech, fintechs
Financial	9	45	1.66	Financial
Innovation	10	34	1.26	innovation, innovations, innovatively
Services	8	32	1.18	service, services
Risk	4	28	1.03	risk, risks
Technology	10	28	1.03	technological, technologies, technology
Industry	8	27	1.00	industrial, industries, industry
Study	5	26	0.96	studied, studies, study, studying
Research	8	25	0.92	research, researchers, researching

Source: NVivo 12

Figure 9. FinTech Innovations Word Cloud

Source: NVivo 12

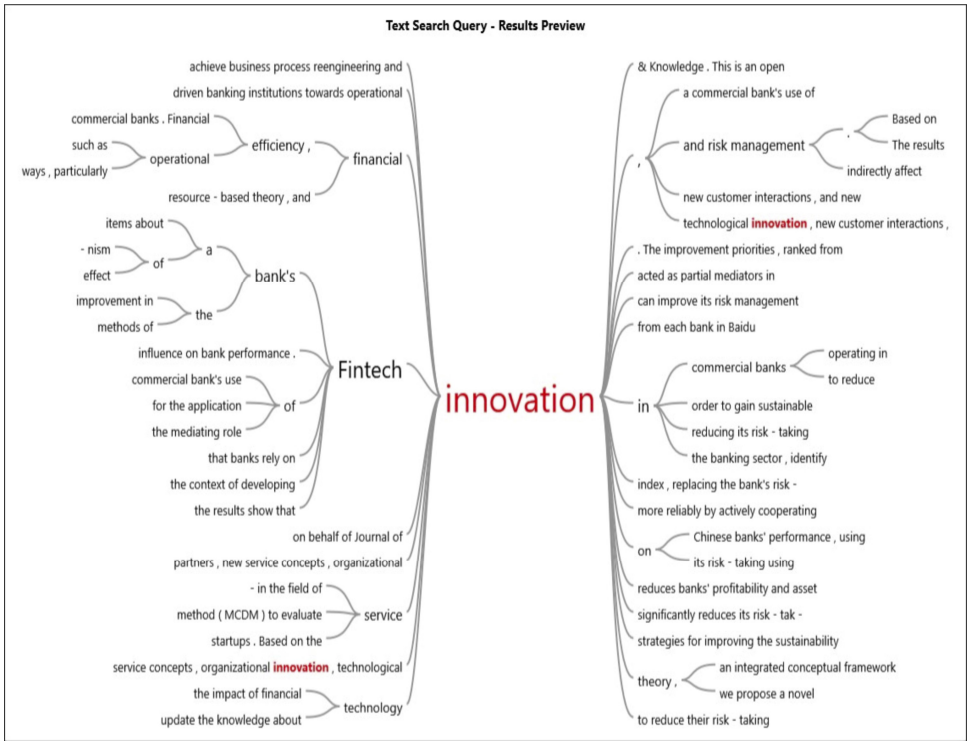

Figure 10. FinTech Innovations Text Search Querry

Source: NVivo 12

reduced fees and provided 24/7 access to finanical activities (Park et al., 2016). In various industries, the digital transactions have been driven by the development of AI (Thowfeek et al., 2020). AI provides business solutions and is basis for abilities in almost all types of business organizations (Chui, 2017). AI functions improve managerial performance and construct competitive advantages. AI provides more than enough business opportunities that enhance the economic growth of various nations (Nadimpalli, 2017). Banks have a golden opportunity to improve interest incomes, lower casts and enhanced customer satisfaction through AI. Table 6 reveals the top ten most frequently words by applying NVivo 12. The words "Banks" and "Fintech" are leading words in Role of AI section with 7.86% and 4.99% respectively. Figure 11 discloses the word cloud of Role of AI section and indicates that "Banks" and "fintech" are most repeated terms used by researchers. Word tree map of Role of AI section presented in Figure 12 which is assembled by using 21 articles extracted from Web of Science. This figure indicates that the directions of AI are financial organizations and AI, commercial banks and AI, risk reduction, AI based fintech firms has various mergers and acquisitions, AI is unique promise of combined cost reduction and AI is creating a rush of opportunities in the financial sector.

4.2.4. Crowdfunding

Interestingly, crowdfunding emerged as the fourth theme in "Fintech in Banking" literature. The section of crowdfuning includes 19 articles extracted from Web of Science. Crowdfunding illustrate encouragement from concepts like micro-finance (Morduch, 1999). Crowdfunding is a technique for funding a selection of new business enterprises for culture, profit or social projects to request funding from many individuals (Mollick, 2014). New business enterprises need resources to succeed and one the most important is financing. In current years, crowdfunding has appeared as a new technique for enterpreneurial ventures to secure funds withoud traditional sources of venture investment (Gompers & Lerner, 2004; Kortum & Lerner, 2001). Table 7 reveals the top ten most recurrently words by applying NVivo 12. The words "Banks" and "Fintech" are leading words in Crowdfunding section with 4.87% and 2.76% respectively. Figure 13 unveils the

Table 6: Word Frequency Query Results

Word	Length	Count	Weighted Percentage (%)	Similar Words
Banks	5	115	7.86	bank, banking, banks, banks'
Fintech	7	73	4.99	fintech, fintechs
Credit	6	36	2.46	credit, crediting
Development	11	24	1.64	develop, developed, development, developments
Financial	9	24	1.64	Financial
Risk	4	24	1.64	risk, risks
Technology	10	21	1.43	technologically, technology
Competition	11	13	0.89	competition, competitive, competitiveness
Commercial	10	12	0.82	Commercial
Companies	9	12	0.82	Companies

Source: NVivo 12

word cloud of Crowdfunding section and points out that “Banks” and “fintech” are most repeated terms used by researchers. Figure 14 represents Crowdfunding word tree covering numerous research areas of the FinTech and banking sector that various research scholars have investigated. This figure assembled on NVivo 12 using 19 articles of Crowdfunding section extracted from Web of Science. The trending aspects relating to innovations in this tree chart are crowdfunding has an impact on retaining customers in Islamic banks, crowdfunding segment amounts to $5,250 mn in 2018 and crowdfunding should be integrated into the Islamic banking system.

Figure 11. Role of AI Word Cloud

Source: NVivo 12

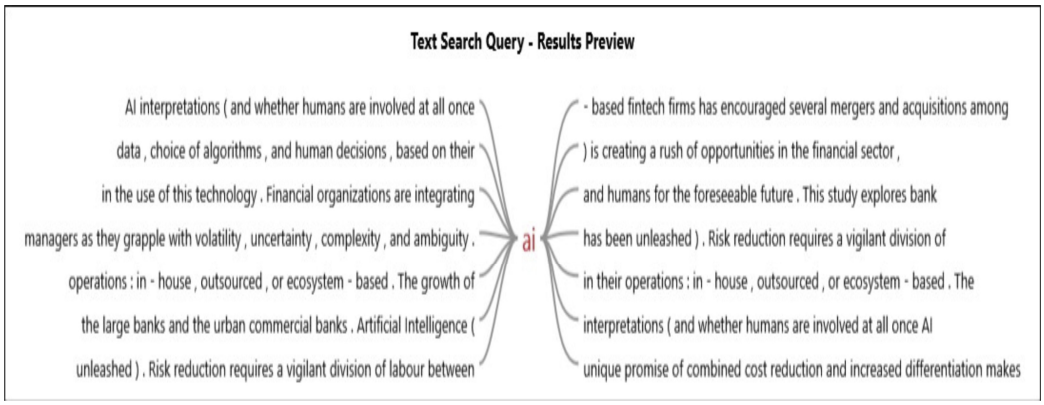

Figure 12. Role of AI Text Search Querry

Source: NVivo 12

Table 7. Word Frequency Query Results

Word	Length	Count	Weighted Percentage (%)	Similar Words
Banks	5	99	4.87	bank, banking, banks
Fintech	7	56	2.76	fintech, 'fintech, fintechs
Financial	9	23	1.13	financial, financially
Technology	10	22	1.08	technological, technologies, technology
Lending	7	20	0.98	lend, lending
Finance	7	17	0.84	finance, financing
Customer	8	16	0.79	customer, customers
Model	5	16	0.79	model, modeling, models
Risk	4	16	0.79	risk, risks
Loans	5	14	0.69	loan, loans

Source: NVivo 12

Figure 13. Crowdfunding Word Cloud

Source: NVivo 12

5. DISCUSSION

FinTech is now used by evey bank with services such as online payments, mobile banking, investment schemes and so forth. However, banks are moving towards digitalization at slow process and large technological companies have become their rivals starting their own fintech services. FinTech companies are offering numerous services depending upon their business models and it is need of the hours to implement new tools and techniques that help in the new procersses (Barroso & Laborda, 2022).

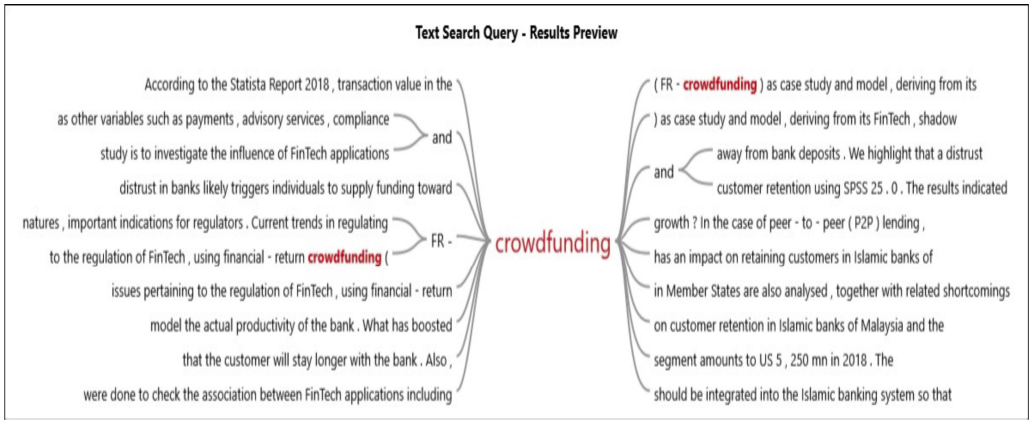

Figure 14. Crowdfunding Text Search Querry

Source: NVivo 12

The current study systematically review the 93 research article which are related to application of FinTech in banking. There are many useful insights that tell us in great detail about current trend in FinTech research. Table 1 reveals that China is leading country to produce 22 articles (5 MCP and 17 SCP) in terms of corresponding authors' country. Table 2 and figure 4 represents the most cited countries and United States is leading with 423 total citations (TC) and 42.30 average article citations (AAC). Figure 5 discloses that "fintech" is the most frequently used keyword by the authors and finally table 3 and figure 6 also show that "fintech" is the most repeated keyword.

On the other hand, in content analysis technique, 93 articles have been categorized in four sections namely Adoption of FinTech, FinTech innovations, The role of artificial intelligence (AI) and Crowdfunding. Each section is analysed through word frequency query results, word cloud and tree map. All the tables and figures in content analysis technique reveals that terms "Banks" and "Fintech" are most frequently used word in existing literature.

The results of the study provide insights which will help the researchers to understand the future directions of FinTech. Our study reveals only 8 countries are represented in studies greater than three. We recommend future researchers especially in underdeveloped countries, Africa and South America to probe into FinTech in banking domain. In systematic literature review we find that out of found ABCDs of FinTech, studies in banking sector have focused mostly on artificial intelligence. Future research should incorporate how blockchain technology, cloud computing and big data influencing the FinTech implementation in the banking sector.

6. CONCLUSION

The present study aims to concisely present a systematic literature review of "FinTech and banks". The paper sheds the light on the directions of future research in the domain of financial technology. FinTech can be considered a bag full of opportunities and risks for all the stakeholders. Correspondingly, the appearance of financial

technology is posing new opportunities and threats for various stakeholders in the field of financial services. The arrival of FinTech services and products has compelled the regulatory authorities to launch new regulations in the field of FinTech. A set of limitations is a part of the studies, so our study has also some limitations such as articles reviewed in this study have been extracted only from Web of Science and other databases have been ignored. Another limitation is small time spam from 2016 – 2022. Finally, in this study only research articles have been reviewed and other type of documents have not been paid any attention such as books, book chapters, conference papers and editorials etc. The future studies should review the documents extracted from other databases such as Scopus.

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УСВАЈАЊЕ ФИНТЕКА У БАНКАРСТВУ: СИСТЕМАТСКИ ПРЕГЛЕД СА БИБЛИОМЕТРИЈСКОМ И САДРЖАЈНОМ АНАЛИЗОМ

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Извод

Ова студија представља свеобухватан преглед утицаја финансијске технологије (FinTech) на банкарски сектор, анализирајући кључне трендове и предлажући будуће правце истраживања за решавање изазова и могућности у овој области. Користећи PRISMA дијаграм тока, студија анализира 93 рада о FinTech у банкарству објављених између 2016. и 2022. године из базе података Web of Science. Применом библиометријских и садржајних анализа, RStudio, VOSviewer и NVivo се користе за дескриптивне анализе, ко-учесталост кључних речи и садржајне анализе, респективно. Кина предњачи у броју истраживачких публикација о FinTech и банкарству, док Сједињене Државе надмашују све друге земље по укупном броју цитата. Дијаграми облака речи и анализе учесталости откривају да су "банке" и "FinTech" често помињани. Студија идентификује "усвајање", "иновације", "вештачка интелигенција" и "crowdfunding" као примарне теме истраживања. Наглашавајући глобалну интеграцију блокчејна, облачног рачунарства и великих података у FinTech истраживања, студија пружа драгоцене увиде у могућности и ризике повезане са технолошким напретком у финансијском сектору.

Кључне речи: FinTech, усвајање, библиометријска анализа, систематски преглед литературе (SLR), иновација, VOSviewer

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