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Paradigm shift in the digital transformation of the banking sector: A bibliometric analysis

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ABSTRACT

This study attempts to provide a comprehensive analysis of the impact of digital technology on the banking industry. The banking industry is undergoing a rapid paradigm shift, driven by the need for reliable, intuitive, and efficient financial services, as well as the proliferation of innovative financial technologies and changing regulations. This calls for a comprehensive study of digital transformation in the banking industry. The main objective of the study is to analyze the growth pattern of technological transformation in the banking industry. This paper adopts bibliometric analysis of data with substantial use of R package and VOSviewer software. The study examines 328 articles published in the Web of Science and Scopus databases between 2009 and 2023. The results show an increasing trend of 18.29% in the publication of articles based on their annual production. The study conducted a network analysis to identify the paradigm shift in banking technology related to FinTech, innovation, digital transformation, adoption of digital banking technology, digital economy, e-commerce, and digitization. The results show that the period from 2017 to 2023 is of great importance, as it has witnessed a significant increase in the volume of publications related to digital transformation in the banking sector.

1. Introduction

The banking sector is undergoing a significant transformation due to advancements in digital technology. Recently, banks have recognized that embracing digital change is both crucial and necessary. This shift has greatly affected various aspects of banking, including customer interaction and operational procedures. Digital Transformation (DT) involves the integration of various FinTech solutions to automate, improve, and digitalize processes while enhancing data security. In banking, digital transformation entails the extensive incorporation of digital technology, data analysis, and a focus on customer needs to fundamentally alter traditional banking practices and services. Banks now typically provide comprehensive services via mobile phones, tablets, and other internet-connected devices. The use of technologies like artificial intelligence, blockchain, cloud services, and mobile apps has led to better operational efficiency, increased customer satisfaction, and sustained competitiveness in the financial market. Banks now offer services that are accessible 24/7 without the need for paper, physical branches, or signatures, allowing customers to conduct financial transactions at any time, even on bank holidays (Meena and Parimalarani, 2020).

The investigation of digital transformation holds significant importance in the current context, owing to the streamlined processes that have become accessible across all sectors of the economy, particularly after the advent of digitalization. Technology is the most important factor, making it possible for banks to stay competitive by combining information with new products or services. Today, many chores are completed electronically due to the widespread usage of information technology at home and in business (Amudhan et al., 2022). Banks necessitate technology platforms for quickly and cheaply designing, building, or plugging in new technological products and services. Digital product platforms must be component-based, API-driven, and cloud-native (Gogia and Chakraborty, 2022).

The banking sector has expanded significantly throughout the years. The introduction of novel transaction methods such as digital banking and the

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sustained expansion of the Indian economy in 2010 led to a nearly doubling of Automatic Teller Machine locations across the country. In 2016, the most digitalized services were the unified payment interface (UPI) and the BHIM app, which provided all customer services (Vidya and Shailashri, 2021). The end goal of digital transformation is to understand and meet the needs of customers with the click of a mouse. Elegance and technological sophistication, including adaptable services, novel business models, and accelerated time-to-market, are at the heart of digital transformation (Jayasheela and Sujatha, 2022).

This study aims to address the following questions: 1) What is the pattern of growth in technology transformation within the banking sector, as shown by the number of articles published by various authors and countries? 2) Who are the prominent authors, and what are their sources of publication? To answer these questions, the study will perform a bibliometric analysis using the R package and VOSviewer, utilizing databases like Scopus and Web of Science. The main goals of this study are to determine how articles on the technological transformation of the banking sector are distributed among different countries and authors and to identify leading authors and their publication sources concerning digital transformation. This bibliometric analysis of digital transformation in banking is particularly important for investors, customers, researchers, banks, and the general public. It provides valuable information and insights into the banking industry, aiding in making informed decisions.

2. Literature review

The existing collection of literature provides a comprehensive understanding of the technological shift in the banking industry. The increasing yearly volume of publications on digital transformation in the banking sector offers valuable perspectives on the transformation that occurred in digital banking. Digital transformation in banking involves four factors: organizational culture, digital technology, digital banking transformation methods, and banking services. A complete transformation strategy can help a bank diagnose digital cultural banking, innovation and deployment layouts, control data, and customer understanding (Khanchel, 2019). The transition from conventional to direct banking does not occur for rational reasons. The benefits of direct banking are substantial enough to make explicit that financial institutions ought to move towards greater ease of access, transparency, and usability and, most importantly, to reduce costs and provide higher interest rates on deposits. It was successful, but only among those who were particularly price-conscious, logical, financially astute, and computer-literate (Filotto et al., 2021).

The use of digital technologies, such as the internet, computing on the cloud, and big data retention, in banking operations holds the potential to expedite the advancement towards the standardization of financial services for subsequent banking models, encompassing non-cash payment activities (Tran et al., 2023). Financial technology can benefit from blockchain, cognitive systems, big data analytics and visualization, robo-advisors, and RPA (robotic process automation) to help with the ongoing digital transformation process. Benefits may include the potential for reduced expenses or new avenues for product sales (Werth et al., 2020). The three characteristics of digital transformation contribute to gaining an edge over the competition: innovation, service quality, and the organizational learning given to employees. The greatest challenge in digital transformation is communication networks, especially in remote areas, while accessing mobile banking (Laila and Kusumawardhani, 2020).

The customers primarily deploy the National Electronic Fund Transfer System, debit cards, credit cards, and the Unified Payment Interface in terms of digital payment systems (Kitsios et al., 2021). The latest technological innovations in FinTech include artificial intelligence, machine learning, predictive behavior analytics, data-driven marketing, chatbots, and distributed ledger technologies (Sendjaja et al., 2022). In the current modern period, artificial intelligence (AI) and big data analytics (BDA) have emerged as key players. Artificial intelligence and behavioral data analytics are helping banks become more data-driven and customer-centric (Indriasari et al., 2019).

The rise of solely digital banks and mobile banking applications shall render privacy and security a top focus for financial technology. Data mining, FinTech artificial intelligence, and the adoption of blockchain will increase the prevention of cybercrime and data theft prevention in financial products and services (Wewege et al., 2020). Financial institutions are implementing biometric technologies to secure bank transactions by recognizing individuals based on their distinctive physical and behavioral traits. Authentication and validation are crucial phases in the user transition that require varying levels of security. Advancements in technology provide effective security solutions like biometrics (Khanboubi et al., 2019). Blockchain-based payment systems offer fast and revocable transaction capabilities. Moreover, particularly in the case of high-value goods, they are comparatively more cost-effective when compared to utilizing financial services. Blockchain technology also provides data privacy and security (Del Sarto et al., 2023). Banks perceive risk in not adapting quickly to shifting client needs, product deterioration, and advances in technology. Data security is a top priority for all financial institutions. Financial institutions frequently enhance their cybersecurity and regulatory protocols, encompassing both technological advancements and procedural enhancements (Pramanik et al., 2019). These research reviews explain the significance and relevance of digital transformation in the banking sector.

3. Methodology

The study employs the "Biblioshiny" feature of the "Bibliometrix" R package to perform additional analyses based on initial findings. The main sources for data collection in this bibliometric analysis were the Web of Science and Scopus databases. These databases hold extensive records of various types of publications, including articles, conference proceedings, and book chapters. Initially, the study found 528 documents related to "digital transformation in banking" in the Web of Science database and 437 documents in the Scopus database. The criteria for including documents in the study are:

- Articles that discuss digital transformation in banking and financial services are taken into account, which is the research topic of the study.
- Articles published from 2009 to 2023 are considered for the study because these are the periods when a high volume of articles related to the research area were published.
- The article's subject area included business, management and accounting, economics, econometrics, and finance since the research topic appears in these areas.
- Articles that are published in the English language alone are considered.
- Articles, conference papers, and review papers are taken into account due to the huge volume of articles identified from these sources.

The exclusion criteria of the study include:

- Articles that are unrelated to the subject of the study.
- Articles published before 2009 are not included.
- The subject areas other than those mentioned in the inclusion criteria, i.e., engineering, psychology, mathematics, art and humanities, decision sciences, and environmental sciences, are not included in the study.
- Articles published in languages other than English are not considered.
- Book chapters, editorial material, early access, and Data papers are not included in the study.

Finally, after the inclusion and exclusion criteria, 240 articles from the Web of Science and 113 articles from the Scopus database were extracted for the study. Later on, both databases were combined with the help of the R studio package to remove duplicates. The total number of duplications removed is 25. Overall, 328 combined articles were finalized for further research.

4. Results

Bibliometric analysis was conducted to unveil the results of the study. A bibliometric approach is a statistical tool for combing through large amounts of research literature (Donthu et al., 2021; Ellegard and Wallin, 2015; Dede and Ozdemir, 2022; Lee et al., 2020; Wallin, 2005; Zupic and Cater, 2015). Bibliometric data and analytical methodologies first gained popularity in the 1980s. At first, bibliometrics was primarily a field of mathematical modeling for analysts, content investigators, and social scientists. Massive amounts of bibliometric information stored in digital form are now readily accessible (Ball and Tunger, 2006). Bibliometric methods are used to determine scientific indicators, evaluate scientific output, acquire journals for libraries, and even predict the future of a topic. The widespread use of bibliometric methods in numerous fields fostered a boom in bibliometric literature (Kumar, 2014). The past few years have seen a proliferation of research performance measures and tools for assessing individual journals, individual writers, entities, sovereigns, and nations. Bibliometric analysis keeps tabs on research output and visualizes scientific expertise within the framework of theory, philosophy, and society (Seidu et al., 2021). This article bestows the literature by offering an extensive bibliometric analysis of published works on digital transformation in the banking industry. The core information from the retrieved set is shown in Table 1.

Table 1: Main Information about the data

Description	Results
Sources (journals, books, etc.)	236
Documents	328
Annual growth rate	18.29%
Timespan	2009-2023
Keywords plus (ID)	572
Author's keywords (DE)	1258
Average citations per document	7.756
Single-authored docs	43
References	6541

Table 1 depicts the sources of articles collected from journals and books, the total documents selected for the literature, the average proliferation rate of documents, the period of the papers published, and the number of keywords used in the studies. Further, it includes the author's keywords, the average number of citations per document, the article that was published by a single author, and the overall references from all the articles.

The average proliferation rate of the published articles is presented in Fig. 1 from 2009 to 2023. This shows a rapid increase in the production of articles. The maximum production of the articles took place in the year 2022. The increasing trend in the publication of articles denotes a tremendous increase in the research field on the banking industry. The average number of citations within the study is displayed in Fig. 2. This shows that the average number of citations per year initially increased in 2011, followed by 2018 and 2021. There was a huge increase in the year 2018 due to research by Gomber et al. (2018). This paper discusses the new method of mapping FinTech innovation across four distinct domains: operations administration, stakeholders' value related to remittances, digital currencies, blockchain, overseas

payments, novelties that impact financing and saving services, collaborative lending, and societal networking adoption. In 2021, there is a considerable increase due to work by Dziamulych et al. (2021). This paper deals with the global trends in bank digitalisation based on the impact factors such as automation, digital sales, innovative offers, competitors and business models, margin reduction pressure, and increased operational risks. Fig. 3 shows the ten most influential references concerning digital transformation in banking. The journal "Sustainability" published approximately 18 papers relevant to the research topic. The journal "Financial and Credit Activity: Problems of Theory and Practice" contributed 8 papers, while "Finance: Theory and Practice" accounted for 5 papers.

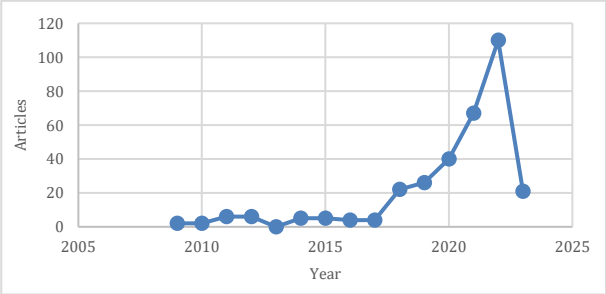

Fig. 1: Annual growth rate

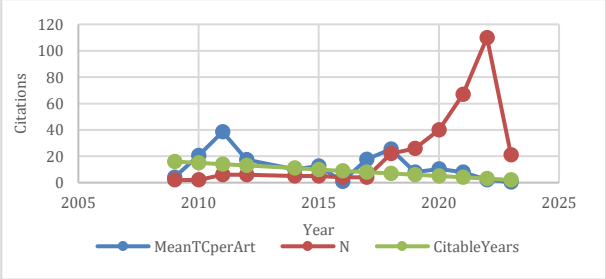

Fig. 2: Average citations per year

The top three journals in this study, identified as significant contributors to research on digital transformation in banking, are analyzed further by reviewing the production of articles from 2009 to 2023. This analysis is detailed in Fig. 4, which shows constant growth across all sources. The Journal of Payment Strategy and Systems, Finance: Theory and Practice, and the International Journal of E-services and Mobile Applications demonstrate the highest growth rates. Specifically, "Technological Forecasting and Social Change" experienced a notable increase in 2021, as illustrated in Fig. 4.

Furthermore, Fig. 5 presents the top 20 globally cited documents. According to Fig. 5, the paper by Gomber et al. (2018), published in the Journal of Management Information Systems, is the most cited document globally with 327 citations. "Management Decisions" by Liu et al. (2011) holds the second position with 140 citations, and "Ecosystem Services" by Lajoie-O'Malley et al. (2020) is third with 77 citations.

The final one speaks about the complete transformation of current online banking systems to a higher level of customer relations, achieved through the implementation of novel solutions and software products and resulting in the birth of an entirely different digital banking system.

Fig. 6 displays the top twenty pertinent authors and their production of articles over time. The number of articles published by each author can be established based on the size of the circle. Based on the production of articles, Hassan M and Britanak V are the top two leading authors. Based on the citations, Gomber et al. (2018) have a high number of citations.

Table 2 depicts the most influencing articles based on the total citation index. According to Table 2, the article by Gomber et al. (2018) gained first place. The article by Kauffman and Riggins (2012) is in the second, and the work by Dziamulych et al. (2021) is in the third position. The first one talks about the new methods of mapping FinTech innovations. The second one explains the role and impact of Information and Communication Technology in microfinance at the customer, institutional, donor, and industry levels.

Table 3 depicts the top 10 systematic productions of articles by different countries. Ukraine retained the first position with 94 documents, Russia with 66 documents in second place, China holding the third position with 55 documents, and India holding the fourth position with 48 documents.

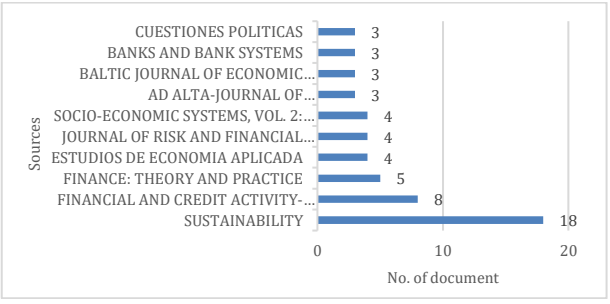

Fig. 3: Most relevant sources

Table 2: Most influencing articles

Author	Source	Times cited	Times cited per year
Gomber et al. (2018)	Journal of Management Information Systems	327	54.50
Kauffman and Riggins (2012)	Electronic Commerce Research and Applications	49	4.083
Dziamulych et al. (2021)	AD ALTA- Journal of Interdisciplinary Research	27	9.000
Siddik and Kabiraj (2020)	Digital Transformation in Business and Society: Theory and Cases	24	6.000
Kaur et al. (2021)	Journal of Financial Services Marketing	23	7.667
Rodrigues et al. (2022)	Research International Business and Finance	9	4.500
Rodrigues et al. (2020)	IEEE Transactions on Engineering and Management	8	4.000
Dehnert (2020)	Business Research	7	1.750
Dziamulych et al. (2022)	AD ALTA- Journal of Interdisciplinary Research	5	2.500
Zuo et al. (2021)	Sustainability	4	1.333

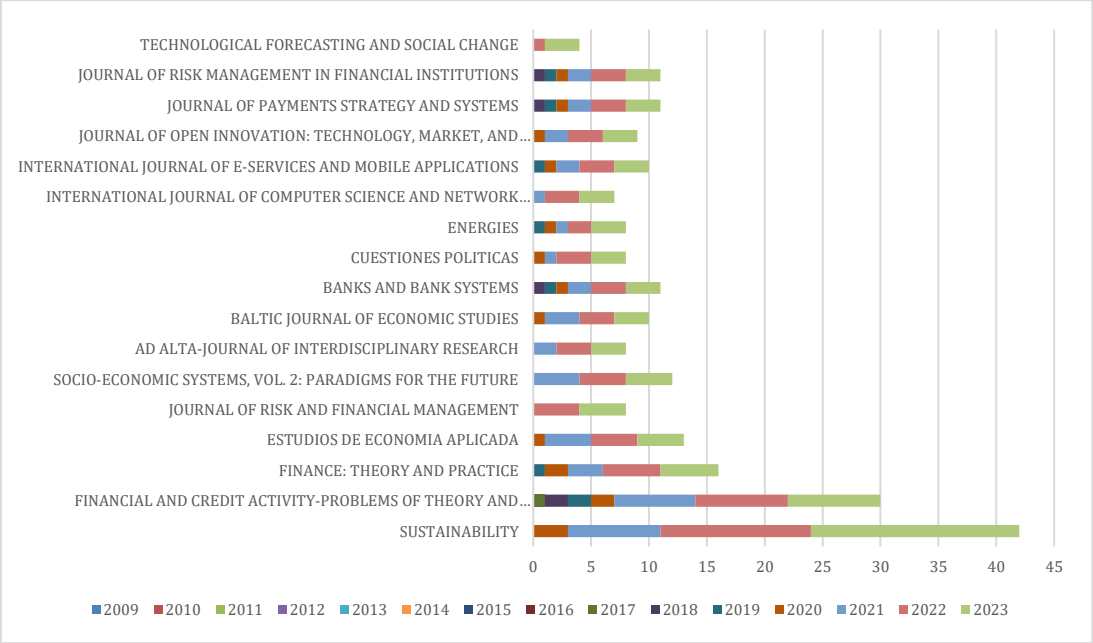

Fig. 4: Yearly production of sources

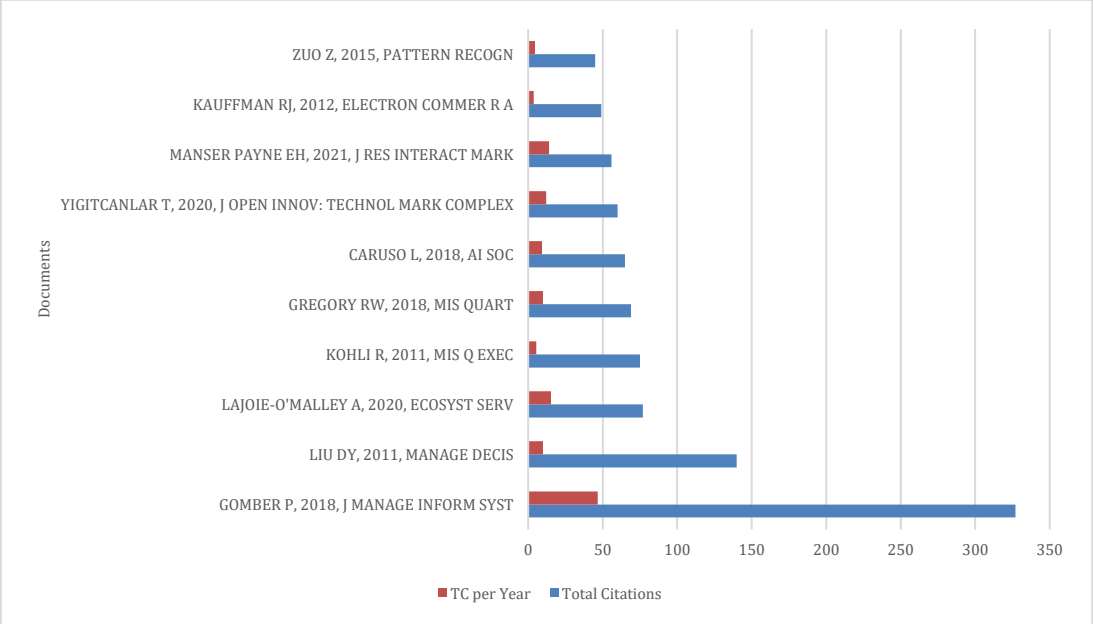

Fig. 5: Most globally cited documents

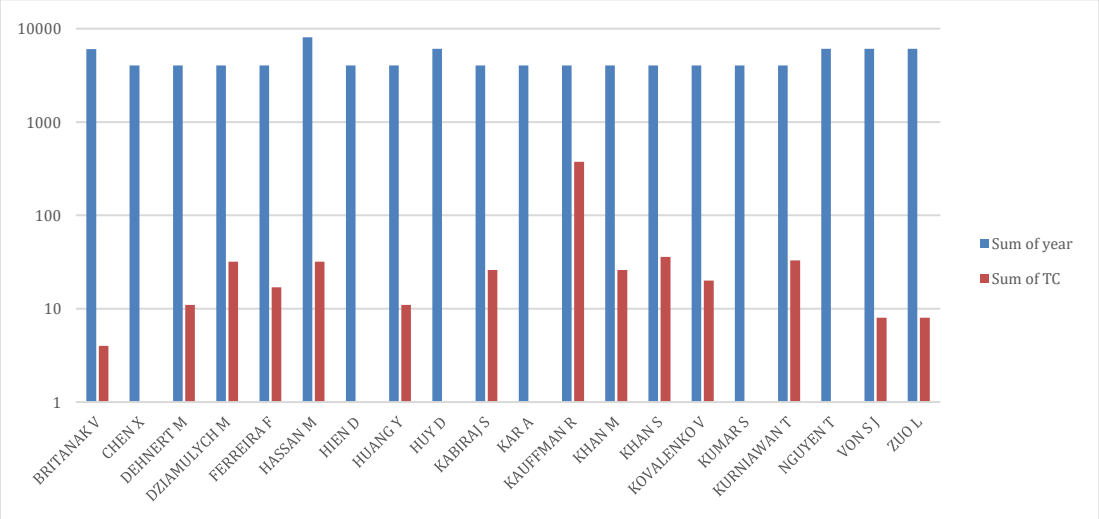

Fig. 6: Most Pertinent authors and production level (Logarithmic vertical axis)

Table 3: Countries' systematic production

Country	No. of documents
Ukraine	94
Russia	66
China	55
India	48
USA	33
Romania	31
Vietnam	26
Poland	23
Italy	19
UK	18

Fig. 7 illustrates the annual production of articles by the top five countries from 2009 to 2023. This data shows that China has the highest annual output of articles. India is in second place, followed by Russia in third place.

Fig. 8 presents a thematic map that plots the relevance (Centrality) on the X-axis against the development (Density) on the Y-axis. Centrality measures the importance of a theme, while Density assesses its development. The graph is divided into four quadrants. Themes in the lower-left quadrant are emerging or declining, representing new areas that might develop further or fade away in the research field. The lower-right quadrant contains themes that are fundamental yet peripheral, indicating they are important but less developed. In contrast, the upper-left quadrant includes robust, mature themes that are as developed as the central themes but perhaps not as central in the discourse. The upper-right quadrant shows themes that are both dense and central, indicating well-developed and pivotal areas of research. This analysis suggests a focus on well-developed and central themes as key drivers in the field (Nasir et al., 2020).

The detailed presentation of the three-field plot is displayed in Fig. 9. Fig. 9 contains the articles contributed by authors, the number of occurrences of keywords, and the cited references provided in the articles. The left column indicates the cited references, the middle column indicates the authors and their contributions, and the right column shows frequently used keywords in the articles. The primary focus is on the height of each box and the thickness of the lines connecting them. The taller the box, the more important it is, and the thicker the lines connecting them, the more knowledge or work was done (Agbo et al., 2021).

The treemap in Fig. 10 shows the combination of different keywords and their occurrences in the articles indicated with their percentage. The network analysis scrutinizes the number of co-occurrences of keyword techniques in VOSviewer software. This software supports only bibliometric raw data files such as Web of Science, Scopus, Dimensions, Lens, and PubMed. Hence, this article used VOSviewer software for the bibliometric data from the Web of Science (WOS) separately and from Scopus separately after removing the duplication of articles. The main cluster of this analysis is portrayed in Table 4, which summarises each cluster and its corresponding keyword. Fig. 11 and Fig. 12 display the analysis of networks that depict the four major clusters from the WoS and the five major clusters from the Scopus database in digital transformation in the banking field. The following are the cluster classifications for WOS and Scopus. WOS: Cluster 1 in red: financial technology or FinTech, Cluster 2 in green: innovation, Cluster 3 in blue: digital transformation, and Cluster 4 in yellow: adoption. Scopus: Cluster 1 in red: digital economy, Cluster 2 in green: technology adoption, Cluster 3 in blue: e-commerce, Cluster 4 in yellow: digital transformation, and Cluster 5 in pink: digitalization.

Under the network analysis based on the WoS, the following clusters have been identified. Cluster 1 is perturbed about financial technology and contains 21 total occurrences, 48 total link strengths, and 21 links. The keywords include bank, banking, big data, blockchain, digital economy, digital technologies, financial services, management, technology, and transformation. FinTech offers alluring promotions, and cardless and cashless transactions are becoming important factors for optimizing financial transactions (Lestari and Rahmanto, 2021).

Cluster 2 is concerned with Innovation in banking and contains 25 total occurrences, 62 total link strengths, and 25 links. The keywords include digital banking, digitalization, industry 4.0, information, internet banking, sustainability, and systems. The emergence of private and international banks stimulated innovation in the banking sector, which in turn activated technical acuity in all banking transactions. As a result, the way banks operate internally and publicly has changed drastically to prioritize client service. Banks that embrace technological and innovative solutions achieve enhancements in quickness, precision, and effectiveness (Hemalatha and Rajitha, 2022). Cluster 3 is perturbed about digital transformation in banking and contains 60 total occurrences, 114 total link strength, and 29 links. The keywords include banks, determinants, impact, performance, and systems. To prove the existence of digital transformation in the banking sector, financial institutions must create a digital transformation strategy, which in turn requires the establishment of key digitalization variables and the measurement of the transformation progress of banking businesses (Zamaslo et al., 2021).

Cluster 4 is concerned about the adoption of digital banking technology and contains 23 occurrences, 56 total links, and 15 links. The keywords include information technology, internet, mobile banking, model and trust. Banks should adopt and use net banking, mobile banking apps, social media, instant apps, progressive web applications, and OTT messaging applications to network with customers. Customers spend a lot of time using such apps, making them easy to approach. Digital transformation has been a buzzword in the financial services sector for more than three decades, but recently, it has become a prerequisite for survival, making it prominent in all financial organizations' actions (Gupta et al., 2022).

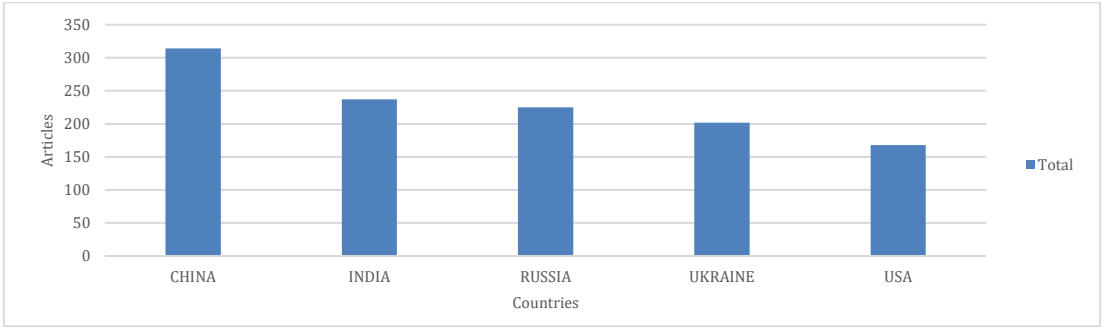

Fig. 7: Production overtime

Fig. 8: Thematic map

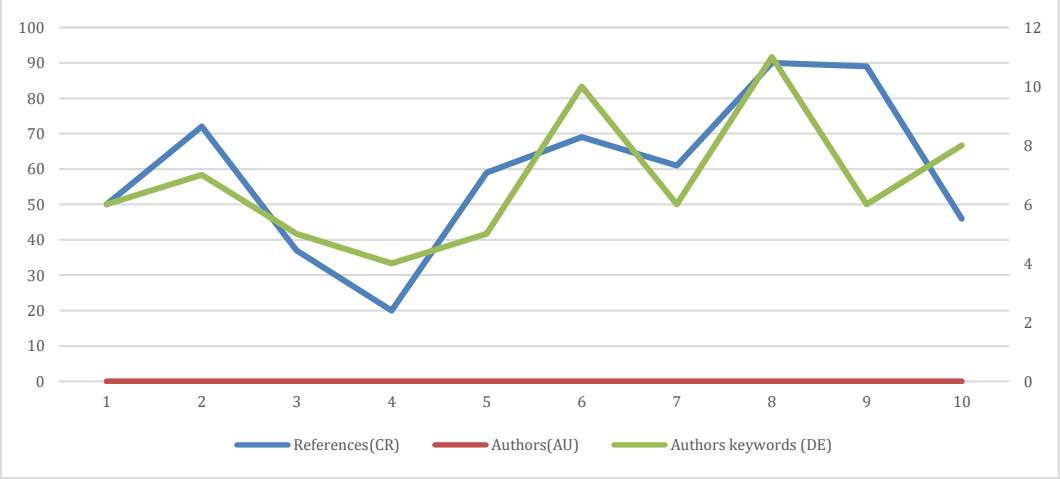

Fig. 9: Field plot

The following clusters have been observed under the network analysis based on the Scopus database. Cluster 1 is concerned about the digital economy and contains 7 occurrences, 11 total link strengths, and 9 links. The keywords include bank, big data, blockchain technology, e-government, finance, financial market, and information technologies. Financial institutions that undergo a digital shift are better able to acquire, retain, and monetize their customer bases. Globalization and intense rivalry have led to the rise of international banking giants.

Cluster 2 is concerned about technology adoption and contains 2 occurrences, 9 total links strengths, and 8 links. Business development, consumer behavior, digitalization, ecosystems, electronic money, information and communication technology and technological development are the keywords included. Cluster 3 is perturbed about E-commerce in banking and contains 3 occurrences, 11 total link strength, and 11 links. The keywords include service quality, customer value, e-service quality, financial services, informational technology, and services marketing. E-commerce might foster quicker, simpler, safer, and cheaper Internet banking payments. These things aid consumers and speed up transactions. Internet banking lets consumers make purchases without worrying about payments. This simplifies business.

Cluster 4 is concerned about digital transformation and contains 41 occurrences, 68 total link strengths, and 29 links. The keywords include banking, banking business model, data mining, digital banking, digital payments, FinTech, and metadata.

Cluster 5 is concerned about digitalization and contains 14 occurrences, 28 total link strengths, and 17 links. The keywords include banks, competition (economics), innovation, reputation, and case study. Banks can mitigate their direct effect on the environment due to digitalization. Bank operations are increasingly being handled electronically, reducing the need for paper, transportation, and air travel. New offerings, amenities, and remote operations allow banks to adapt their business strategies to modern society. Bank inclusivity and accessibility rise with digitalization (Potapova et al., 2022).

These clusters help readers effectively discern the diverse sub-topics and keywords encompassed within the domain of digital transformation in the banking sector.

Table 4: Summary of clusters

Web of Science			
Keyword	Total occurrences	Total link strength	Link
Cluster 1: FinTech	21	48	21
Bank	7	16	12
Banking	10	30	19
Big data	9	25	17
Blockchain	7	21	16
Digital economy	12	10	7
Digital technologies	8	10	8
Financial services	7	18	14
Management	20	43	24
Technology	17	45	23
Transformation	9	27	15
Cluster 2: Innovation	25	62	25
Digital banking	8	25	15
Digitalization	24	50	25
Industry 4.0	7	16	12
Information	12	40	21
Internet banking	9	24	12
Sustainability	7	28	17
System	7	16	11
Cluster 3: Digital transformation	60	114	29
Banks	14	12	7
Determinants	12	35	21
Impact	18	54	21
Performance	18	55	20
Systems	11	23	16
Cluster 4: Adoption	23	56	15
Information technology	10	31	15
Internet	9	23	14
Mobile banking	11	31	15
Model	15	36	17
Trust	7	20	11
Scopus			
Cluster 1: Digital economy	7	11	9
Bank	5	20	15
Big data	3	6	6
Blockchain technology	3	7	7
E-government	2	9	8
Finance	3	14	12
Financial market	3	11	9
Information technologies	2	6	6
Cluster 2: Technology adoption	2	9	8
Business development	2	17	14
Consumer behaviour	2	12	10
Digitalization	4	24	16
Ecosystems	2	9	9
Electronic money	2	13	12
Information and communication technology	4	21	15
Technological development	2	11	9
Cluster 3: E-commerce	3	11	11
Service quality	3	14	9
Customer value	2	12	7
Digitalization	2	12	7
E-service quality	2	12	7
Financial services	7	35	21
Information technology	2	12	7
Services marketing	2	12	7
Cluster 4: Digital transformation	41	68	29
Banking	18	62	26
Banking business model	2	7	7
Data mining	2	9	7
Digital banking	9	15	8
Digital payments	3	4	2
FinTech	19	41	21
Metadata	2	9	7
Cluster 5: Digitalisation	14	28	17
Banks	3	7	5
Case study	2	11	11
Competition (economics)	2	14	13
Innovation	6	16	9
Reputation	2	7	6

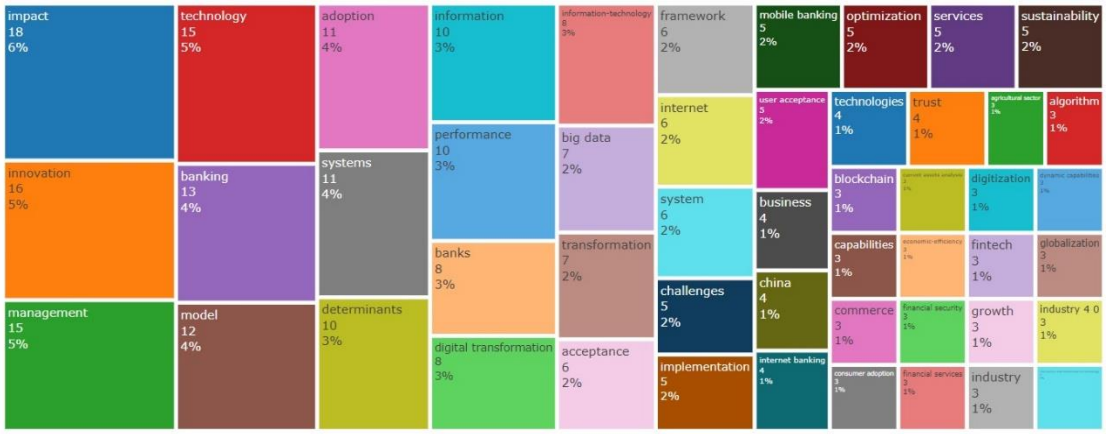

Fig. 10: Tree map

5. Discussion

This paper employs bibliometric analysis and VOSviewer software to summarize research on digital transformation in the banking sector. The analysis shows an annual increase of 18.29% in article production. From 328 documents, 236 sources were identified, with the highest number of articles published in 2022. Since 2011, the average annual citation count of articles has steadily increased, with significant growth in 2018 following research by Gomber et al. (2018) and notable growth in 2021 due to work by Dziamulych et al. (2021). Key journals include "Sustainability," "Financial and Credit Activity: Problems of Theory and Practice," and "Finance: Theory and Practice," producing 18, 8, and 5 papers, respectively. Among the top 20 authors, Hassan M and Britanak V are highlighted as pioneering contributors. The top three contributing countries are Ukraine, Russia, and China.

The thematic analysis outlined four main clusters, each differing in significance. The basic theme cluster includes terms like "digital storage," "financial service," and "economic and social effects." The motor theme cluster encompasses "digital transformation," "banking," and related terms, indicating core areas of ongoing research. "Metadata," "organizational," and "data mining" emerged as niche themes. Declining or emerging themes were identified as "information management," "commerce," and "finance."

The three-field plot organizes the author's contributions, cited references, and frequently used keywords into three columns, respectively. A treemap visually represents the combination of keywords across different articles. Network analysis was conducted with VOSviewer, based on data from the WoS and Scopus databases. After removing duplicates, four clusters were identified under WoS: FinTech, innovation, digital transformation, and adoption. Five clusters were identified under Scopus: digital economy, technology adoption, e-commerce, digital transformation, and digitalization. These clusters aid in pinpointing keywords linked with technological transformation in banking.

Overall, the term "digital transformation" emerges as a critical and unifying theme in both databases, underscoring its importance in addressing comprehensive solutions within the digital information system, integrating all key terms related to technological transformation in banking.

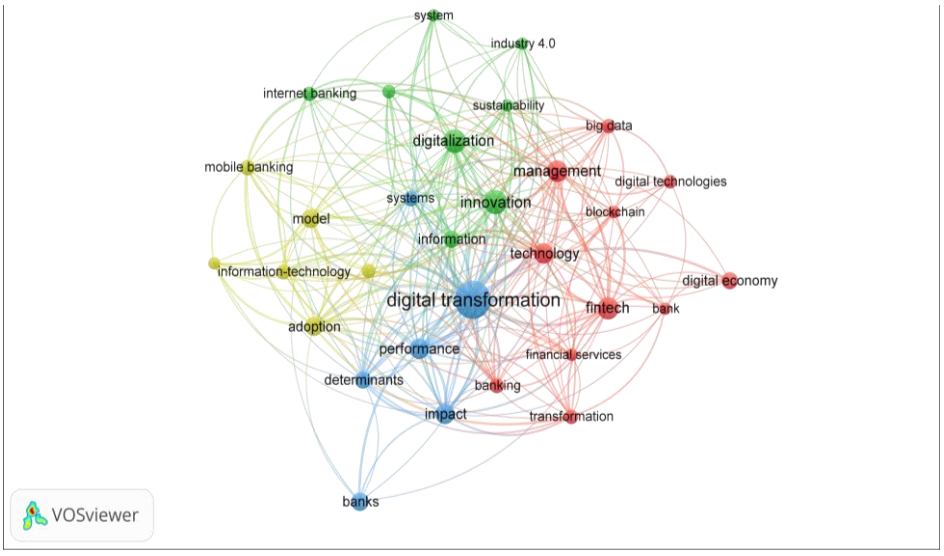

Fig. 11: Analysis of network (WoS)

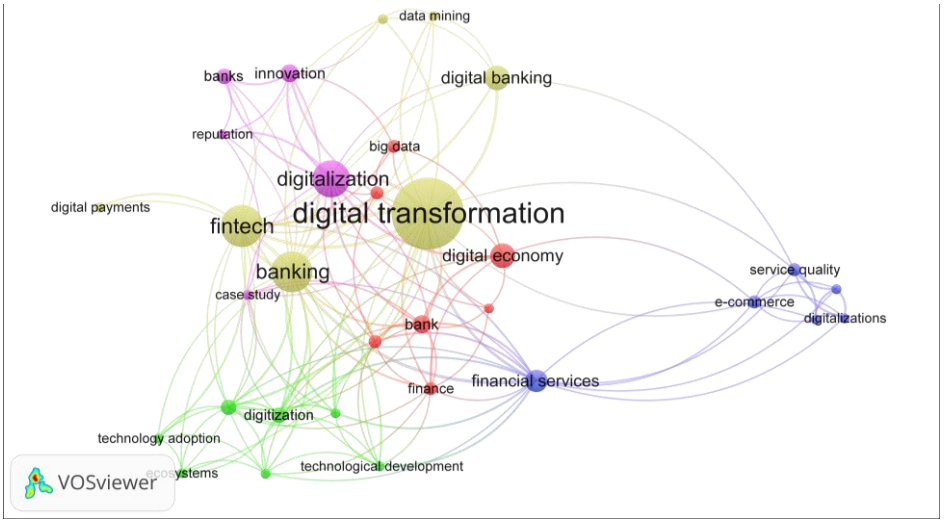

Fig. 12: Analysis of network (Scopus)

6. Conclusion

This study, employing bibliometric analysis and R programming, investigates the growth pattern of articles on technological transformation in the banking industry by prominent authors from various countries. The review reveals that technological advancements in banking have significantly contributed to its growth and development in the digital era. Consequently, there has been a substantial increase in customer use of digital banking features. The research shows a steady increase in publications on this topic from 2009 to the present. Notably, the COVID-19 pandemic further accelerated the adoption of digital banking services, leading to a surge in related articles during this period. This underscores the relevance of the study in the current context. Therefore, this bibliometric review not only broadens the understanding of digital banking among bank stakeholders, aiding in informed decision-making but also provides a foundation for future research into new digital domains.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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