



To cite this article: Mr. Anvar Sadat Z and Dr. S. Chandramohan (2026). EVOLUTION OF RESEARCH ON CUSTOMER ADOPTION OF DIGITAL BANKING SERVICES: A BIBLIOMETRIC STUDY, International Journal of Research in Commerce and Management Studies (IJRCMS) 8 (2): 884-911 Article No. 726 Sub Id 1225

EVOLUTION OF RESEARCH ON CUSTOMER ADOPTION OF DIGITAL BANKING SERVICES: A BIBLIOMETRIC STUDY

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DOI: <https://doi.org/10.38193/IJRCMS.2026.8264>

ABSTRACT

This study analyses the evolution of research on the adoption of digital banking services by customers through bibliometrics. The study analyses publication trends, prominent authors, the major themes, and the contribution of global research based on 1,530 publications, 2000-2025. The results indicate that the research has grown at a high rate since 2015 because of the developments of digital technologies and mobile banking. The research establishes significant factors affecting adoption, such as trust, perceived usefulness, and perceived risk. It also demonstrates the change in the research focus towards mobile banking and fintech innovations, rather than internet banking. These findings reveal powerful roles played by developed and developing nations, where China, India, and the United States are at the top. On the whole, the research offers valuable information about the evolution of this field of research and proposes the future research directions.

KEYWORDS: Mobile banking, Fintech innovations, Internet banking, Digital technologies

1. INTRODUCTION

Background of digital banking and its growth

Over the past few decades, the banking sector has experienced significant transformation driven by rapid advancements in information and communication technologies. Digital banking, which can be described as the provision of banking services by use of electronic banking facilities like internet, mobile phones and automated banking systems, has become one of the most important innovations in the financial services sector. It also allows customers to conduct a broad scope of banking operations, such as transfer of funds, payment of bills, account management, and financial planning, without having to go to physical bank branches (Shaikh & Karjaluo, 2015). Digital banking development can be traced back to the late 20th century with the introduction of automated teller machines (ATMs) and telephone banking. Nevertheless, the introduction of internet banking services came with the



adoption of the internet in the early 2000s when the use of the internet started to gain momentum. The past few years have seen the spread of smart phones and mobile apps, which has further increased the rate of digital banking to the extent that mobile banking has become a popular channel of service provision. The rising speed of the internet and the rising digital literacy of customers worldwide have enabled this switch (Kajol et al., 2022). Digital banking has also increased significantly in growing economies, especially in those where governments and financial institutions have been very active in promoting digital financial inclusion. Efforts made to curb cash dependency and improve access to financial services have helped in the fast growth of digital payment systems and mobile banking platforms. Consequently, digital banking has become an essential instrument to enhance financial inclusion and economic growth (Kumar et al., 2020). Besides, technological advancements like artificial intelligence, big data analytics, blockchain, and cloud computing have greatly increased the capacities of digital banking systems. Such technologies can help banks to provide individualized services, enhance the efficiency of their operations, and enhance security. Meanwhile, they have sparked competition within the banking industry as they have enabled the entry of non-traditional financial service providers and fintech companies (Kaur et al., 2020). Although digital banking has many advantages, its expansion is also fraught with difficulties to address, especially regarding cybersecurity, data privacy, and customer confidence. The fear of the security of online transactions and privacy of personal information remains an issue that affects the adoption of online transactions. However, the further development of digital technologies and the expansion of the use of online financial services indicate that digital banking will continue to play a primary role in the contemporary financial environment.

Importance of customer adoption

The success and serviceability of digital banking services depend highly on their customer adoption. Although banks are still spending a lot of money on digital infrastructure and technological advancements, the success of these investments is mostly determined by the willingness of customers to utilize and constantly use these services. The best digital banking systems might not bring their promised benefits without the active involvement of the users (Venkatesh et al., 2003). Digital banking services adoption can help financial institutions to improve operational efficiency, lower transaction costs, and improve service delivery. Digitally, banking is convenient, fast, and accessible, which are paramount in customer satisfaction and loyalty. Research has revealed that increased customer adoption rate correlates with enhanced customer retention and better banking performance (Gefen et al., 2003). Moreover, customer adoption is strongly associated with digital transformation strategies success in the banking industry. With the shift of the traditional service models to the online platform, the behavior of customers will be an important aspect of designing user-friendly and secure systems employed by banks. The studies point out that the intention of customers to adopt digital banking services is largely affected by such factors as trust, perceived risk and service quality (Featherman &



Pavlou, 2003). Moreover, customer adoption also leads to wider economic and societal impacts, especially supporting financial inclusion. Access to financial resources by underserved groups is achieved through the wide adoption of digital banking services, thus promoting inclusive development and decreasing disparities. Digital financial service adoption also promotes the creation of a cashless economy, which promotes increased transparency and efficiency in the financial transactions (*UNESCO - Search - UNESCO World Heritage Center*, n.d.). With all these benefits, high rates of customer adoption have been a challenge to many banks. Opposition to change, digital illiteracy and worries about security and privacy usually impede the adoption rates. Hence, banks and policymakers need to pay more attention to fostering trust, enhancing user experience, and creating more awareness to promote digital banking service implementation by more people.

Research problem and gap

The rapid expansion of digital banking services has attracted significant academic attention, particularly in understanding the factors influencing customer adoption. Digital banking adoption has been a subject of many empirical studies over the years with the use of models like Technology Acceptance Model (TAM), Diffusion of Innovation (DOI), and other behavioral models. The central theme in these studies is to determine the determinants like perceived usefulness, ease of use, trust, and perceived risk in the effect they have on the customer intention to adopt digital banking services (Corson, 2007). The research environment has been disjointed, even though more and more literature exists which has been done in various countries, technologies (e.g., mobile banking, internet banking) and methodological approaches. The majority of previous studies have been micro-level in their approach, focusing on a particular variable or regional background instead of giving an overall picture of knowledge development in the field. As a result, the progress of research on customer utilization of digital banking services has received little knowledge about the theme, the authors who have shaped the field, and the emerging trends (Donthu et al., 2021). Moreover, the current literature reviews in this field are mostly systematic or narrative in nature, which, despite their value, tend not to be quantitatively rigorous in mapping the intellectual landscape of the field. These methods fail to capture relationships in citation, networks of collaboration or thematic development, which are fundamental to the dynamics of a research domain. Conversely, bibliometric analysis is a strong and objective way to study a great number of scientific publications and determine trends in research activity (Aria & Cuccurullo, 2017). The other major gap is that there is less integration of interdisciplinary views in the research of the adoption of digital banking. Although the input of the information system, finance, and management is evident, the role of emerging technologies like artificial intelligence, blockchain, and big data in influencing the adoption behavior of customers has not been adequately put together in literature. Moreover, the number of studies that investigate the temporal development of research topics is also deficient, and it is essential to find the transition between the conventional internet banking towards the progressive services based on fintech. Considering these constraints, it is evident



that a thorough bibliometric research is warranted, which systematically investigates the development of research on the adoption of digital banking services by customers. This kind of research might be a good source of information about the trends of publication, the most influential works, collaboration dynamics, and the new topics of research, which could give a comprehensive overview of the field and inform research directions.

Purpose of the study

The main aim of the research is to investigate the development of the research on the customer adoption of the digital banking services in a systematic way by applying bibliometric methods. As the number of academic writings in this area grows, synthesis of the body of knowledge and the establishment of the intellectual framework of the field has become quite a necessity. Bibliometric analysis allows scholars to assess literature massively by mapping the trends of publications, citation patterns, and the evolution of the themes through time (Zupic & Čater, 2015). In particular, this paper will examine the developmental trend of the research associated with the adoption of digital banking, including the important dates of its development and changes in the research priorities. Through the analysis of authorship, journals and country contributions, the study aims at determining the most significant sources and contributors in the field. The paper also examines the conceptual organization of the literature based on co-occurrence of keywords and thematic clusters, which aids in comprehending the prevailing and emerging research themes (Cobo et al., 2011). The other significant goal of this research is to reveal the collaboration network of researchers and institutions that conduct research on the adoption of digital banking. This kind of analysis will give understanding regarding the level of knowledge sharing and creation of research communities in the field. Moreover, using bibliometric mapping methods, the study will fill in the gaps in the research and the insufficiently studied areas that need additional scholarly work. Moreover, this research aims to make contributions to both theory and practice, offering an overview of the current literature in the area of customer adoption of digital banking services. Theoretically, it contributes to a better comprehension of the development of the various research streams, including technology adoption models, fintech innovations, and customer behavior, and the way they have changed and interacted over time. In practical terms, the results can be used to help banking practitioners and policy makers understand some of the significant elements that affect customer adoption, and to develop strategies to encourage the use of digital banking. The objective of the research is to offer an informed and comprehensive view of the research literature on the customer adoption of digital banking services, thus, providing an educational base to the subsequent research and decision making in the digital banking industry (Ellegaard & Wallin, 2015).

Contribution of the paper

The paper presents a number of significant contributions to the current body of knowledge on digital



banking service adoption by customers through the use of a thorough bibliometric methodology. First, it presents a systematic and quantitative review of the research area, which allows understanding the way in which academic research on the adoption of digital banking has changed over time. Bibliometric analysis, unlike the traditional narrative review, provides objective information on the trends in publications, citation patterns and knowledge building in an area of study (van Eck & Waltman, 2010). Second, the paper has made its contribution by establishing the conceptual framework of the discipline by means of co-citation and bibliographic coupling patterns. Through the mapping of the relationships between the influential articles, the authors and the journals, the paper points to the premise works and the main streams of research that have contributed to the study of customer adoption of digital banking services. This helps the researchers comprehend the theoretical basis and paradigms prevailing in the field (Small, 1973). Third, the work contributes to the knowledge base through the discovery of the conceptual framework and development of the literature. It is able to identify key research clusters like technology acceptance, trust and security, fintech innovations, and customer behavior through thematic mapping and key-word co-occurrence. Also, the analysis shows new themes and research frontiers, thus offering insightful guidelines to further research (Callon Michel et al., 1983). Fourth, the article is valuable because it provides information on collaboration patterns among authors, institutions and countries. Knowing these collaboration networks can be used to identify major contributors and research centers and the level of international collaboration in digital banking adoption research. These understandings can be applied to future academic partnerships and strengthening the worldwide knowledge exchange. Lastly, this paper has a theoretical and practical contribution. Theoretically, it combines various streams of research, and provides a comprehensive perspective of how digital banking adoption literature has developed. In practice, the results can guide the banking personnel, developers of fintech, and policymakers to recognize key determinants that affect customer adoption and develop plans to increase the use of digital banking. The study fills this gap between the separate researches and therefore is a good resource in future research in the field (Boyack & Klavans, 2010).

2. LITERATURE REVIEW

A digital banking service has revolutionized the interaction between the customers and the financial institutions by facilitating the provision of the banking services via the digital platform including online services and mobile applications. The services enable users to complete transactions, check accounts and access financial products without having to physically interact with the banks in the physical premises and this increases convenience, speed and accessibility of services. Digital banking is also a key feature of contemporary banking systems as the growing permeation of digital technologies into banking processes has contributed to the enhancement of the quality of services and interaction with customers (Mauro & Afonso Mazzon, 2007). The use of the digital banking services has been broadly studied using the well-known theoretical framework, specifically, the Technology



Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). TAM describes the acceptance of users in terms of perceived usefulness and perceived ease of use, which evolve the behavioral intention of an individual to use a technology. The model has been widely tested in the digital banking settings where customers are likely to embrace services that are seen to be helpful and user-friendly (Pikkarainen et al., 2004). UTAUT elaborates this viewpoint further and adds other constructs like social influence and facilitating conditions to provide a more detailed explanation of technology adoption behavior. It has been especially helpful in the interpretation of the impact external factors and social environments have on customers in their decision-making to switch to using digital banking services (Alalwan et al., 2018). Perceived usefulness is one of the many determinants that affect customer adoption, since customers tend to adopt digital banking services more when they perceive they improve their efficiency and effectiveness in performing financial activities. The ease of use is also a vital consideration since systems that are easy to navigate and use minimise effort and promote the constant use. Besides these reasons, the issue of trust has proved to be a major determinant in adopting digital banking because of the sensitivity of financial transactions. To conduct online banking, customers need to have trust in the dependability and honesty of digital platforms. On the other hand, the perceived risk such as privacy, fraud, and data security concerns may be a hindrance to adoption. Consequently, to instill confidence and minimize the perceived risk, strong security measures will be required to create trust (Lee, 2009). The past works on the adoption of digital banking have mostly concentrated on determining and testing the customer behavior determinants in various contexts. Internet banking adoption was the focus of early studies, whereas more recent research has looked into mobile banking, digital payments, and fintech services. Empirical evidence has repeatedly pointed out perceived usefulness, ease of use, trust and security as important predictors of adoption intention. Moreover, the cultural differences, technological infrastructure, and demographic factors have also been identified to impact adoption patterns and it is possible to assume that digital banking behavior differs by region and user groups. The research has broadened over time to cover other concerns like user experience, quality of services and customer satisfaction as the nature of digital banking services has changed. Although a lot of research has been conducted on this domain, there are gaps. Numerous studies are country or region specific and not generalizable across the country or regions. Also, the majority of studies are cross-sectional and do not show any longitudinal perspective to trace the transformation of customer adoption behavior over time. It also has a lack of knowledge fragmentation, where research is frequently limited to particular variables or models without combining the results of research in other streams. In addition, though the classical models like TAM and UTAUT have been extensively used, emerging technological aspects like artificial intelligence, big data analytics, and sophisticated security systems should be introduced into the system of adoption. Notably, no systematic literature reviews exist to chart the development, intellectual framework, and themes of research on customer adoption of digital banking services, which explains the significance of using a bibliometric approach to offer a comprehensive study on



the topic.

3. METHODOLOGY

The current research follows a bibliometric research design, which will examine the development of research on customer adoption of digital banking services. Bibliometric analysis is a method of quantitative analysis to assess and visualize the organization of scientific literature through analysis of patterns of publication, patterns of citation, and research trends. The information used in this research was retrieved in the Web of Science Core Collection database, which is well known to have a high quality and reliability in indexing peer-reviewed academic publications. Relevant literature was retrieved using a comprehensive search strategy. A combination of keywords based on digital banking service and customer adoption behavior was used to build the search query. In particular, digital banking, online banking, internet banking, mobile banking, electronic banking, and e-banking were considered to represent the field of digital financial services. These keywords were used together with adoption related terms such as adoption, acceptance, usage, behavioural intention, technology acceptance, customer intention and user behaviour using all the Boolean operators. The first search gave 13,304 records of digital banking-related terms and 780,486 records of adoption-related terms which were combined to produce 2855 records. To maintain the relevance and quality of the dataset some inclusion criteria were used. The literature used in the study covered the years 2000-2025 to reflect the changes in the digital banking research over time. The time filter was used and the dataset was narrowed down to 2,832 documents. As an additional step to refinement, the results were narrowed down to pertinent categories within the Web of Science, such as Business, Management, Business Finance, Economics, Information Science Library Science, Computer Science Information Systems, Computer Science Interdisciplinary Applications, Computer Science Artificial Intelligence, Computer Science Software Engineering, Telecommunications, Social Sciences Interdisciplinary, Psychology Multidisciplinary, Psychology Applied, Communication, Operations Research Management This step narrowed down the data set to 2,080 documents. Moreover, the meso level citation topic filter, and micro level citation topic filter were used to further focus the research areas of interest. Management, Economics, Artificial Intelligence and Machine Learning, Software Engineering, Telecommunications, Human-Computer Interaction, Security Systems, Communication, Social Psychology, Bibliometrics, and Statistical Methods were covered at the meso level. On the micro level, Technology Acceptance Model, Consumer Behavior, Innovation Strategies, Innovation Diffusion, Organizational Behavior, Finance-growth Nexus, Credit Scoring, Corporate Governance, Blockchain, Digital Privacy, Big Data, and Entrepreneurship have been considered. This narrowing down led to 1,634 documents. Lastly, the dataset was narrowed down to relevant research areas, such as Business Economics, Computer Science, Information Science Library Science, Telecommunications, Social Sciences, Psychology, Communication, Behavioral Sciences, Operations Research Management Science, Public Administration, Mathematical Methods in Social Sciences and



Development Studies. A total of 1,633 documents were first used in the final dataset, which was based on the inclusion and exclusion criteria. Microsoft Excel was then used to do further data cleaning to improve the quality and reliability of the dataset. In particular, the year 2026 (n = 16) publications were filtered out to ensure consistency in the study period. Authors address Records without author address information (n=8) and records without author keywords (n=73) were also deleted since this is a necessary information in bibliometric mapping and analysis. Also, to make sure that there would be uniformity in the interpretation, the documents that were published in other languages other than English were filtered out, especially the Portuguese and Spanish documents (n = 6). Redundant records noted in the screening process of the Excel-based screening were also removed. Upon doing these extra refinement processes the data was narrowed down to 1,530 documents that were then used to analyze. **Figure 1**, presents the detailed process of data identification, screening, eligibility, and final inclusion used in this bibliometric analysis. The extracted data were analyzed using bibliometric tools like Biblioshiny and VOSviewer. Different analyses, such as publication trends, co-authorship network, co-citation analysis, and mapping key words co-occurrence were performed. These approaches have helped to uncover the intellectual framework, patterns of collaboration and new research themes in the field of customer adoption of digital banking services.

DATA FILTERING

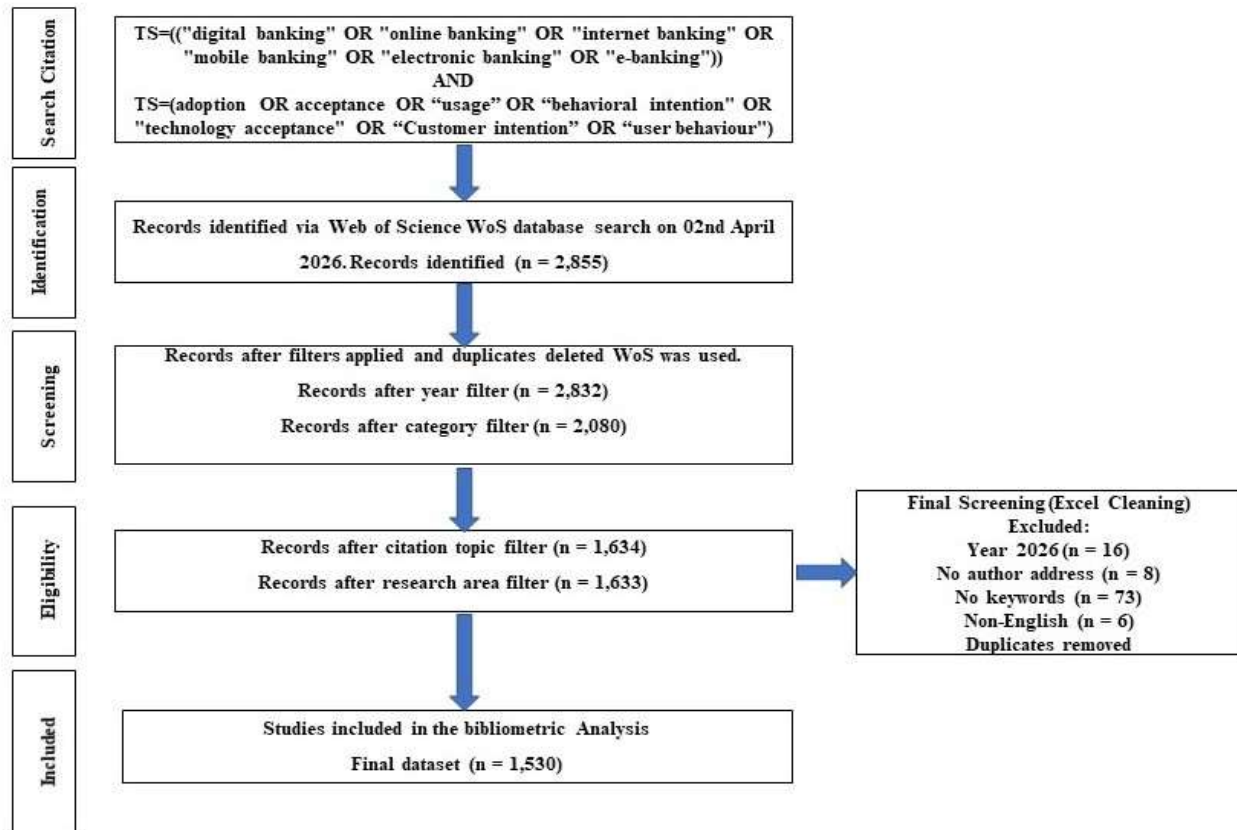


Figure 1. PRISMA Flow Diagram steps in the Bibliometric Research. Source: Authors

4. RESULTS AND DISCUSSION

4.1 Publication Trends

The Publication by Year data on the research study of customer adoption of digital banking services shows that the number of scholarly outputs has steadily risen over the years as more scholars have been involved in this field (Shaikh & Karjaluoto, 2015). The period between 2000 and 2005 has low and comparatively constant numbers of publications (between 3 and 7 per year), which suggests an early phase of research on the digital banking adoption. Starting in 2006, the trend is steeply upwards, with 11 publications in 2006 and then rising steadily every year, which is an indication of a rising scholarly interest (Alalwan et al., 2017). The number of publications between 2010 and 2014 demonstrates average growth with a range between 26 and 34, indicating the time of constant yet controlled development of research activity. A sharp increase is registered beginning in 2015, as the numbers of publications have increased almost twofold, 34 in 2014 to 61 in 2015, reflecting a considerable increase in attention to the adoption of digital banking. This increase accelerates since 2016 and the number of publications is expected to be 178 in 2025 and illustrates a solid and increasing research momentum. The annual growth over the years highlights the growing significance and

applicability of customer adoption in digital banking, presumably due to the growth of technology, the rising rate of digital adoption in banking, and changing consumer habits in **Figure 2**. On the whole, such a trend in publications reflects the maturation and increased academic interest in customer adoption (Venkatesh et al., 2003; Davis, 1989).

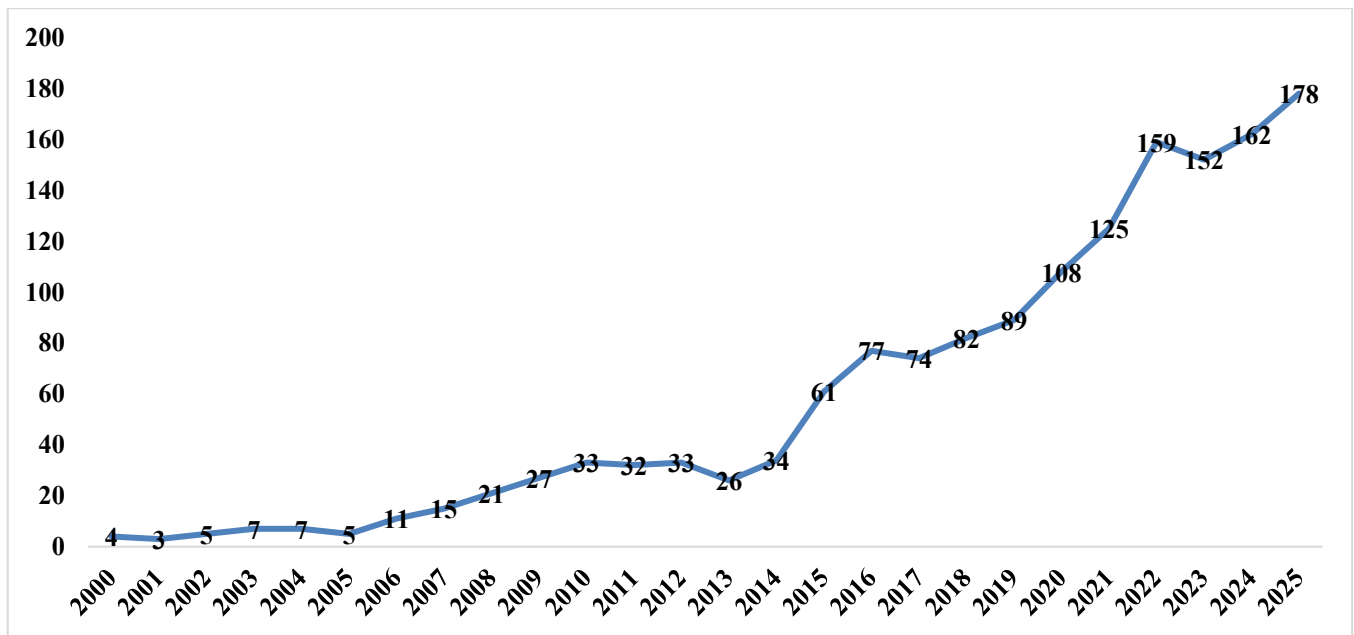


Figure 2. Annual Growth of Publications (2000-2025). **Source:** Authors

The annual growth over the years highlights the growing significance and applicability of customer adoption in digital banking, presumably due to the growth of technology, the rising rate of digital adoption in banking, and changing consumer habits. On the whole, such a trend in publications reflects the maturation and increased academic interest in customer adoption (Davis, 1989; Venkatesh et al., 2003).

4.2 Most Cited Articles

The **Table 1**, shows the most frequently mentioned authors and articles in the digital banking and technology adoption field, which implies that they have a great impact and contribution to the research field development. Bhattacharjee has the highest number of citations with 14,363, much more than any other work. This means that it can be used as a basis to understand information system continuance because user retention and ongoing use is a key factor to digital banking continuity that goes beyond the point of adoption. The other most cited works are Ming-Chi Lee and Pui-Mun Luarn and Hsin-Hui Lin which feature more than 3,000 citations each and are devoted to the adoption of internet and

mobile banking. These works combine the main theoretical models, including the Technology Acceptance Model and behavioral theories, with the emphasis on such aspects as the perceived risk, benefits, and user intention. The literature on the subject has also been reinforced by this particular study by Tingting Zhou which had 2,934 citations and was able to integrate the models of Task-Technology Fit and Unified Theory of Acceptance and Use of Technology, which further proves the trend of combining multiple models in order to explain user adoption behavior better.

Rank	Authors	Articles	Total Citations
1.	(Bhattacharjee, 2001)	Understanding Information Systems Continuance: An Expectation-Confirmation Model	14363
2.	(Lee, 2009)	Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit	3577
3.	(Luarn & Lin, 2005)	Toward an understanding of the behavioral intention to use mobile banking	3450
4.	(Zhou et al., 2010)	Integrating TTF and UTAUT to explain mobile banking user adoption	2934
5.	(Alalwan et al., 2017)	Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust	2840
6.	(Meuter et al., 2005)	Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies	2559
7.	(Martins et al., 2014)	Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application	2547
8.	(Oliveira et al., 2016)	Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology	2351
9.	(Williams et al., 2015)	The unified theory of acceptance and use of technology (UTAUT): a literature review	2253
10.	(Queiroz & Fosso Wamba, 2019)	Blockchain adoption challenges in supply chain: An empirical investigation of the main drivers in India and the USA	1488

Table 1. Top 10 Most Cited Scientific Articles. **Source:** Authors



Recent works like Ali Abdallah Alalwan highlight the importance of trust in mobile banking adoption and are indicative of changing issues regarding security and reliability in online financial services. Likewise, recent research by Tiago Oliveira and other scholars aims to study perceived risk and customer intention (2014, 2016, respectively) suggesting a move towards a more subtle and user-centered value in adoption research. The article by Mary Jo Bitner emphasizes the significance of self-service technologies, and there is a shift towards digital service delivery systems at an early stage. Moreover, Marcelo Queiroz & Samuel Fosso Wamba take the adoption research to the next level of adoption of innovative technologies such as blockchain, which implies the broadening of the study of the topic to non-banking.

4.3 Keyword Co-Occurrence

The **Figure 3**, is a key word co-occurrence network in digital banking field and information technology adoption. The number of nodes represents how often the key word occurs and the connections among the nodes are the intensity of the relationship or co-occurrence of concepts. The clusters or subject groupings in the research domain are denoted by different colors (red and blue). One of the most notable findings is that the keyword Technology Adoption (“adoption”) is the biggest and central node, as it is the central focus of the research field. It is closely related to such crucial terms as Information Technology, User Acceptance and Mobile Banking, which implies that the majority of the studies focus on how users embrace and accept digital banking technologies. There are also good links between Internet Banking and adoption-related constructs as depicted in the network, which indicates that internet banking is one of the key areas of application in the subject of this research. Likewise, Trust appears as an influential node, indicating its paramount importance in shaping user choices especially with financial technologies where the issue of security is eminent.

There are two large clumps which can be seen:

- **Red Cluster (Behavioral & Theoretical Factors):**
Has keywords like acceptance, model, trust, satisfaction, perceived risk and intention. This group is mostly based on the theoretical models such as Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology that concentrated on perception and behavioral intentions of the users.
- **Blue Cluster (Technology & Application Context):**
Embraces information technology, mobile banking, online banking, and determinants. This group focuses on the technological background and the practice of digital banking services.

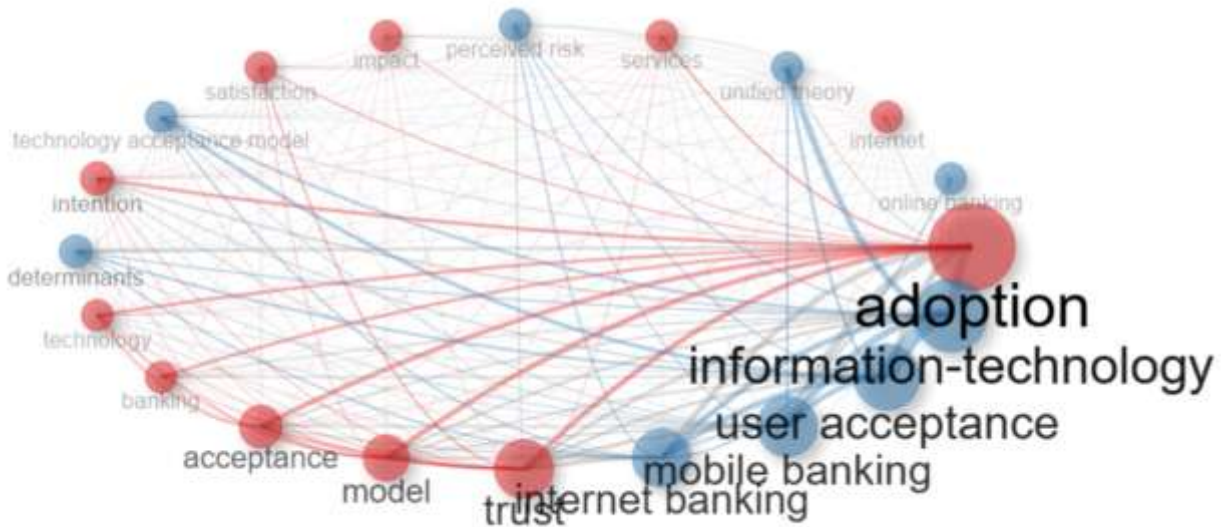


Figure 3. Keyword Co-Occurrence Network. **Source:** Authors

The thick network of interrelationships among nodes shows that the field of research is highly integrated, with the behavioral theories and technological applications being interconnected. The fact that such terms as perceived risk and trust were used also indicates a change in the direction of the security, privacy, and reliability issues in recent research.

4.3.1 Thematic Map

Figure 4, thematic map introduces a visualization of an idea of research on the adoption of digital banking services by customers through the lens of two dimensions: the centrality (relevance) and density (development). The four quadrants identify themes as classified into niche, motor, basic, and emerging or declining which offer insight into the maturity and relevance of various research areas. Information technology, user acceptance, and mobile banking are the three terms in the motor themes quadrant (upper right), which means that these are well-developed and core themes in the sphere. These themes are solid and influential in forming the research field due to the high concentration on the technological-based adoption and user behavior in digital banking research. The most basic themes quadrant (lower right) includes the themes of trust, model, and determinants, which are very relevant, but not very developed. These themes are the concepts that are the foundation of study area and they are common throughout studies. Despite being the core of digital banking adoption, they need to be developed further and studied more in-depth in order to complement their theoretical and empirical input. The cluster of adoption, acceptance, and banking is a well-developed, although less central

theme in the niche themes quadrant (upper left). This implies that these subjects have been researched widely, but they are a bit narrow and do not relate profoundly to the overall research project. These themes can be close or context-oriented investigations in the field. The new or falling themes quadrant (lower left) encompasses compatibility and network externalities, which shows that there is low development and relevance.

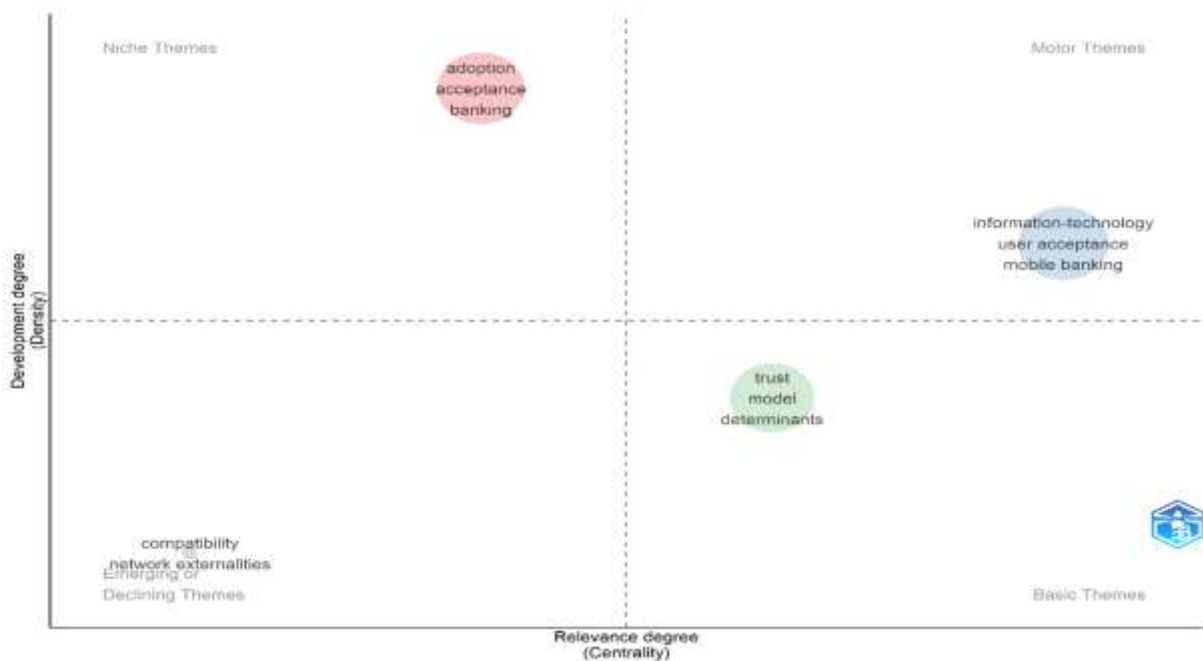


Figure 4. Keywords Thematic map. **Source:** Authors

These themes can be either emerging themes that have yet to be given a lot of attention or fading themes that are becoming irrelevant in the current research trends. In general, the thematic map indicates that technology acceptance and mobile banking are highly driving factors in the research area, but the underlying principles like trust and determinants are necessary but need to be investigated. Meanwhile, certain conventional aspects such as compatibility and network effects seem to be less significant, implying a research emphasis to more sophisticated and user-friendly digital banking models.

4.3.2 Thematic Evolution

The keyword co-occurrence network map in Figure 5, reveals the intellectual organization of the research on customer adoption of digital banking services, grouping related ideas into specific clusters, each being defined by their co-occurrence relationship. The visualization shows three large clusters, each indicating various thematic areas of interest in the research area. The red cluster is the technology

and innovation view of digital banking adoption. Keywords that can be identified in this cluster are technology, adoption, fintech, innovation, systems, and risk. It means that much of the literature is devoted to the technological infrastructure, financial technologies, and aspects of innovation that impact the adoption of digital banking. Certain keywords used like risk and systems give an indication that even the researchers highlight technological difficulties and issues of systems in adoption research. The green cluster is representative of the user acceptance and behavioral intention viewpoint, which is one of the most prevailing themes within the area. Technology acceptance, user acceptance, perceived usefulness, intention, and internet banking are some of the keywords that are major in this cluster. This indicates the dominant role played by behavioral theories, especially technology acceptance models, in understanding the decision-making process of customers to use digital banking services. The concentration and the linkage of this cluster provide evidence that it is a hub of study with a considerable amount of scholarly interest. The blue cluster is the customer experience and outcome perspective, which deals with post-adoption behavior and service outcomes. Keywords in this cluster are customer satisfaction, trust, service quality, loyalty, and word of mouth. This implies that the new studies have gone beyond the first adoption to analyze customer satisfaction, trust, and customer relationship long-term results in digital banking.

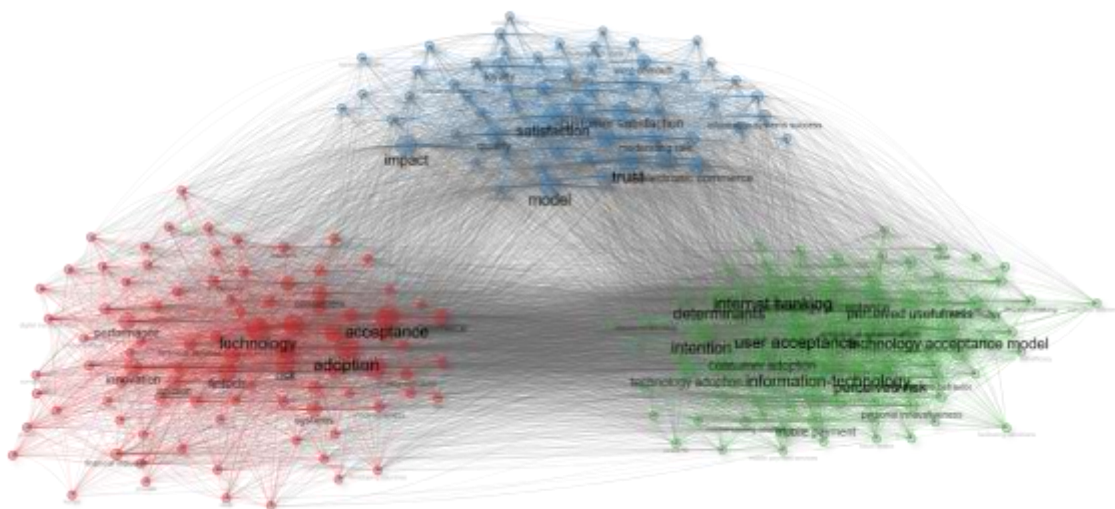


Figure 5. keyword co-occurrence network map. Source: Authors

The network demonstrates that the field can be organized according to three key dimensions: technological innovation, user acceptance behavior, and customer experience outcomes. The high interrelations among clusters show that these themes are not held in isolation but are being more and more integrated in the literature. This indicates a change in studies that were rather technology-driven to a more holistic view of digital banking adoption that takes behavioral and experiential factors into

consideration.

4.4 Leading Authors

This **Figure 6**, shows the most successful authors in the sphere of customer adoption of digital banking services in terms of the number of citations and publications. The findings show that Nripendra P. Rana is the most influential author, who has the most citations (4,907) and publications (29), and his role and influence on the academic sphere by his works are substantial. Next in line is Yogesh K. Dwivedi who has 4 752 citations and 28 publications, which shows a steady and significant production of research. Tiago Oliveira has the third highest number of citations and publications at 4,263 and 17, respectively. Correspondingly, Ali Abdallah Alalwan and Keng-Boon Ooi also demonstrate significant contributions as they have 2,512 and 2,199 citations respectively, which reflect the significance of their works in the development of research on the topic of digital banking adoption and technology acceptance. Additionally, Francisco Liébana-Cabanillas is characterized by a high number of citations (2,017) in 16 publications, which means that his research presence is strong and active. Mediocre contributions have been made by other authors like Ales Popovic, Goncalo Baptista, Michael D. Williams and Yaobin Lu with a citation count of about 1,400 to 1,700 indicating new or expert influence on the field.

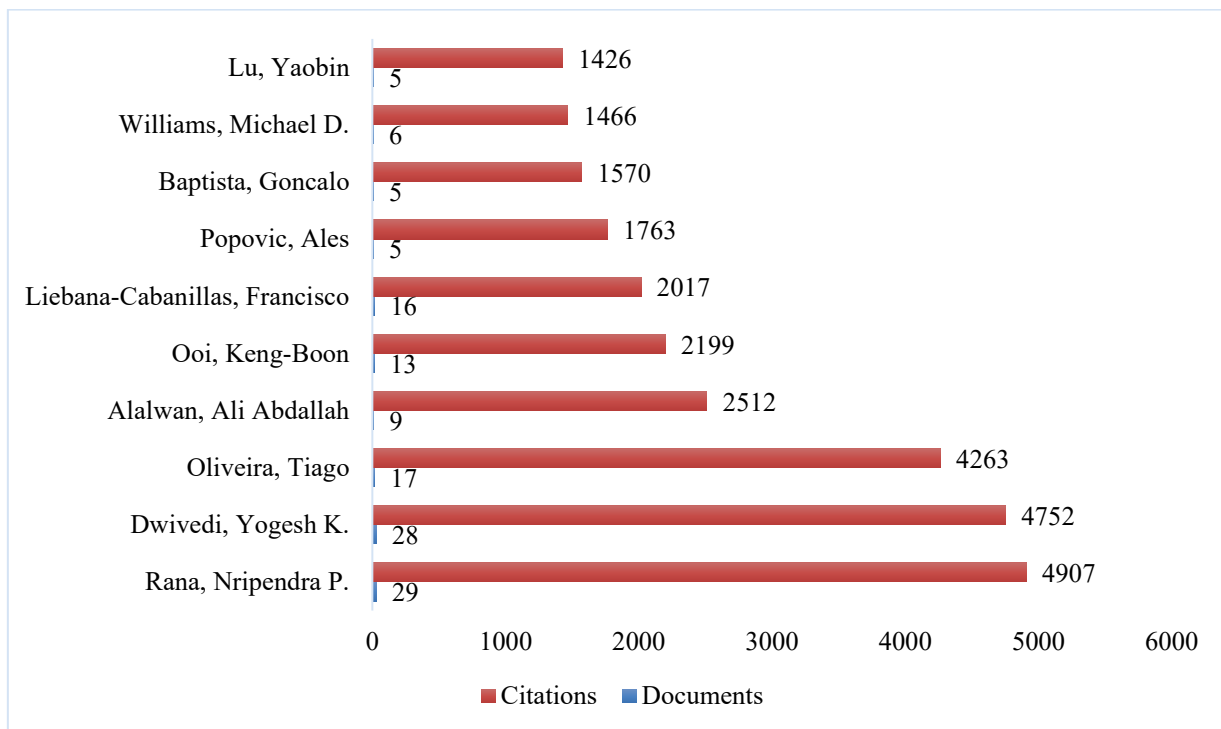


Figure 6. Top 10 Leading Authors by Publications and Citation Performance. **Source:** Authors



It also indicates that a comparatively low number of authors prevail in the research environment, with their contribution being both high publication rate and high citation influence. It also emphasizes that the effect of citation is not necessarily always directly related to the amount of publications as certain authors can have a significant influence with a relatively small number of publications. This is indicative of the existence of high-impact-high-cited literature that influences the course of research on customer adoption of digital banking services.

4.5 Contributing Organizations

The bibliometric analysis of the top journals indicates significant bibliometric patterns in the development of the research on the topic of customers adopting digital banking services. The International Journal of Bank Marketing stands out as the most fruitful journal with 188 publications, which suggests that it will be the most central source of digital banking and financial services research. Its high academic impact and relevance in the field is also supported by its Q1 ranking, and its high H-index (113). Interdisciplinary journals with high impact, including the International Journal of Information Management and the Journal of Business Research, are highly influential with a very high SJR score (6.26 and 3.499, respectively) and H-index (196 and 292 respectively). These journals play an important role in informing theoretical and empirical development in the adoption of digital banking especially through the incorporation of information systems, business and consumer behavior perspectives.

Equally, other journals such as the Computers in Human Behavior and the Technological Forecasting and Social Change place emphasis on the significance of behavioral and technological approaches to comprehending user adoption. Both of their H-indexes (275 and 209) demonstrate that the research published in these journals is highly popular and influential, showing the interdisciplinary character of the digital banking research. The Journal of Retailing and Consumer Services and Technology in Society, also underline the importance of consumer and societal factors in the adoption of digital banking, indicating the field of research has shifted past technological matters to focus on customer experience and social impact. Conversely, the International Journal of Mobile Communications, though with lower SJR rating (Q4), is involved in mobile and communication-related details of digital banking, that is, niche yet pertinent contribution to the overall research area. Also, SAGE Open indicates the growing openness and accessibility of research dissemination, contributing to a variety of contributions in different regions.



Rank	Sources	Articles	Publisher	Country	SJR Ranking	Quartile	H-index
1.	(International Journal of Bank Marketing, n.d.)	188	Emerald Group Publishing Ltd.	United Kingdom	1.439	Q1	113
2.	(International Journal of Information Management, n.d.)	53	Elsevier Ltd	United Kingdom	6.26	Q1	196
3.	(Journal of Retailing and Consumer Services, n.d.)	47	Elsevier Ltd	United Kingdom	3.439	Q1	167
4.	(International Journal of Mobile Communications, n.d.)	45	Inderscience Publishers	United Kingdom	0.133	Q4	51
5.	(Computers in Human Behavior, n.d.)	40	Elsevier Ltd	United Kingdom	2.923	Q1	275
6.	(SAGE Open, n.d.)	39	SAGE Publications Inc.	United States	0.514	Q1	74
7.	(Technological Forecasting and Social Change, n.d.)	34	Elsevier Inc.	United States	3.472	Q1	209
8.	(Technology in Society, n.d.)	29	Elsevier Ltd	United Kingdom	2.559	Q1	112
9.	(Journal of Business Research, n.d.)	28	Elsevier Inc.	United States	3.499	Q1	292
10.	(Internet Research, n.d.)	27	Emerald Group Publishing Ltd.	United Kingdom	2.11	Q1	118

Table 2. Top 10 Contributing Organizations. **Source:** Authors

The Prevalence of Q1-ranked journals and such reputable publishers like Elsevier and Emerald demonstrate the maturity and high-quality research on the topic of customer adoption of digital banking services. The geographical leadership in this area of research is also reflected in the concentration of publications in the journals located in the United Kingdom and the United States. These results indicate in **Table 2**, that the discipline has emerged as a highly established and interdisciplinary field, where marketing, information systems, and technology management views



This visualization shows a vivid development of research such as:

- Early phase: Concentrate on basic models of adoption (TAM, UTAUT) and internet banking.
- Middle stage: Focus on user acceptance, satisfaction and risk/trust.
- Recent stage: Mobile banking, fintech innovation, and customer experience.

This trend fits into the evolution part of your research and proves that the discipline has evolved beyond theory-based adoption studies towards a more comprehensive view of digital banking ecosystems and customer-driven innovation.

4.7 Global Distribution of Publications

The geographic spread of the publications offers a solid argument of the development and internationalization of the studies on the adoption of digital banking service by the customers. The **Figure 8**, show that the focus of the research output is in both emerging and developed economies, which underscores the adoption of digital banking as a global research concern. First is China (682 publications), which is evidently leading the pack. This is indicative of the fast digital transformation in China, high adoption of mobile payments, and affinity of fintech ecosystems, which have made China a major context to examine customer adoption behavior. Both India (357) and the United States (357) are at the second position, which implies similar contributions made by a large developing economy and a highly developed market. The expansion of financial inclusion initiatives and mobile banking in India drives growth, whereas studies in the U.S. are inclined to innovation and user experience, along with sophisticated financial technologies. United Kingdom (263) also has a high level of research activity, probably because of being one of the world fintech hubs. Likewise, Malaysia (188) and South Korea (167) demonstrate high contributions, indicating technologically developed banking infrastructures and high rates of digital adoption in Asia. The fact that it is represented by Europe with Spain (153) shows that there is increasing academic interest in the topic of digital banking adoption in the EU, especially as it relates to user trust and regulation frameworks. In the meantime, Saudi Arabia (123) underscores the growing research output in line with national digital transformation strategies. Australia (102) and Pakistan (100) are emerging contributors, and this indicates an expanded research space that encompasses mature and developing financial systems presents in **Table 3**.



Rank	Country	Freq
1.	China	682
2.	India	357
3.	Usa	357
4.	Uk	263
5.	Malaysia	188
6.	South korea	167
7.	Spain	153
8.	Saudi arabia	123
9.	Australia	102
10.	Pakistan	100

Table 3. Top 10 Country-wise Distribution of Publications. **Source:** Authors

Evolutionary Insight

The pattern of distribution indicates three important phases of research development:

- **Early Stage (Economies in Development):**
Leadership of nations such as the United States and United Kingdom, which revolve around the basic adoption models and internet banking.
- **Expansion Stage (Emerging Economies Rise):**
Massive expansion of places like China, India and Malaysia due to mobile banking and financial inclusion initiatives.
- **Recent Stage (Global Diversification):**
Growing input of different regions such as the Middle East, Europe and Oceania, signifying a wider, more comprehensive research agenda, covering cultural, regulatory and technological variations.

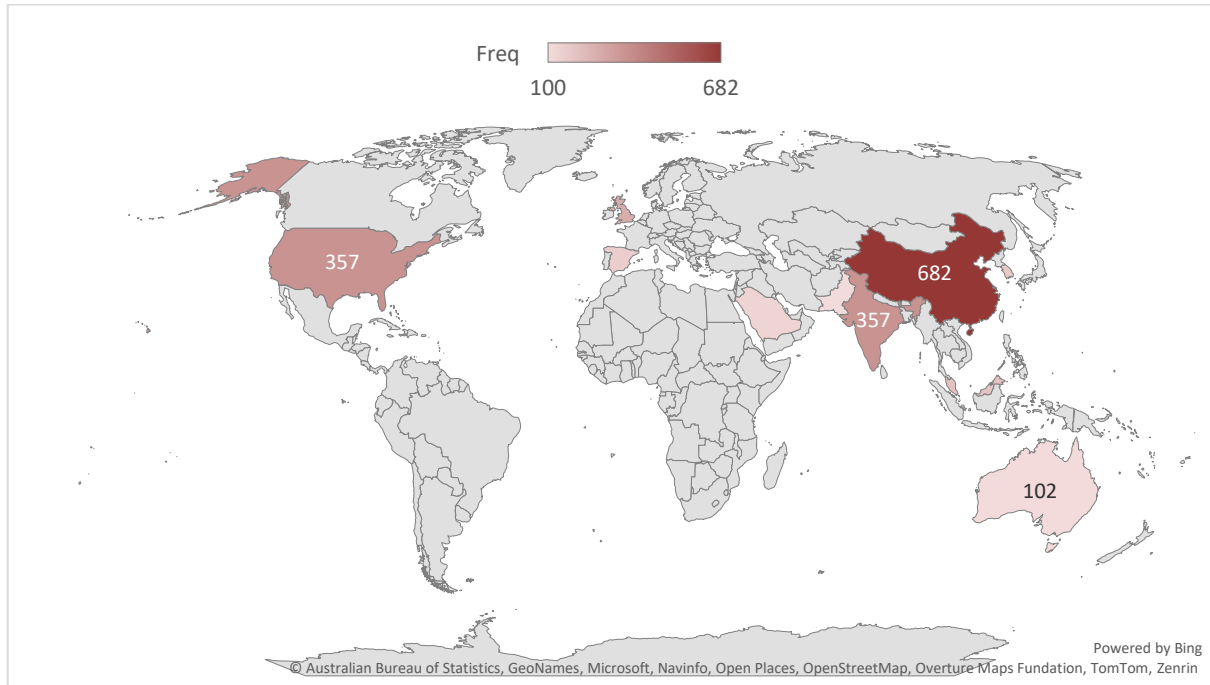


Figure 8. Leading Countries in Publication output. **Source:** Authors

The results prove that customer adoption of digital banking services research has become a globally distributed and not regionally focused research area. The leadership of Asian nations, specifically China and India, can be seen as the sign that the mobile-first and innovation-focused banking ecosystems are on the rise, and the input of Western economies makes sure that the theoretical and methodological progress is being made. This international diffusion highlights the increased significance of digital banking uptake as a key field of investigation within both developed and developing settings.

5. DISCUSSION

The results of this bibliometric analysis can be used to gain a more in-depth insight into the way in which the research of customer adoption of digital banking services has changed over the years. The reason why publications have increased substantially since 2015 is due to the fast pace of development of digital technologies and the growing importance of digital banking in both academic and practical realms. This trend is aligned with the spread of smartphones, fintech solutions and digital financial ecosystems across the globe. Among the most important study findings is that the theories of technology adoption, including TAM and UTAUT, remain dominant. The search term co-occurrence and thematic analysis shows that such constructs as perceived usefulness, perceived ease of use, trust, and perceived risk are still at the center of the discussion of customer behavior. This is an indication that regardless of the technological development, there are underlying behavioral theories that still



form the basis of study in this field. Nonetheless, the incorporation of other variables like quality of the service, customer satisfaction, and user experience speaks of a slow change towards a more comprehensive concept of adoption. The thematic development also shows the shift of the technology-focused research towards the more user-focused and experience-based worldview. Initial research was mainly done on internet banking and simple models of adoption, whereas more recent research is on mobile banking, fintech innovations, and customer engagement. This transition is indicative of evolving consumer demands and the growing significance of streamlined and customized online experiences.

The other significant finding is that there is a great spread of research production around the world. Emerging nations such as China and India have become major players due to the high digital transformation and financial inclusion efforts. Simultaneously, developed economies like the United States and the United Kingdom remain hugely important in promoting theoretical and methodological frameworks. This represents a balanced development in which the emerging and developed markets have their own contributions to the literature. The patterns of collaboration and the most active writers revealed in the investigation indicate that the discipline is determined by a rather limited group of influential researchers. Their works have greatly informed the nature of research, especially the incorporation of behavioral theories with technological innovations. This discussion points out that the field has evolved into an interdisciplinary field, which incorporates the perspectives of information systems, finance, marketing and behavioral sciences. The development has shown a developmental movement of simple theories to the complex models that take into consideration the technological, psychological, and environmental aspects.

6. FUTURE DIRECTION OF THE STUDY

In the future, research could be done on new technologies like artificial intelligence, blockchain, and big data to learn more about their influence on customer adoption. More long-term studies are also required to focus on the variation of customer behavior with time. Researchers ought to investigate other countries and cultures in order to comprehend the variations in adoption across the world. There is also need to conduct more studies in under-researched areas, such as Africa. Moreover, the following research is not only supposed to be about adoption but also about customer loyalty and further use. Lastly, integrating various disciplines will aid in giving a more in-depth and comprehensive view of digital banking adoption.

7. CONCLUSION

This study provides a clear overview of how research on customer adoption of digital banking services has developed over time. The results show a strong increase in research, especially in recent years, driven by technological growth and digital transformation. The study also highlights the importance



of key factors such as trust, risk, and user perception in influencing adoption. Furthermore, it shows that research has expanded globally and become more diverse. Overall, this study helps in understanding the trends, key themes, and future directions in digital banking research, making it useful for researchers, practitioners, and policymakers.

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