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# The Evolution of FinTech in Banking: A Dual-Method Systematic Review and Bibliometric Analysis (2016-2024)

Douaa LAHROURI
*Laboratoire de Recherche en Management, Marketing, Logistique internationale et Finance, École Supérieure de Technologie, Université Sidi Mohamed Ben Abdellah, Fès, Morocco.*

Zakia ERRABIH
*Laboratoire de Recherche en Management, Marketing, Logistique internationale et Finance, École Supérieure de Technologie, Université Sidi Mohamed Ben Abdellah, Fès, Morocco.*

**Abstract.** This study uses both bibliometric and systematic review methods to analyze FinTech-banking research from 2016 to 2024. It shows a quickly growing global field, with a shift in focus from disruption to cooperative competition. While quantitative methods are well-developed, there is a shortage of qualitative insights. Major gaps include geographical bias, outdated theories, and unclear partnership models. The suggested agenda calls for diverse methods, comparative studies, and investigations into AI and blockchain. This synthesis provides a clear roadmap for researchers and practical guidance for industry and policy experts dealing with the digital transformation of finance.

***Keywords:*** *Banking Sector; Digital Transformation; Financial Technology; Fintech; Systematic Literature Review; SLR.*

## 1. Introduction

The global financial services sector is undergoing significant changes due to the emergence of new digital technologies, commonly referred to as "financial technology" (FinTech). Innovations such as mobile payments, peer-to-peer lending, blockchain, and artificial intelligence are fundamentally changing traditional banking operations and challenging the sector's identity (Arner et al., 2020; Gomber et al., 2017). This intersection of finance and technology is reshaping the landscape of competition, regulatory frameworks, and the structure of modern economies.

Research in academia has demonstrated this change as well. Early studies primarily viewed FinTech as a disruptive force, emphasizing competition and the potential replacement of existing banks (Thakor, 2020). However, experts have learned that the relationship between banks and FinTech firms is more complicated. It encompasses both competition and collaboration (Vovk et al., 2021; Haddad & Hornuf, 2019; Georgiev, 2024).

Despite this growing scholarly interest, the FinTech-banking literature remains fragmented. Existing contributions are largely scattered across disconnected strands of research: purely bibliometric studies that map publication trends and citation networks without engaging critically with theoretical content, and narrative or systematic reviews that synthesize findings qualitatively but lack a quantitative, data-driven view of how the field has structurally evolved. As a result, these bodies of work rarely cite or build on one another, leaving researchers without a single, integrated

reference point that connects the intellectual structure of the field to its conceptual and methodological substance.

Yet this growing body of scholarship has developed somewhat unevenly. On one side, bibliometric studies excel at mapping who is publishing, where, and how frequently, but they rarely engage with the substance of the theories or findings behind the numbers (Donthu et al., 2021). On the other side, narrative and systematic reviews dig into theoretical and methodological detail but seldom situate their conclusions within the broader, quantifiable structure of the field (Tranfield et al., 2003; Snyder, 2019). The result is a literature that talks past itself: studies that could inform one another instead sit in separate conversations, with bibliometric work and qualitative synthesis rarely drawing on each other's strengths.

This study sets out to close that gap by deliberately combining both traditions within a single, sequential design rather than treating them as alternative or competing methods. What is original here is not bibliometric analysis or systematic review taken separately, both well-established tools, but their integration in service of one another: the bibliometric mapping identifies where the intellectual weight of the field lies, and the systematic review then interrogates why it lies there, what theoretical assumptions underpin it, and where it falls short. This dual lens allows the study to move past simply counting publications toward explaining how the field's conceptual foundations have shifted over time. In doing so, it offers three concrete contributions: a structured, evidence-based map for scholars entering an otherwise scattered field; a consolidated picture for practitioners of how bank-FinTech relationships are actually being theorized and tested in the literature; and a clearer sense, for regulators and policymakers, of where the empirical and theoretical blind spots lie before they shape policy.

This study systematically investigated the following questions to present a comprehensive and critical state-of-the-art of FinTech in banking research, thereby contributing to the field's continued maturation and relevance.

1. Which countries, institutions, authors, frequently occurring keywords, and publication trends have significantly influenced the research on the role of FinTech in banking from 2016 to 2024?
2. What are the main theories in the field of FinTech banking research?
3. Which research instruments are most commonly used in the FinTech and banking research fields?
4. What is the most prevalent research statistical analysis in the field of FinTech banking research?
5. What are the key research gaps in the field of FinTech banking research that should be addressed?
6. What are the future agenda and recommendations in the field of FinTech banking research?

## 2. Research Design

The methodological approach of this study incorporates a sequential mixed methods design, integrating bibliographic analysis and systematic literature review. By synthesizing quantitative and qualitative approaches, this two-fold methodology can provide an integrated view of intellectual evolution and conceptual foundations at the intersection of FinTech and banking.

First, a bibliometric analysis is employed to create a quantitative map of the research area. This step is designed to identify the most significant publication patterns, leading authors, collaboration patterns, and themes based on co-occurrence keywords.

A subsequent systematic literature review methodically analyzes the identified literature through a more profound examination of the literature using thematic synthesis. The analysis is conducted through thematic synthesis with an aim to examine theoretical perspectives, methodological approaches that are widely used, analysis techniques, gaps in current research, and future trends.

The design will ensure a holistic approach, from objective mapping to critical engagement, and will lay a sound foundation for evaluating the state of knowledge and potential areas of research.

### a. Search Strategy

A comprehensive search strategy was meticulously developed and executed to identify all pertinent scholarly literature on the relationship between FinTech and the banking sector. The objective was to provide a comprehensive overview of peer-reviewed publications, prioritizing quality and relevance.

The Scopus database was selected as the primary source for literature compilation due to its comprehensive indexing of numerous high-impact journals, offering robust coverage in the social sciences, particularly economics, finance, and business management. The search was conducted on one day, September 25, 2025, to ensure the replicability of the results.

An initial search was conducted using the key string TITLE-ABS-KEY (banking AND FinTech). This preliminary search yielded 2,243 documents, indicating a substantial body of academic work in this area. To improve these results and increase the accuracy of the document retrieval, a detailed search string with several filters was used. The final query implemented was as follows:

TITLE-ABS-KEY ( banking AND FinTech ) AND ( LIMIT-TO ( PUBYEAR , 2014 ) OR LIMIT-TO ( PUBYEAR , 2015 ) OR LIMIT-TO ( PUBYEAR , 2016 ) OR LIMIT-TO ( PUBYEAR , 2017 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO ( PUBYEAR , 2023 ) OR LIMIT-TO ( PUBYEAR , 2024 ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Fintech" ) OR LIMIT-TO ( EXACTKEYWORD , "Banking" ) OR LIMIT-TO ( EXACTKEYWORD , "Digital Banking" ) OR LIMIT-TO ( EXACTKEYWORD , "Banks" ) OR LIMIT-TO ( EXACTKEYWORD , "Bank" ) OR LIMIT-TO ( EXACTKEYWORD , "Banking Services" ) OR LIMIT-TO ( EXACTKEYWORD , "Financial Technology (fintech)" ) ) AND ( LIMIT-TO ( SUBJAREA , "BUSI" ) OR LIMIT-TO ( SUBJAREA , "ECON" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( OA , "all" ) ) This refined search strategy, which explicitly filtered for publication years (2014-2024), specific keywords, relevant subject areas, document type (articles), and language, resulted in a more focused corpus of 205 documents.

Although the publication-year filter applied in the Scopus query spanned 2014 to 2024 to avoid overlooking any relevant work, none of the documents matching the keyword, subject-area, and document-type filters were published in 2014 or 2015. The corpus retrieved, and consequently the period analyzed throughout this review, therefore effectively spans 2016 to 2024.

From this refined pool, we successfully retrieved and downloaded 140 full-text articles for further review. These documents then underwent a two-stage screening process. First, we scanned the

abstracts and conclusions to check for broad relevance. The next step is to read the full texts in detail. This careful evaluation, based on our pre-defined inclusion and exclusion criteria, resulted in the final selection of 29 articles. These articles constituted the primary collection for in-depth analysis and synthesis in the systematic literature review. This meticulous filtering process ensured that only the most relevant and high-quality studies were included.

### b. Inclusion and Exclusion Criteria

To ensure a clear and rigorous selection of publications, please refer to the table below, which summarizes the inclusion and exclusion criteria that were applied in this review. The objective of these criteria was to maintain a coherent and methodologically sound sample.

**Table 1. Inclusion and Exclusion Criteria**

| Inclusion criteria | Exclusion criteria |
|---|---|
| Publication from 2014 to 2024 | Publication before 2014 were excluded; publications in 2025 were also excluded since 2025 is not yet over |
| Banking and fintech | Other than that were excluded |
| Article only | Conferences, profile, blogs, theses, books, chapters were excluded |
| English language | any other language was excluded |
| Publications in Economics, Econometrics, and Finance<br>And Business, Management and Accounting | Any other subject area was excluded |

### c. Data Collection and Synthesis

The data collection and synthesis followed a structured, multi-stage process to ensure analytical rigor. Initially, a set of 205 documents was retrieved. Of these, 140 full-text articles were subjected to a two-stage screening process. A preliminary scan of titles, abstracts, and conclusions was first conducted, followed by an in-depth full-text review applying predefined inclusion and exclusion criteria, resulting in a final corpus of 29 articles.

Data synthesis combined two complementary approaches. A bibliometric analysis was conducted to examine publication trends, authorship, citations, and keywords, with the aim of mapping the intellectual structure and evolution of the field. Concurrently, a systematic qualitative content analysis was conducted using a structured coding framework to identify theoretical foundations, methodologies, key findings, and research gaps. Collectively, these analyses offer a thorough and nuanced understanding of the FinTech–banking literature, thereby establishing a solid foundation for future research.

### d. Quality Assessment

To ensure the quality and reliability of this review, each study was meticulously evaluated beyond the established inclusion and exclusion criteria. Out of 205 documents, 140 articles were selected for detailed evaluation. Each article was meticulously reviewed to ensure clarity, methodological rigor, the relevance of the data and samples, and the support of the analysis for the conclusions. This thorough evaluation led to the selection of 29 high-quality studies, ensuring the review is both reliable and methodologically sound.

Figure 1 presents the PRISMA framework used to guide the literature review process

**Figure 1: PRISMA framework for this review**

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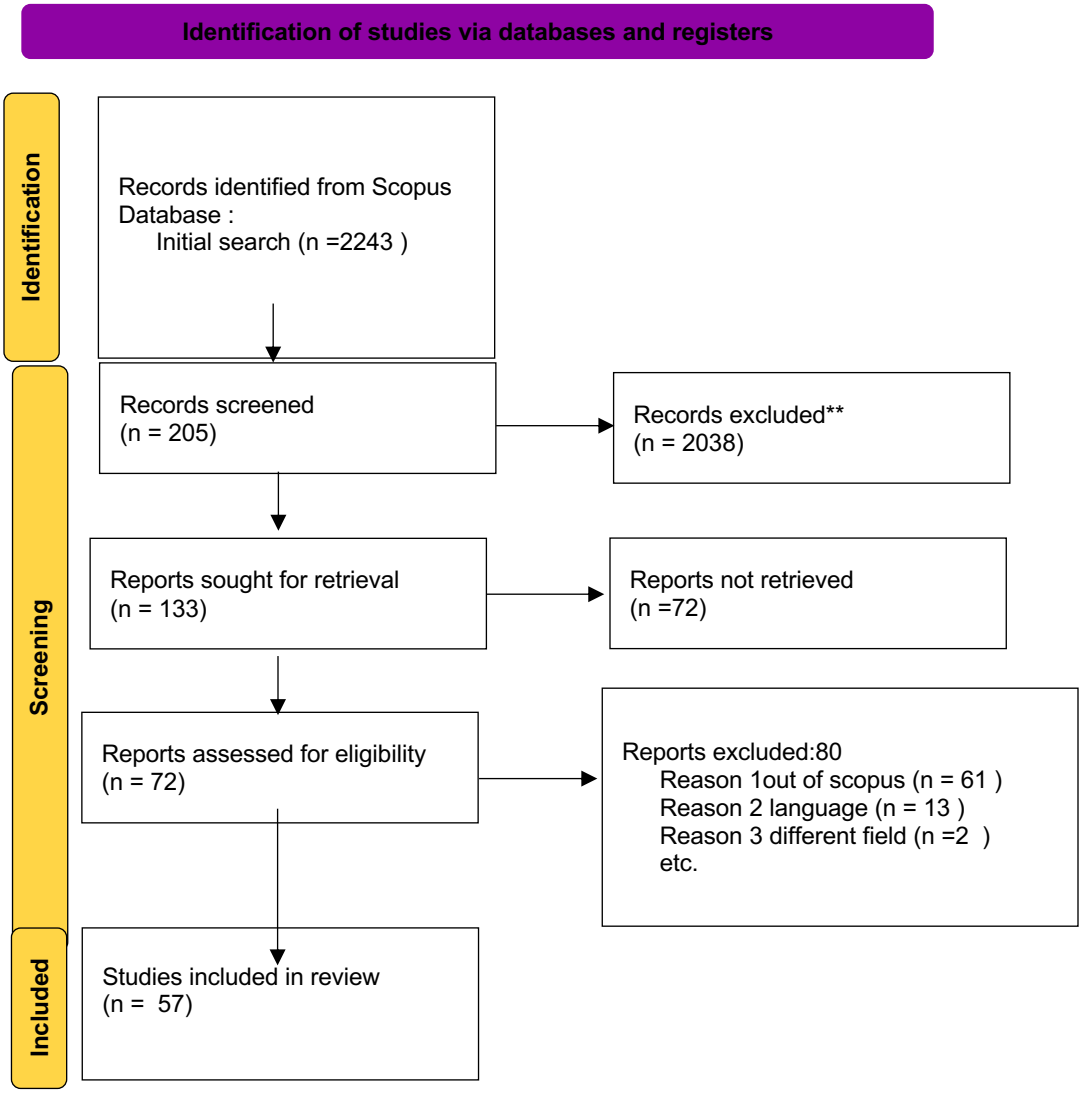



*Source: authors*

The PRISMA framework was utilized to guide the literature review process, as illustrated in Figure 1.

## 3. Results

To obtain a comprehensive understanding of our research subject, we employed a dual-method strategy that combined bibliometric analysis with a Systematic Literature Review (SLR). By integrating the broad structural insights derived from the bibliometric analysis with the in-depth,

content-oriented knowledge provided by the SLR, we were able to fully leverage the strengths of both approaches.

By seamlessly transitioning from the bibliometric analysis to the SLR, we ensured the coherence of the overall narrative. The bibliometric analysis was used to quantitatively delineate publication trends, geographic and institutional contributions, leading authors, and keyword co-occurrence networks, thereby providing a macro-level context for the subsequent discussion of the granular findings obtained from the SLR. This methodological design not only reinforced the logical consistency of our results but also yielded an all-encompassing grasp of the FinTech and banking research landscape.

To strengthen the interrelationship between the two approaches, cross-referencing was maintained throughout the work. The bibliometric analysis identified the predominant research themes, seminal contributors, and the evolving intellectual architecture of the field, while the SLR delivered comprehensive examinations of theoretical frameworks, methodological norms, research gaps, and future directions derived from a critical synthesis of selected publications. Through this cross-referencing, we ensured that the general patterns detected by the bibliometric data remained firmly anchored in the specific evidence and conceptual insights presented in the systematic literature review.

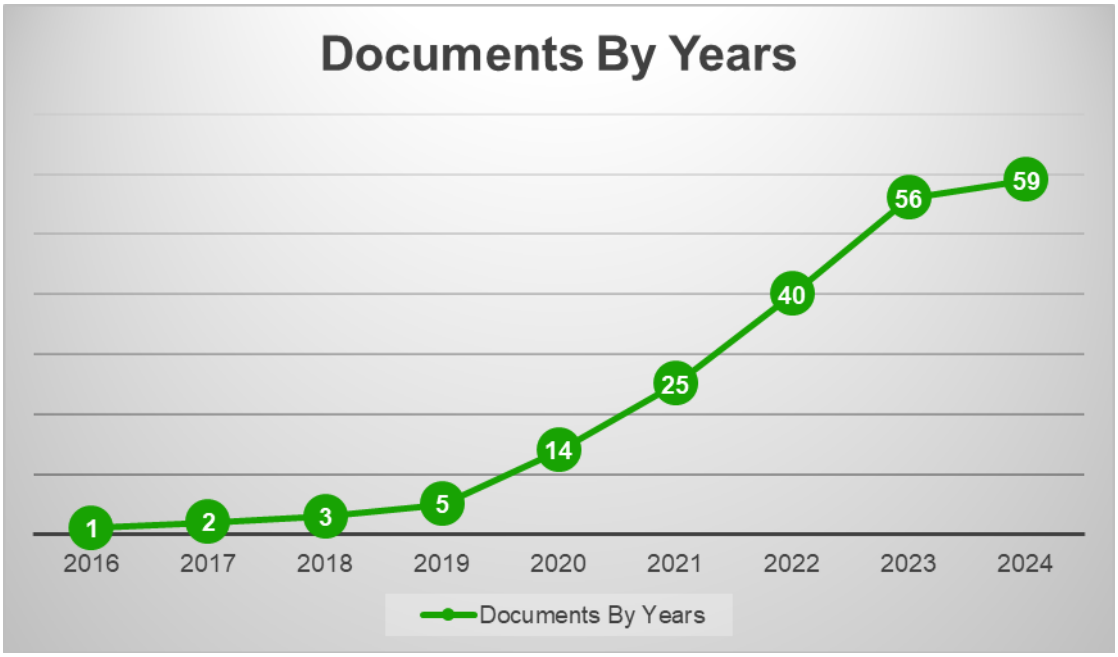
### a. The First Phase (Bibliometric Analysis)

This study used bibliometric analysis to map the intellectual structure and evolution of research at the intersection of FinTech and banking. Specifically, it examined publication trends, key contributors, institutional affiliations, collaborative networks, and keyword co-occurrence over a defined period. The goal was to identify leading research areas, pinpoint geographic and institutional hubs of knowledge production, and uncover the field's underlying cognitive framework. These macro-level insights provided a data-driven foundation that informed and contextualized the subsequent systematic literature review.

#### *i. Publication distributions by years*

The yearly distribution of academic publications from 2016 to 2024 is shown in Figure 3. The data showed a clear and steady upward trend. There was little activity during the first few years, from 2016 (1 publication) to 2018 (3 publications). Publication counts increased gradually through 2020 (14) and 2021 (25), with a notable acceleration starting in 2019 (5 publications). After 56 publications in 2023, growth accelerated to a peak of 59 publications in 2024. The exponential growth, especially from 2021 onward, indicates that the field is maturing and that research interest is growing quickly. The significant output in the most recent year highlights the field's current relevance and dynamism.

**Figure 1 : publication distributions by years**

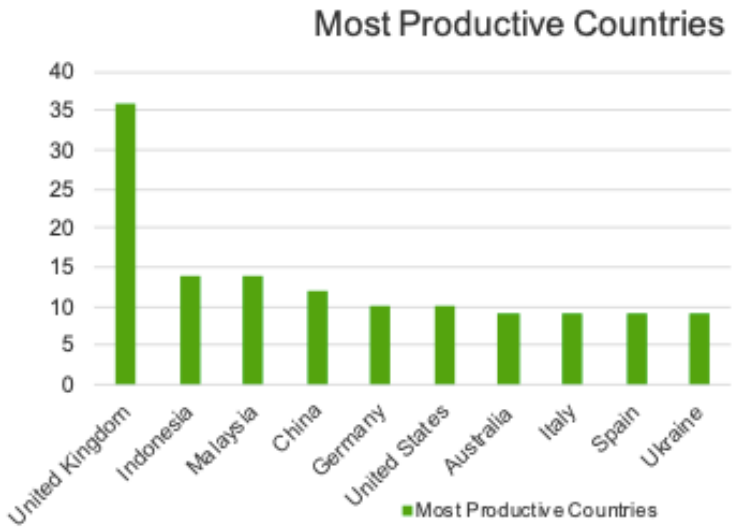



*Source : Autours*

### *ii. Publication distributions by countries*

The distribution of publications by country is shown in Figure 4. The country-by-country analysis revealed a global landscape of research and collaboration. With 36 publications, the United Kingdom is in the lead, highlighting its significant contribution to the advancement of this field. Following closely behind are Indonesia and Malaysia, which also demonstrated strong research focus. China, Germany, and the United States are other important productive countries, showing broad international interest in this area of study.

**Figure 2 : Publications distributions by countries**




*Source : Autours*

### *iii. The top auteur in the filed of fintech and banking*

**Table 1. The top authors in the field of fintech and banking**

| | Authors | Scopus ID | TP | TC | H-index | Most Cited Article | Times cited | Affiliation |
|---|---|---|---|---|---|---|---|---|
| 1 | Kohardinata, Cliff | 57214994595 | 8 | 42 | 2 | Indonesian peer to peer lending (P2P) at entrant's disruptive trajectory | 21 | Universitas Ciputra , Surabaya, Indonesia |
| 2 | Mashamba, Tafirei | 57209133920 | 12 | 95 | 6 | Fintech, bank funding, and economic growth in Sub-Saharan Africa | 11 | University of South Africa , Pretoria, South Africa |
| 3 | Tjahjadi, Bambang | 57191278873 | 1,193 | 73 | 16 | Indonesian peer to peer lending (P2P) at entrant's disruptive trajectory | 21 | Universitas Airlangga , Surabaya, Indonesia |
| 4 | Allen, Franklin | 7102515412 | 17,434 | 139 | 55 | Fintech, Cryptocurrencies, and CBDC: Financial Structural Transformation in China | 212 | Imperial College Business School, London, United Kingdom |
| 5 | Anholon, Rosley | 56910252000 | 3,382 | 200 | 29 | Impacts of digitization on operational efficiency in the banking sector: Thematic analysis and research agenda proposal | 31 | Universidade Estadual de Campinas, Campinas, Brazil |
| 6 | Arner, Douglas W. | 15046436800 | 1,682 | 75 | 16 | Decentralized finance | 310 | The University of Hong Kong, Hong Kong, Hong Kong |
| 7 | Ashfaq, Muhammad | 57205358476 | 408 | 34 | 11 | Evaluating Drivers of Fintech Adoption in the Netherlands | 64 | IU Internationale Hochschule GmbH, Erfurt, Germany |
| 8 | Aysan, Ahmet Faruk | 18433415200 | 2,038 | 154 | 24 | Fintech Strategies of Islamic Banks: A Global Empirical Analysis | 23 | Hamad Bin Khalifa University, Doha, Qatar |
| 9 | Bianchi, Robert J. | 37060330600 | 324 | 34 | 9 | COVID-19 and policy responses: Early evidence in banks and FinTech stocks | 13 | Griffith Business School , Brisbane, Australia |
| 10 | Broström, Anders | 36873854900 | 2,710 | 36 | 15 | Global drivers of cryptocurrency infrastructure adoption | 95 | Göteborgs Universitet, Gothenburg, Sweden |

*TP: Total publications*

*TC: Total citation*

Among these scholars, Franklin Allen stands out as a leading figure. His corrected publication record includes 823 works, an H-index of 55, and a total of 139 citations, demonstrating his strong influence. His affiliation with Imperial College Business School in London highlights his role in a top global institution.

This analysis examined the initial ten important authors who have made major contributions to the evolving area of FinTech. These influential researchers are joined by other key contributors from various countries and organizations. Their combined efforts shape the current landscape of financial technology scholarship. The dataset shows a global spread of expertise, with representatives from institutions in Indonesia, South Africa, Hong Kong, Brazil, and Qatar, reflecting the global importance of FinTech development and its applications.

The research focus of these authors highlights the main themes of the field. Their most cited publications discuss important topics such as decentralized finance (DeFi), peer-to-peer lending in emerging markets, the factors driving FinTech adoption, and the relationship between policy and financial innovation. This range demonstrates the diverse nature of FinTech research, covering technical, economic, and regulatory aspects.

### *iv. The top influential institutions are prominent in fintech and banking*

**Table 2: the most influential institutions are prominent in fintech and banking**

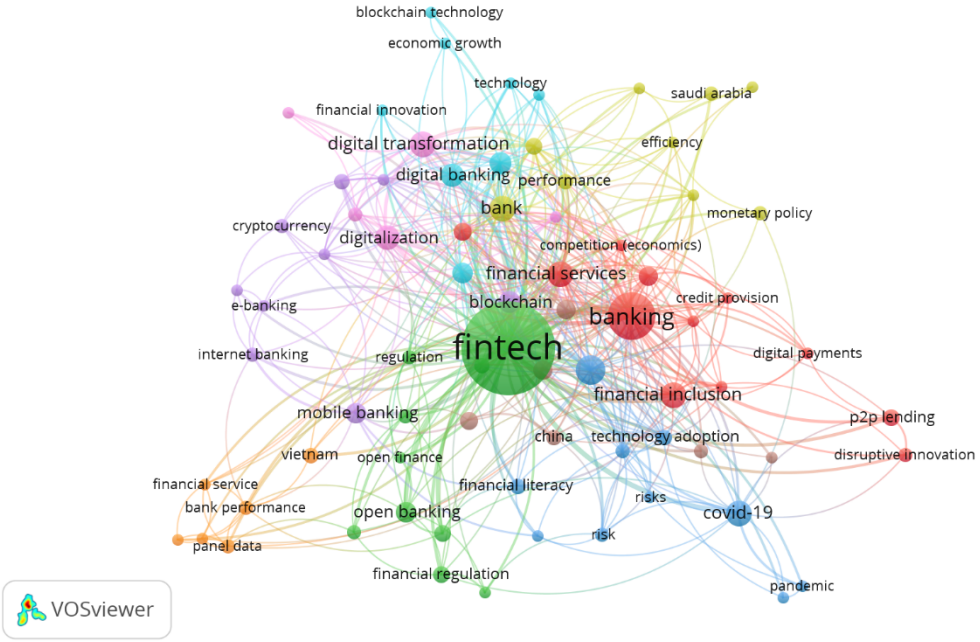
| Rank | Institution | TP | Rank | Institution | TP |
|---|---|---|---|---|---|
| **1** | University of South Africa | 6 | **11** | University of Oxford | 3 |
| **2** | The University of Sheffield | 4 | **12** | University of Cambridge | 3 |
| **3** | Multimedia University | 4 | **13** | University of London | 3 |
| **4** | Universität Zürich | 4 | **14** | Applied Science Private University | 3 |
| **5** | UNSW Sydney | 4 | **15** | Universitas Airlangga | 3 |
| **6** | The Royal Institute of Technology KTH | 3 | **16** | Universitas Padjadjaran | 3 |
| **7** | Poznań University of Economics and Business | 3 | **17** | Amman Arab University | 3 |
| **8** | Universiti Utara Malaysia | 3 | **18** | Universitas Ciputra | 3 |
| **9** | Heinrich-Heine-Universität Düsseldorf | 3 | **19** | Sheffield University Management School | 3 |
| **10** | Universiti Putra Malaysia | 3 | **20** | Great Zimbabwe University | 3 |

The institutional landscape of FinTech research, as demonstrated by these studies, is characterized by a decentralized geographic distribution and a lack of clear dominance by a small number of establishments. The University of South Africa stands out as the most prolific institution, while a significant group of universities—including prestigious institutions such as the University of Oxford and the University of Cambridge, as well as universities from Southeast Asia and Africa—exhibit comparable research productivity. This distribution reflects the global and interdisciplinary nature of the field, where expertise is distributed among established and emerging regions without a single center of gravity.

### v. *The top keywords used in publication in the field of fintech and banking*

The most common themes in FinTech and banking research are revealed by the co-occurrence network analysis. With a commanding 171 occurrences and a total link strength of 341, "fintech" stands out as the primary and dominant theme, highlighting its fundamental role in the academic discourse. With 45 occurrences and a strong link strength of 136, the keyword "banking" follows with significant prominence, underscoring its ongoing importance in the context of technological disruption. The research landscape is further shaped by other key terms, such as "financial services," "digital transformation," and "banks," which reflect the intricate relationship between institutional change, technological innovation, and service delivery. This analysis elucidates not only the prevalence of these concepts but also their interconnected influence, collectively charting the intellectual structure of contemporary FinTech and banking scholarship.

**Fig. 5. The most used keywords used in publication in the field of fintech and banking**




### b. The Second Phase (the Systematic Literature Review, SLR)

A Systematic Literature Review (SLR) was the next stage of this study, which involved a qualitative analysis of the academic literature on FinTech and banking. The purpose of this systematic analysis was to critically synthesize the corpus's substantive themes, methodological norms, and theoretical underpinnings. Thus, the SLR complemented the structural insights of the bibliometric analysis with a critical, content oriented synthesis by making it easier to identify constitutive research gaps and develop a cogent agenda for future investigation.

This section delineates the key theories, concepts, and models pertinent to bank FinTech strategy, as derived from the literature review. These foundational frameworks are synthesized in Table 1 (formerly Table 1 of the SLR).

**Table 1. Theoretical Frameworks for Bank FinTech Strategy: An Analysis of Competitive and Collaborative Models**

| Theories, Concepts, and Models | Explanation (Applied to Bank/FinTech Strategy) |
|---|---|
| Disruptive Innovation Theory | Guides banks to recognize FinTech startups as potential threats that will force them to change their business model radically by innovating or partnering just to survive in the evolving market. |
| Activity Theory & Complementarity Framework | Helps banks and FinTechs in their symbiotic partnership strategy and planning, rather than pure competition, especially useful to reach new markets or survive crises. |
| Barriers-to-entry Theory & Industrial Organization | Used by banks to comprehend how FinTechs overcome traditional market barriers, and to devise a counter-strategy: first compete, then adopt/acquire to regain market power – U-shaped effect. |
| Agency Theory & Corporate Governance | Informs strategy by highlighting how strong board oversight and audit committees are crucial for managing the risks and opportunities of financial innovation in different institutional contexts (e.g., oil-rich countries). |
| Platform Economics & Network Effects | Necessary to devise strategies to build multi-sided platforms. Banks can leverage this to outcompete FinTech through the building of ecosystems which lock in customers and partners. |

This table summarizes the fundamental intellectual foundations that underpin the strategic interactions between traditional banks and FinTechs. Analyzing these theories, concepts, and models demonstrates that the strategic interactions between traditional banks and FinTechs can be viewed in multiple dimensions and conceptualized along a continuum from rivalry to strategic collaboration. As a result, these financial organizations must combine these disparate points of view. These include risk management for internal agency problems and governance structures, strategic emphasis on long term competitive advantages derived from unique resources and processes (RBV/PBV), and strategic planning for either defensive or proactive measures against disruptive and disintermediation threats. On the other hand, these conceptual foundations would provide FinTechs with strategic insights into how traditional banks would react to their disruptive innovations, as well as how FinTechs can hone their value propositions (which may be inspired by public distrust of traditional banking systems) and position themselves for either strategic partnership or market capture.

This section outlines the primary research instruments and statistical methods employed in the analysis of bank-FinTech dynamics, as identified in the reviewed literature. The key methodologies, their applications, and justifications are consolidated in Table 2.

**Table 2. Research Methodologies Application and Justification in the Bank/FinTech Context**

| Research Instruments & Statistical Methods | Application & Justification in the Bank/FinTech Context |
|---|---|
| Data Envelopment Analysis (DEA) & Bootstrap (Banna et al., 2023; Liu, 2022) | Application: Measuring technical efficiency of banks (Islamic and conventional). Justification: DEA analyzes efficiency with no structural specifications imposed; the bootstrap technique corrects statistical bias. |
| IV-Tobit & Fractional Probit Regressions (Banna et al., 2023; Saiedi et al., 2020) | Application: Investigating factors that influence bank efficiency or the probability of using P2P loans. Justification: Tobit models handle censored dependent variables; IV or fractional probit models address endogeneity or proportional dependent variables. |
| Panel Tests (Fixed/Random Effects) & Specification Tests (Kohardinata et al., 2024; Qi et al., 2022; Mansour, 2024) | Application: Studying how P2P loans affect bank credit or how FinTech influences bank market power. Justification: Panel techniques account for unobserved heterogeneity; Hausman test guides model choice. |
| Simultaneous Equations Models (2SLS) (AlHares & AlBaker, 2023; Zheng et al., 2023; Mashamba & Gani, 2023) | Application: Investigating joint relationships among governance, innovation, and performance. Justification: 2SLS is necessary when bidirectional causation exists, allowing causal effects to be isolated. |
| Structural Equation Modeling (SEM/PLS-SEM) (Lamey et al., 2024; Mashamba & Gani, 2023; Dehnert & Schumann, 2022) | Application: Complex models such as the effect of FinTech adoption on non-financial outcomes through circular economy practices. Justification: PLS-SEM handles latent constructs (e.g., “trust,” “adoption”) and relatively small sample sizes. |

This synthesis of research methods emphasizes the epistemological diversity required to thoroughly explore the growing bank-FinTech environment. The prevalence of complex econometric tools, particularly GMM and simultaneous equations models, demonstrates the field’s effort to solve endogeneity concerns and establish causal inference in the face of dynamic financial interdependence. Simultaneously, the strategic use of textual analysis and qualitative inquiry shows scholarly recognition that critical constructs such as digital transformation and organizational collaboration go beyond traditional quantitative metrics and necessitate novel measurement strategies. This methodological combination of causal identification, latent variable modeling, and contextual exploration establishes a solid empirical foundation for moving theoretical frameworks beyond basic description to predictive accuracy and management relevance.

Analysis of Research Gaps in Bank-FinTech Literature

A thorough examination reveals significant research gaps in Bank-FinTech studies across theoretical, methodological, geographical, and contextual aspects.

Geographical and contextual limitations pose a considerable research gap. Many studies are still limited to specific national contexts, such as the United States (Saiedi et al., 2020), China (Qi et al., 2022; Song et al., 2023), Indonesia (Kohardinata et al., 2024), Poland (Waliszewski et al., 2024), and Arab countries (Al-Shouha et al., 2024). This geographical restriction severely hinders

theoretical generalizability and prevents the development of universal frameworks applicable across diverse financial ecosystems. Furthermore, compared to standard banking studies, research on Islamic banking contexts (Banna et al., 2023; Aysan et al., 2022) is significantly limited.

Methodological shortcomings represent another critical area. The research stresses the scarcity of longitudinal data (Suryanto et al., 2022; Serkbayeva et al., 2024) and the early stage of FinTech-specific indicators (Zheng et al., 2023; Serkbayeva et al., 2024). Moreover, there is a distinct absence of qualitative and mixed-methods research (Suryanto et al., 2022; Kohardinata et al., 2024; Panday et al., 2024), with the discipline heavily biased towards quantitative techniques. Several studies (Liu, 2022; Li et al., 2017) also point to difficulties in measurement accuracy and data granularity.

Theoretical and conceptual inadequacies constitute a third major difficulty. According to Broby (2021), there is a significant disconnect between the realities of modern digital banking and traditional theories of financial intermediation. Underdeveloped regulatory frameworks (Georgiev, 2024; Galazova & Magomaeva, 2019), as well as insufficient consideration of new threats in operational and cybersecurity areas, exacerbate this theoretical weakness. In some institutional contexts, such as oil-rich states (AlHares & AlBaker, 2023), the ambiguity in governance-performance linkages remains largely unsolved.

Relationship dynamics form the fourth major research gap. Current research has limited ability to move beyond simplistic competitive-cooperative dichotomies (Waliszewski et al., 2024; Vovk et al., 2021). Sophisticated evaluations of bank-FinTech partnership structures, complementarity effects during economic crises, and factors driving symbiotic relationship creation are crucial. Research (Bedowska-Sojka et al., 2023; Katsiampa et al., 2022) highlights the limited understanding of volatility dynamics and risk transfer mechanisms between FinTech companies and traditional banks.

Industry-specific understanding reveals gaps in several specialized sectors. These include a paucity of studies comparing traditional banks to FinTech lenders (Katsiampa et al., 2022), a lack of research on the impact of FinTech through bank funding channels (Mashamba & Gani, 2023), and insufficient examination of the role of non-bank financial intermediaries in monetary policy transmission (Beirne et al., 2023). Furthermore, there is a lack of research on the behavioral and demographic elements of FinTech adoption (Dehnert & Schumann, 2022).

These interconnected gaps point to a pressing research agenda that includes methodological diversification, theoretical framework renewal, comparative cross-national approaches, and more in-depth analysis of ecosystem dynamics and collaborative models. Addressing these constraints is necessary to acquire a better understanding of the shifting Bank-FinTech landscape and its consequences for global financial systems.

Future Research Directions and Strategic Recommendations

Collectively, these papers shed light on crucial avenues for developing FinTech research and practice in the banking sector. Georgiev (2024) and Galazova & Magomaeva (2019) emphasize the significance of building comprehensive regulatory frameworks and dealing with new hazards in digital finance. As highlighted by Zheng et al. (2023), developing robust FinTech inclusion measures enables more accurate measurement of financial development outcomes across varied economic circumstances.

Several studies emphasize the importance of extending research beyond existing geographical boundaries. Saiedi et al. (2020) call for worldwide validation of FinTech adoption models, while Waliszewski et al. (2024) and Song et al. (2023) propose cross-country comparative studies to better understand diverse patterns of bank-FinTech complementarity across different market configurations. This geographical extension should be matched by methodological diversification, as proposed by Suryanto et al. (2022) and Kohardinata et al. (2024), including longitudinal designs and mixed-methods techniques that combine quantitative rigor with qualitative insights.

Integration of sophisticated technologies is another critical direction. Kohardinata et al. (2024) and Aysan et al. (2022) focus on AI and machine learning applications for risk modeling and consumer segmentation, whereas Galazova & Magomaeva (2019) emphasize blockchain's potential for improving security and operational efficiency. Furthermore, Lamey et al. (2024) and Dehnert & Schumann (2022) suggest using advanced analytical tools, such as artificial neural networks and finite mixture modeling, to capture complex behavioral patterns and latent consumer segments.

Strategic organizational transformation is a recurring theme. Panday et al. (2024) and Vovk et al. (2021) highlight the necessity of building symbiotic relationship models between traditional banks and FinTech enterprises, whereas Aysan et al. (2022) and Kurniati & Suryanto (2022) emphasize the need for region-specific digital strategies and regulatory frameworks. Monitoring potential monopolistic risks and promoting balanced competition, as stated by Qi et al. (2022), are critical for long-term market development.

Multiple studies (Banna et al., 2023; Serkbayeva et al., 2024; Mashamba & Gani, 2023) advocate creating focused methods for policy formation that take institutional specificities into account, particularly the distinction between Islamic and conventional banking models. Simultaneously, Beirne et al. (2023) and Katsiampa et al. (2022) call for stronger supervisory frameworks and the inclusion of non-bank financial intermediaries in regulatory supervision mechanisms.

Finally, the research agenda proposes investigating emergent phenomena such as central bank digital currencies (Beirne et al., 2023), embedded finance (Dehnert & Schumann, 2022), and the impact of crises on FinTech adoption (Bedowska-Sojka et al., 2023). These inquiries should be supplemented with ongoing examinations of consumer protection mechanisms, data privacy concerns, and financial stability implications in increasingly digitalized financial ecosystems.

Collectively, these recommendations provide a comprehensive roadmap for advancing both scholarly understanding and practical implementation of FinTech innovations in banking, emphasizing the importance of collaboration among researchers, practitioners, and regulators in successfully navigating the changing financial landscape.

### i. Discussion

### c. The Growing, Globalized, Collaborative World of Research

Through this detailed bibliographic assessment, it becomes clear that not only is the number of published papers increasing exponentially, but the increased interest in FinTech bank relationships began in earnest after 2021. This mirrors the rate at which the global financial industry is being digitally transformed. Although the UK remains in a leadership position in terms of published papers on FinTech bank relationships, the increasing number of papers contributed from Indonesia, Malaysia, South Africa, and China signifies that FinTech bank relationships matter to the world and that the world matters to FinTech bank research. This increased diversity introduces a wider

range of "concerns" that FinTech bank research must address, as well as a broader set of approaches that can be considered or explored. For instance, Mashamba & Gani (2023) submit that "financial inclusion in emerging markets" becomes an area that FinTech bank research must consider. On a broader aspect, Banna et al. (2023) assert that FinTech bank research is surrounded by an Islamic banking environment that is unlike any environment in the UK. Banna et al. are corroborated by Aysan et al. (2022), who assert that FinTech bank research remains an area surrounded by an environment different from that in the UK. Through such views, Vovk et al. (2021) submit that FinTech bank research is impacted by "FinTech's ubiquitous effects" in accordance with a "local institutionally embedded context." Vovk et al. are corroborated by Georgiev (2024).

### d. Theoretical Evolution: Disruption to Symbiotic Co opetition

Turning to dominant models of analysis, what emerges from the SLR is that there has been a richness and development of theory over time, moving from more simplistic models towards more complex approaches attuned to capturing interdependence relationships (Sloman et al., 2019). Disruptive Innovation Theory was central to the early narrative, positioning FinTech as a potentially existential threat to traditional banking forms (Belleflamme et al., 2014). However, our analysis reveals a definite movement towards more complex approaches designed to incorporate nuanced models of relationships (Vovk et al., 2021; Lamey et al., 2024), encompassing Platform Economics, Resource Based View/Practice Based View (RBV/PBV), and models of complementarity and symbiosis. Such development represents intellectual maturity as scholars align models more closely with reality. Georgiev (2024) identifies a reality of "financial re intermediation" where FinTechs gradually engage in strategic partnerships and develop Banking as a Service (BaaS) models after an initial phase of disintermediation (Vovk et al., 2021; Broby, 2021). Indeed, our analysis establishes this movement towards more hybrid "co opetitive" models. This model recognizes more than an either or focus positioned within simplistic terms of competition or cooperation. It recognizes that genuine, meaningful cooperation for advancement must be predicated upon acknowledging each other's assets and potential (Zveryakov et al., 2019).These findings carry several implications for theory building in the FinTech-banking domain. First, the gradual displacement of Disruptive Innovation Theory as the field's dominant lens suggests that frameworks rooted in zero-sum, substitution-based logic are increasingly insufficient to account for the relational and often symbiotic nature of bank-FinTech interactions observed in the literature (Vovk et al., 2021; Georgiev, 2024). Second, the emergence of Platform Economics and re-intermediation perspectives implies that classical theories of financial intermediation, which assume banks as the primary locus of information processing and risk allocation, require conceptual revision to formally incorporate platform-mediated value creation and the redistribution of intermediation functions across ecosystems (Broby, 2021). Third, the increasing reliance on Resource-Based and Practice-Based Views to explain bank-FinTech complementarity suggests that competitive-advantage theories must be extended beyond firm boundaries to account for inter-organizational resource pooling and capability sharing among nominally competing actors. Taken together, the coexistence of multiple, only partially reconciled theoretical frameworks (disruption, platform economics, RBV/PBV, and complementarity models) points to the pre-paradigmatic state of this research stream and underscores the need for an integrative theoretical framework able to jointly capture competition, collaboration, and ecosystem-level dynamics rather than treating them as separate or sequential phases (Zveryakov et al., 2019).

### e. Theoretical Implications

Beyond simply tracing the field's evolution, these findings invite a more direct reckoning with the theories themselves. Disruptive Innovation Theory, in its original formulation, was built around a logic of substitution: incumbents either adapt or are displaced by leaner entrants offering inferior-but-improving alternatives (Christensen, 1997). That logic sat comfortably with the early FinTech narrative, but it sits less comfortably with what this review actually finds, namely a landscape increasingly defined by partnership, BaaS arrangements, and co-opetition (Vovk et al., 2021; Georgiev, 2024). If banks and FinTechs are converging rather than one replacing the other, a theory built on displacement needs, at minimum, a companion framework capable of explaining cooperation as something other than a temporary truce.

A similar tension surfaces around financial intermediation theory. Classical accounts position banks as the primary resolvers of information asymmetries between savers and borrowers (Allen & Santomero, 1997). The re-intermediation dynamics documented in this review, in which FinTechs absorb pieces of that function through platforms and then hand some of it back to banks under new contractual arrangements, are not easily accommodated within that classical frame (Broby, 2021). This suggests the theory itself, not just its applications, may be due for revision, treating platforms as a structural feature of intermediation rather than an external disruption to it.

Finally, the literature's growing use of the Resource-Based View to explain bank-FinTech complementarity (Barney, 1991) is theoretically interesting precisely because RBV was conceived to explain why firms compete, not why they share. Pairing it with platform economics (Parker et al., 2016) to account for resources once guarded within firm boundaries now being pooled across them is a productive move, but it remains more a conceptual bridge than a fully worked-out theory. The coexistence of these partially overlapping frameworks, disruption, intermediation, RBV, platform economics, says less about theoretical richness than about a field still searching for a unifying account of how competition and collaboration coexist (Zveryakov et al., 2019).

### f. Methodological Sophistication Amidst a Qualitative Deficit

A scan of current research tools and statistical analyses shows a focus on causal analysis. More complex econometric analyses, such as GMM for dynamic panels (Qi et al., 2022; Zheng et al., 2023) and simultaneous equations models (2SLS) to deal with endogeneity (Mashamba & Gani, 2023), are common. This is advantageous, as it heightens the credibility and relevance of the empirical findings. Notwithstanding, there is a remarkable lack of balance in the methodological approach. To date, there is a marked absence of qualitative or mixed methodology in the body of current research (Suryanto et al., 2022; Kohardinata et al., 2024). Although the main advantages of the quantitative models lie in the reliable identification of correlations and general trends, they lack understanding of the “black box” of strategic choice, partnerships, and consumer behavior. Noted exceptions to this lack of balance can be found in the qualitatively oriented study of Panday et al. (2024) from South Africa.

### g. Ever Present Gaps and a Strategic Research Agenda for Future Research

By integrating the identified gaps, a complex and challenging research program emerges. First, geographic and contextual constraints continue to hinder generalization. The geographical focus on US, Chinese, and Indonesian data (Saiedi et al., 2020; Kohardinata et al., 2024) must be offset by more comprehensive comparative studies across more countries, aiming to build universal

models (Waliszewski et al., 2024). Second, a theoretical gap is also apparent. Traditional models of financial intermediation are ill suited to account for blockchain based disintermediation or banking platforms (Broby, 2021). Third, studies of bank FinTech relationship dynamics must dispense with oversimplification through binary thinking and instead seek a deeper examination of complex partnerships and dynamics evolving towards ecosystem configurations (Vovk et al., 2021).

To address these, a more pluralistic research program must be advocated. Methodological pluralism is required, encouraging more longitudinal exploration as well as mixed method studies that combine qualitative and quantitative approaches (Suryanto et al., 2022). Theoretically, new thought must be directed towards integrating several distinct areas, including platform economics, digital transformation, and network analysis. In terms of subject matter, a more proactive exploration must be undertaken, including new frontiers centered on the implications of artificial intelligence and machine learning for improved risk stratification and personalization services (Aysan et al., 2022; Kalogiannidis et al., 2024); the transformative effects of blockchain and central bank digital currencies (Beirne et al., 2023); as well as the stability implications of more ubiquitous financing arrangements such as “embedded finance” (Dehnert & Schumann, 2022). Of equal note, as new FinTech innovations continue, more must be learned about issues involving concentration, data privacy, consumer protection, and systemic risk.

## 4. Conclusion

This study set out to map the intellectual landscape of FinTech-banking research by pairing two methods that are too often used in isolation: a bibliometric analysis to chart what has been published, and a systematic review to understand what it actually means. Taken together, the picture that emerges is of a field still finding its feet, but moving quickly. Publication output has grown at a near-exponential rate, and more tellingly, the way scholars talk about the bank-FinTech relationship has matured alongside it, shifting from early disruption narratives toward more nuanced accounts of symbiotic co-opetition and ecosystem integration (Vovk et al., 2021; Georgiev, 2024).

Three observations stood out from this synthesis, each pointing toward a different kind of unfinished business. The first concerns geography: research has spread across a genuinely wide range of countries, which is encouraging, but this diversity has not yet translated into systematic comparison. We know a great deal about FinTech in any number of individual settings, and comparatively little about which of those findings travel and which are artifacts of local context (Waliszewski et al., 2024). The second is a methodological imbalance that runs through much of the corpus: econometric work in this space has become genuinely sophisticated (Qi et al., 2022), yet that rigor has come at the expense of the kind of qualitative inquiry needed to understand how managers and customers actually behave, negotiate, and adapt. The third is theoretical: existing frameworks have not fully caught up with how bank-FinTech collaboration is structured in practice, particularly the more intricate architectures behind banking-as-a-service and similar arrangements (Broby, 2021). None of these gaps is fatal to the field, but together they suggest where its next decade of research should be spent, namely on longitudinal, mixed-methods work, on more deliberate cross-country comparison, and on emerging domains such as AI, blockchain, and central bank digital currencies that existing theory has barely begun to absorb (Aysan et al., 2022; Beirne et al., 2023).

Beyond its academic contribution, this synthesis is meant to be useful. For banks, it offers a structured starting point for thinking about ecosystem strategy rather than treating FinTech partnerships as one-off tactical decisions. For regulators, it lays out, in one place, the tensions, between innovation and stability, between competition and collaboration, that any adaptive regulatory framework will eventually have to confront (Banna et al., 2023).

Naturally, a study built on these choices carries some boundaries worth stating plainly. The decision to rely on a single database, Scopus, was made for good reason: it offers consistent metadata and broad coverage of high-impact business and economics journals, and is the database most commonly recommended for this type of analysis (Donthu et al., 2021). Still, no single database is exhaustive, and relevant work indexed only in Web of Science, Google Scholar, or regional repositories will inevitably have been missed. The same trade-off applies to restricting the sample to English-language, peer-reviewed, open-access journal articles: a choice that kept the review manageable and reproducible, but one that may have filtered out conference papers, books, or non-English scholarship that could have nuanced the picture further. The final corpus of 29 articles, while arrived at through a transparent and rigorously applied screening process, is also modest in absolute terms, and a field growing this quickly will likely have outpaced parts of this synthesis before it is even published. There is, too, an unavoidable degree of interpretive judgment in any thematic coding exercise, however structured; two careful readers will not always parse a borderline study identically. Finally, because the search was run on a single date in September 2025, what is presented here is best understood as a snapshot rather than a continuously updated record, one that future reviews would do well to revisit and extend.

None of these limitations undercut the basic contribution of the work. If anything, they sharpen it: this study consolidates a fragmented body of knowledge into a single, evidence-based map, and in doing so identifies precisely where the next wave of research needs to go. Closing those gaps, methodological, theoretical, and comparative, will determine whether this field continues simply to describe the changing relationship between banks and FinTechs, or whether it begins to actively shape it.

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## Appendix A

| # | Authors | Theories / Concepts Used | Research Instruments | Research Statistical | Research Gaps | Future Agenda and Recommendation |
|---|---|---|---|---|---|---|
| 1 | Banna, H. et al. (2023) | Schumpeter's Economic Development Theory, link between finance and growth, inclusive finance | Data Envelopment Analysis (DEA), Bias-corrected Simar-Wilson bootstrap, IV-Tobit regressions | DEA, Bias-corrected Simar-Wilson bootstrap, Tobit, IV-Tobit, Fractional Probit | Limited access to financial services, insufficient studies differentiating Islamic and conventional banks, limited FinTech data in Islamic context | Enhance rural access, increase FinTech integration for bank efficiency, comparative studies (Islamic vs. conventional), policy for digitalization |
| 2 | Suryanto, S. et al. (2022) | Financial performance theory (ratios), Innovation & disruption in banking, Strategic performance measurement | Quantitative analysis of secondary financial data, financial ratios (CAR, ROA, NIM, NPL) | Paired sample t-test, Wilcoxon signed-rank test | Limited focus on FinTech regulation timing impact, need for deeper operational analysis (BOPO), lack of longitudinal & qualitative insights | Longitudinal studies post-2019, qualitative bank management perspectives, investigate impact on customer satisfaction & operational risk |
| 3 | Kohardinata, C. et al. (2024) | Disruptive Innovation, Consumer Theory, Financial Intermediation Theory, Complementary vs. Substitution effects | Secondary data (33 Indonesian provinces), bank credit, P2P loans, savings, branch data | Panel data regression (Fixed/Random Effects), VIF test, Chow test, Hausman test | No prior study jointly examines P2P's impact on non-MSME bank credit AND bank liquidity, focus only on Indonesia 2022, no behavioral insights | Extend to multiple years/countries, incorporate qualitative interviews, explore AI/ML-based P2P risk models, test additional control variables |
| 4 | AlHares, A. & AlBaker, Y. (2023) | Agency theory & corporate governance applied to board structure and financial innovation | Secondary data (Refinitiv Eikon, Fitch Connect, annual reports) | Panel data, two-way random effects, two-stage simultaneous equations (2SLS) | Ambiguity in direct governance-performance link in oil-rich countries, lack of studies on audit committee & ownership, sample limited to GCC banks | Examine effect of innovative services on credit extension & funding; international comparisons; expand beyond banking sector |
| 5 | Waliszewski, K. et al. (2024) | Activity Theory, Conceptual Framework of Complementarity between LendTech and banks in crises | Primary surveys (200 LT users), survey with LT managers, secondary data (Credit Bureau) | Horvitz-Thompson estimator, descriptive & comparative analysis | Lack of international studies on LT-bank complementarity in crisis, limited | Extend to other countries, analyze behavioral/cognitive factors in LT vs bank choice, explore impact |

| # | Authors | Theories / Concepts Used | Research Instruments | Research Statistical | Research Gaps | Future Agenda and Recommendation |
|---|---|---|---|---|---|---|
| | | | | | sample size (200 households, Poland only) | of AI/ML on LT development |
| **6** | Saiedi, E. et al. (2020) | Distrust Theory, Technology Adoption in FinTech (linking bank distrust to P2P lending) | Large dataset of 7,275,560 P2P lending transactions (US), survey-based distrust measures | OLS, Logit regressions, Instrumental Variable models (2-stage), Fixed Effects | Limited to US context, need for international validation, lack of analysis beyond P2P lending | Extend to other countries & FinTech forms, explore psychological mechanisms of distrust, integrate cross-cultural studies |
| **7** | Qi, H., Yang, K. & Wang, W. (2022) | Barriers-to-entry theory, Industrial organization, U-shaped effect of FinTech on bank market power | Panel data (155 Chinese banks), Digital Financial Inclusion Index (Peking University) | Dynamic panel regression (System GMM), U-shaped regression models | Lack of consensus on FinTech's effect on bank power, most prior studies qualitative/single-service, limited empirical research on later stages | Monitor monopolistic risks, promote digital transformation of small/medium banks, encourage bank-FinTech cooperation, study risk-taking |
| **8** | Zheng, C. et al. (2023) | Diversification Theory, Financial Inclusion, FinTech as a driver, Composite FinTech index (PCA) | Secondary data (Orbis, FAS-IMF, WDI, WGI, Findex), PCA for FinTech index | Fixed Effects, 2SLS-IV, Two-Step System GMM, GLS, Granger Causality | Lack of FinTech-specific inclusion metrics, limited cross-country analysis in developing contexts, endogeneity issues ignored | Develop robust FinTech inclusion indicators, expand research to diverse banks/regions, address endogeneity, promote policy support for adoption |
| **9** | Serkbayeva, Z. et al. (2024) | New Empirical Industrial Organization (NEIO), Triple/Quadruple Bottom Line, Asymmetric Information, Efficient Structure Hypothesis | Dependent variables: Profitability (ROA, ROE, NIM/NNIM), NPL ratio. Independent: Firm-specific, Macro, ESG, FinTech proxy (internet users) | Two-Step System GMM, Panel Data Analysis, Diagnostic Tests (VIF, Hansen, Arellano-Bond) | Lack of long-term studies on IBs & CBs profitability/NPLs, no prior study incorporated internet users (FinTech proxy) & ESG, limited application of NEIO/QBL | IBs: adopt modern know-how for risk. CBs: learn from IBs' resilience. Both: caution with FinTech products. Policymakers: prioritize stability, ESG, balanced FinTech regulation. |
| **10** | Liu, T.-K. (2022) | Efficiency and Productivity Theory, Data Envelopment Analysis (DEA: CCR, BCC models), Panel Data Analysis | Dependent: Stock Price, ROA, ROE. Independent: Patents, Operating Expenses, Market Share, etc. DEA Inputs/Outputs | DEA, Panel Data Model (Hausman test for Fixed/Random Effects), Descriptive Statistics | Inconsistent results on financial innovation/patents impact, immature FinTech patents in Taiwan, focus only on banking, patents highly concentrated | Subdivide patent types, expand to other financial sectors, analyze with more mature patent data. Policymakers: provide FinTech guidance. Investors: use patents as signal. |
| **11** | Broby, D. (2021) | Theory of the Banking Firm, Financial Intermediation, Disintermediation, Liquidity Transformation, Open Banking, BaaS | Analytical Framework, Conceptual Diagrams, Literature Synthesis, Algebraic Modeling | None (Conceptual paper) | How intermediation theories adapt for digital banks/non-banks, impact of reduced friction, changing nature of banking risk (e.g., online bank runs) | Research on risk pricing, future of deposits & central bank policy, address moral hazard from challenger banks, extend deposit insurance, empirical testing needed |
| **12** | Panday, L. et al. (2024) | Improved TAM (iTAM), Disruptive Innovation, Strategic Alignment, Client-Centricity, Coopetition | Semi-structured interviews (n=12), Purposive sampling, Qualitative thematic analysis (NVivo) | None (Purely qualitative) | Absence of South African models for bank-tech partner relationships, insufficient literature on how | Partner with FinTechs for fit-for-purpose solutions, garner leadership support, adopt client-centred |

| # | Authors | Theories / Concepts Used | Research Instruments | Research Statistical | Research Gaps | Future Agenda and Recommendation |
|---|---|---|---|---|---|---|
| | | | | | disruptive tech impacts sustainable growth/advantage | model, focus on strategic partnerships |
| **13** | Lamey, Y.M. et al. (2024) | Practice-Based View (PBV), FinTech Adoption (FA), Circular Economy Practices (CEPs), Non-Financial Performance (NFP) | Structured Questionnaire (Likert scale), Convenience Sampling (n=397 bank employees), Pilot Test | PLS-SEM (SmartPLS), Descriptive Stats, Measurement Model, Structural Model, Mediation Analysis | Dearth of literature on FA's impact on banks' NFP, no prior study on mediating role of CEPs, most prior studies in developed countries | Extend to other countries/sectors, investigate other moderators, use secondary data, employ advanced techniques (e.g., Artificial Neural Networks) |
| **14** | Mashamba, T. & Gani, S. (2023) | Financial intermediation theory, Fintech disruption, Bank funding structure, Economic growth, Mediation analysis | Secondary data (S&P Capital IQ, World Bank, IMF), Panel data (56 banks, 19 SSA countries), PCA for Fintech index | Descriptive statistics, Correlation matrix, Structural Equation Modeling (SEM), 2SLS for endogeneity | Limited research on Fintech's impact on growth via bank funding channel, unclear mediation role, heterogeneous effects on funding types understudied | Policymakers: Monitor Fintech's impact. Banks: Become Fintech enablers. Governments: Develop capital markets. Researchers: Explore regulatory frameworks. |
| **15** | Georgiev, L. (2024) | Financial Intermediation, Disintermediation & Re-intermediation, Platform Economics / Network Effects, Qualitative Asset Transformation | Comparative analysis (traditional banks vs. fintechs), Literature review, Conceptual modeling, Industry reports | Asset growth comparison, ROE comparison, Venture capital trends, Market share analysis | Lack of empirical studies on fintech-bank partnerships, insufficient regulatory frameworks (EU/Bulgaria), limited research on risks (cyber, operational) | Develop supportive regulatory frameworks (sandboxes), encourage bank-fintech partnerships, enhance supervision (SupTech, RegTech), address new risks |
| **16** | Zveryakov, M. et al. (2019) | Digital Economy, Network Society, Information Economy, Business Models & Platform Economics, Regulatory Arbitrage, FinTech-Bank Symbiosis vs Competition | Statistical Monitoring, Dynamic Analysis, Comparative Analysis, Case Studies, Literature Review | Investment trends (VC, PE, M&A), Number/valuation of 'unicorns', Market share projections | Fragmentary empirical works on FinTech-bank relationships, lack of clear stimulators/dissimulators, insufficient risk analysis, limited regulatory frameworks | Banks adopt symbiotic models (APIs, partnerships), develop RegTech/SupTech, embrace Blockchain/AI/cloud, transform business models, enhance data security |
| **17** | Aysan, A.F. et al. (2022) | Bank 4.0, Digital Transformation Theory, Financial Technology Adoption, Disruptive Innovation, Strategic Management of Technology | Global Islamic Bankers Survey (GIBS), Questionnaire (101 Islamic banks), Quantitative Research | Correlation coefficients, ANOVA F-tests, Descriptive Statistics, Percentage distributions | Limited global empirical studies on Islamic banks' digital adoption, discrepancy between awareness/implementation, lack of systematic adoption strategies for AI/DLT | Increase R&D investment in AI/DLT, form FinTech partnerships, develop region-specific strategies, enhance awareness/training, adopt open banking & P2P models |
| **18** | Sadiku, A. et al. (2022) | Digital Transformation Theory, Customer-Centric Banking, ICT Adoption, Disruptive Innovation, Generational Preferences, Pandemic Acceleration | Framework Analysis, Literature Review, Market Data Analysis, Consumer Preference Surveys, Case Studies | Percentage distributions of preferences, Eurostat data, Generational adoption rates, Investment growth data | Limited focus on emerging markets' challenges, insufficient cybersecurity risk analysis, lack of longitudinal studies, minimal research on hybrid models | Accelerate digital transformation, develop flexible/secure payments, invest in AI/blockchain/mobile, create hybrid models, enhance data analytics for personalization |

| # | Authors | Theories / Concepts Used | Research Instruments | Research Statistical | Research Gaps | Future Agenda and Recommendation |
|---|---|---|---|---|---|---|
| **19** | Bedowska-Sojka, B. et al. (2023) | Competitive threat of fintechs, Digital transformation, Volatility transmission, Tail risk, Dynamic correlations & quantile dependence | Indices: iSTOXX Global Fintech 30, STOXX Global 3000 Banks. Robustness: MSCI, Euro STOXX, KBW Nasdaq | Multivariate GARCH-DCC, Quantile Coherency, Engle & Sheppard test, KPSS test, Skewed Student t-distribution | Lack of pre/during COVID-19 comparison studies, limited research on tail dependence/quantile coherency, geographical differences (US vs. Euro) underexplored | Encourage FinTech integration by traditional banks, facilitate development with balanced risk controls, research long-term impact of crises & regional/size factors |
| **20** | Song, X. et al. (2023) | Competition Effect vs. Technology Spillover Effect, Long-tail Theory, Economies of Scale, U-shaped relationship | Panel data (46 listed Chinese banks), Peking University Digital Financial Inclusion Index, Control variables | Two-way fixed effects panel regression, Hausman test, VIF, Panel cointegration test, Robustness checks | Limited sample (Chinese banks only), lack of cross-country analysis, need for broader regional/international data | Expand to other countries, develop targeted strategies based on bank size/region, encourage differentiated FinTech routes, enhance innovation, focus on user-centered services |
| **21** | Vovk, V. et al. (2021) | Symbiosis between banks and FinTech, Digital transformation, Life cycle stages of banks, Digital Economy and Society Index (DESI) | Linear trend model, Exponential Moving Average, Multiplicative trend, DESI index components, Survey data (KPMG) | Forecast of net interest income, Global FinTech adoption rates, DESI scores, Investment data | Lack of comprehensive legal framework for bank-FinTech cooperation in Ukraine, insufficient integration into int'l ecosystems, underdeveloped infrastructure | Harmonize legislation with EU (PSD2), develop dedicated legal framework, increase state support for innovation/R&D, promote digital literacy, adopt life-cycle-based policies |
| **22** | Beirne, J. et al. (2023) | Monetary policy transmission channels, Regulatory arbitrage, Financial intermediation and fintech, Countercyclical policy, Central bank independence | Panel Structural VAR (PSVAR), Fixed effects panel regression, Data from BIS, IMF, World Bank, FSB, Bloomberg | Unit root tests, Hausman test, Impulse response functions, Robustness checks | Limited empirical evidence on non-bank finance & monetary policy in Asia, heterogeneous effects, role of regulatory quality/CBI underexplored | Incorporate non-banks into central bank operations, strengthen financial regulation, enhance supervisory frameworks, research non-bank balance sheets, explore CBDCs |
| **23** | Katsiampa, P. et al. (2022) | Financial vs. prudential performance, Credit/liquidity/capital/operational/market risks, Ownership structure, Fintech disruption | Panel data regression (Fixed Effects, GMM), Dependent: ROA, ROE, NPL, SML. Independent: LLP, LQ, EA, VaR, etc. | Hausman test, Fisher panel unit root test, Sargan test, Arellano-Bond test, Descriptive statistics, Correlation matrices | Limited studies comparing traditional banks and Fintech lenders in China, few analyses of prudential performance (SML & NPL), insufficient focus on Fintech proficiency within banks | Explore long-term effects, investigate client segmentation, examine role of regulatory changes, extend analysis to unlisted Fintechs, study impact of CBDCs, enhance in-house capabilities |
| **24** | Al-Shouha, L. et al. (2024) | Transaction Cost Theory, Agency Theory, Financial Intermediation, Digital Transformation & Competitive Advantage, Profit Maximization | Panel Data (21 banks, 7 Arab countries), Textual Analysis (digitalization keywords in reports), Financial Ratios (ROA, ROE, Solvency) | Fixed Effects Model, Two-Stage Least Squares (2SLS), Hausman Test, Wooldridge Test, Wald Test, Sub-period Analysis | Limited empirical studies on Fintech impact in Arab countries, lack of regional focus, under-researched interaction between fintech and bank profitability | Expand FinTech investment, develop regulatory frameworks, encourage bank-technology firm partnerships, further research on local-level effects and cross-country comparisons |

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|---|---|---|---|---|---|---|
| **25** | Mansour, N. (2024) | Competition Effect vs. Technology Spillover Effect, Market Power & Monopoly Power, Monetary Policy Transmission, Bank Profitability Drivers | Panel data model with fixed effects, Digital Inclusive Finance Index (Peking University), IV: Internet penetration rate, Control variables | Fixed effects regression, Hausman test, VIF test, Kleibergen-Paap rk LM & Wald F stats, Robustness tests | Limited studies on FinTech's direct impact on profitability, lack of heterogeneity analysis from market structure/monetary policy, few studies use comprehensive indices, focus on China | Extend to other countries/banking systems, include more performance indicators, incorporate qualitative methods, explore other moderating factors, study long-term effects & collaboration |
| **26** | Li, Y. et al. (2017) | Disruptive Innovation, Consumer Theory (Substitution vs. Complementarity), Fama-French Asset Pricing Models (3 & 5 factor) | CB Insights (FinTech data), Bloomberg (bank returns), Kenneth French (risk factors) | Panel regression (Pooled, Fixed Effects, Free), Seemingly Unrelated Regression (SUR), t-tests on FinTech coefficient | Short sampling period (2010-2016), monthly data may not capture effect lags, imperfect proxy (funding as measure of FinTech value), no geographic/bank strategy differentiation | Extend analysis to other countries, include non-listed banks using accounting measures, examine effects by funding stage (early vs. late), study impact on bank risk-taking, competition, M&A |
| **27** | Kalogiannidis, S. et al. (2024) | Financial-Digital Space, Digital Transformation (ABCD), Value Creation, Universalization & Ecosystem Models, Financialization | Abstract-logical methods, Analytical-monographic methods, Systems analysis, Causal analysis, Modeling (Excel Solver) | Liquidity Coverage Ratio (LCR), ROE, Capital Adequacy Ratios, Cost-to-Income Ratio (CIR), Correlation analysis, Investment trends | Lack of theoretical analysis of banking system as subject/source of digitalization financing, limited research in less developed/crisis countries (e.g., Ukraine), insufficient financial inclusion focus | Develop financial risk management methods, create strategic risk maps, maximize 'near field' banking, ensure financial stability, state incentives for high-risk period investment |
| **28** | Kurniati, P.S. & Suryanto, S. (2022) | Disruptive Innovation, Digital Transformation in Banking, FinTech Ecosystem, Government Regulation & Policy, Financial Inclusion | In-depth Interviews (OJK, Bank Indonesia, Associations), Literature Review, Documentary Study, Data Triangulation | Descriptive Analysis (e.g., tables showing decrease in banks/branches) | Previous research focused more on FinTech impact & bank transformation, lack of specific research on the government's role in banking disruption era | Promote bank-FinTech collaboration (platform sharing, distribution), regulators monitor key areas (fund misuse, data protection, laundering), continue developing neutral/adaptable regulatory framework |
| **29** | Galazova, S.S. & Magomaeva, L.R. (2019) | Digital Transformation, FinTech, Financial Innovations, Digital Ecosystem, Big Data, Blockchain, API, Cloud, Digital Operating Models | Theoretical analysis & synthesis, Comparative analysis (traditional vs. digital), Examination of case studies (Barclays, Deutsche Bank), Survey data | Investment amounts (e.g., Russia 2016: $15M), Survey data on bank approaches (26% separate project, 42% subsidiary, 32% core value) | Lack of universally accepted FinTech definition, dual effect of digitalization (benefits vs. cyber risks) needs deeper exploration, limiting factor of small Russian investment | Develop legislative regulation for FinTech in Russia, banks adopt integrated digital strategy, explore blockchain applications (smart contracts, credit histories), use Big Data for risk management, Central Bank balance conservatism & support |
| **30** | Dehnert, M. & Schumann, J. (2022) | Consumer Decision-Making (CDM), Random Utility Theory, Technology Acceptance Model (TAM), Service | Discrete Choice Experiment (DCE), Survey (Likert scales), Pre-test, Qualitative interviews (15 participants) | PLS-SEM, Finite Mixture Modeling (Flexmix), Multigroup Analysis (PLS-MGA), Latent Class Regression, | Limited research beyond TAM in banking, few experimental studies on banking preferences, lack of | Study situational norms & digital access paths, examine platform ecosystem-based banking, analyze personality traits, |

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|---|---|---|---|---|---|---|
| | | Attributes, Influencing Factors | | Bootstrapping, Reliability/Validity Tests | understanding of latent personal characteristics in digital choices | replicate in other cultures, investigate embedded finance, include pricing attributes |