Educational Administration: Theory and Practice
2024, 30(5), 440-450
ISSN: 2148-2403
https://kuey.net/

Research Article

"Exploring The Fintech Frontier: A Systematic Literature Review Of Fintech Integration In Commercial Banks"

Bharath.S[1*], Dr. Vinay Joshi Chandniwala[2]

[1*]Research Scholar, School of Commerce, Presidency University, Bengaluru. Email ID: bharath15889@gmail.com
[2]Professor & Associate Dean, School of Commerce Economics, Presidency University Bangalore

***Corresponding Author:** Bharath.S
Research Scholar, School of Commerce, Presidency University, Bengaluru. Email ID: bharath15889@gmail.com

Citation: Bharath.S, et al. (2024) "Exploring The Fintech Frontier: A Systematic Literature Review Of Fintech Integration In Commercial Banks", *Educational Administration: Theory and Practice*, 30(5), 440-450
DOI: 10.53555/kuey.v30i5.2869

ARTICLE INFO

ABSTRACT

Financial Technology (Fintech) has emerged as a game-changer in the financial services industry in the last few years. With the goal of offering a thorough grasp of the trends, obstacles, and possibilities in this dynamic subject, this literature review examines the incorporation of Fintech into commercial banks. This study delves into the several ways Fintech is changing conventional banking, consumer relations, risk management, and regulatory compliance by combining the results of numerous academic studies. It also delves at how commercial banks' innovation strategies, competitiveness, and future prospects might be affected by Fintech adoption. This work adds to the academic conversation on commercial banking's use of Fintech via a systematic review of the literature and provides guidance to scholars, practitioners, and policymakers as they negotiate the ever-changing intersection of technology and finance.

Keywords: Fintech, Commercial Banks, Systematic Literature Review, Integration, Innovation, Digital Transformation, Financial Services, Technology Adoption, Banking Sector, Regulatory Compliance.

Introduction:

How people and companies use, access, and manage their money has been drastically altered by the fast development of financial technology (Fintech). The need for thorough and methodical research on the effects, difficulties, and potential benefits of Fintech is rising as technology continues to shake up conventional banking practices. In this introductory section, we go into the use of systematic literature review techniques to analyze the complex Fintech innovation environment.

Systematic literature reviews offer a structured and comprehensive approach to synthesizing existing research on Fintech, providing valuable insights into its adoption, implications, and future directions. By systematically searching, selecting, and analyzing relevant studies, systematic reviews enable researchers to navigate the vast and rapidly expanding body of literature on Fintech with methodological rigor and precision.

The application of systematic literature review methodology in the field of Fintech serves several purposes:

1. Comprehensive Mapping of the Fintech Landscape: Systematic reviews enable researchers to systematically map the diverse array of Fintech innovations, including but not limited to AI, blockchain, robo-advisors, digital payments, peer-to-peer lending, mobile banking, By synthesizing findings from a wide range of studies, systematic reviews provide a holistic view of the Fintech ecosystem, identifying key players, emerging trends, and technological advancements.
2. Identification of Adoption Drivers and Barriers: Systematic reviews help identify the drivers and barriers influencing the adoption of Fintech solutions by consumers, businesses, and financial institutions. By synthesizing empirical evidence from multiple studies, systematic reviews shed light on factors aspects like perceived utility, usability..., trust, regulatory environment, and cultural acceptance that shape Fintech adoption decisions.
3. Analysis of Fintech Impact on Financial Inclusion and Access: Systematic reviews contribute to understanding the impact of Fintech on financial inclusion, access, and empowerment, particularly in underserved and unbanked populations. By synthesizing empirical findings from diverse contexts and

populations, systematic reviews provide insights into the effectiveness of Fintech interventions in expanding access to financial services, reducing inequalities, and promoting economic empowerment.
4. Assessment of Regulatory and Ethical Implications: Systematic reviews facilitate the assessment of regulatory frameworks, policy interventions, and ethical considerations surrounding Fintech innovation. By synthesizing research on regulatory responses, compliance challenges, and ethical dilemmas, systematic reviews inform policymakers, regulators, and industry stakeholders about the need for adaptive regulatory approaches and ethical safeguards in the rapidly evolving Fintech landscape.
5. Guidance for Future Research and Practice: Systematic reviews identify research gaps, methodological limitations, and unanswered questions in the literature, guiding future research directions and priorities in Fintech scholarship. By synthesizing existing knowledge and highlighting areas requiring further investigation, systematic reviews inform researchers, practitioners, and policymakers about emerging topics, methodological innovations, and interdisciplinary collaborations.
The application of systematic literature review methodology in the field of Fintech offers a structured and rigorous approach to synthesizing existing research, providing valuable insights into adoption patterns, impact assessments, regulatory challenges, and future research directions. As Fintech continues to shape the future of finance, systematic reviews provide an essential function in the financial services sector by enhancing knowledge, guiding decision-making, and propelling innovation.
Co-authors and authors relationship:

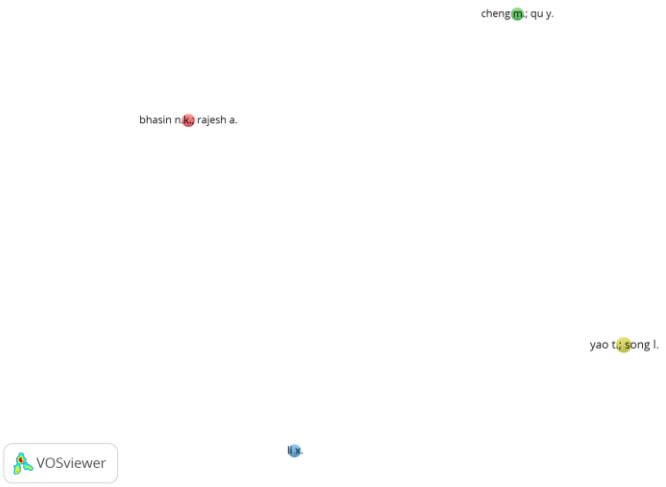

Figure 1 Co-authors and authors relationship.

In the represented network diagram of co-authorship relationships among authors within Fintech literature, a total of 185 authors are depicted. Among these authors, at least 4 have met the minimum publication threshold of 2 papers each. However, the diagram reveals a notable absence of connectivity between these authors, indicating a lack of collaborative relationships in their publications. A separate box denotes each author, and lines connect the boxes to the articles those writers have written. Despite individual authorship of multiple papers, there are no intersecting lines between authors, highlighting the absence of joint authorship or collaboration among them. This portrayal underscores the isolated nature of authorship within the Fintech literature, despite the presence of multiple authors meeting the publication threshold.
Year wise Publication trend:

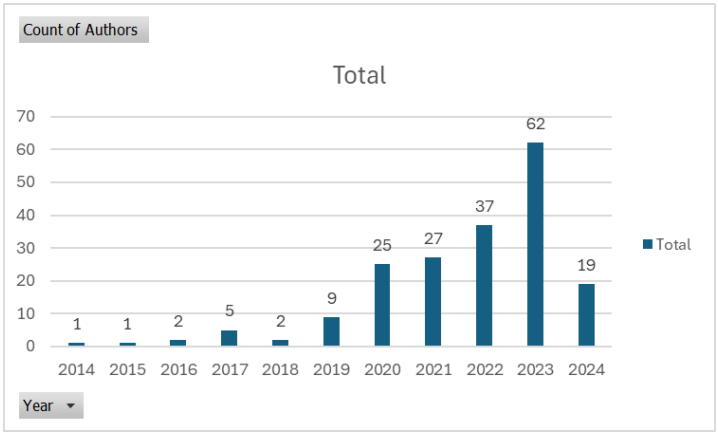

Figure 2 Year wise Trend

The publication trend in Fintech literature over the years demonstrates a remarkable rise in scholarly interest and research activity. Beginning with modest numbers, the field saw one publication each in 2014 and 2015. In 2016, there was a slight uptick with two publications, followed by a notable increase to five publications in 2017, indicating a burgeoning interest in Fintech research. While 2018 saw a brief plateau with two publications, the momentum surged in 2019, marking a significant jump to nine publications. Subsequently, the field experienced exponential growth, with the number of publications more than doubling in 2020 to 25, and continuing to rise steadily in the following years. The peak was reached in 2023 with a remarkable 62 publications, underscoring the burgeoning interest and investment in Fintech-related studies. However, in 2024, there was a slight decline to 19 publications, possibly reflecting fluctuating research priorities or external factors. Nonetheless, the overall trajectory illustrates a robust upward trend in Fintech publications, indicating the field's increasing relevance and scholarly engagement over the years.

Literature review:

Since 2011, Rabobank Nederland's commercial bank business arm has entrusted him with the task of strategy and innovation. He has been a stockbroker specialising in wholesale and retail financial services for twenty years and has considerable experiences working abroad as a global relationship manager. To be sure, the financial industry isn't exactly known for its innovative spirit, but that's all about to change. The widespread digitization of the banking sector has caused many outsiders to examine the industry's business model in a new light. Customers now have an unparalleled choice of alternatives, rendering traditional banking outdated due to the growth of connected services. Financial technology encompasses a wide range of fields, such as: Completely new approaches to banking that integrate technology with traditional methods of doing business. Because they open the door for third parties to provide services that customers want, they threaten the relationship between banks and their customers. This has forced a paradigm change within the financial sector. One alternative perspective, meanwhile, sees this pattern as a chance for growth. Taking advantage of these developments as a bank might help you deepen your relationship with customers. Open innovation, which entails working with third parties to achieve innovation, will inevitably be necessary for this. (Van Den Bosch & Gilsing, 2014)

Commercial banks have long had a stranglehold on the lending business, but P2P lending platforms have shaken things up in the last decade. Some of the most influential factors propelling this paradigm change are recent developments in information technology, such as Fintech, which is built on big data. This article examines the impact of big data on the banking industry's transition from an information economics standpoint. We address the topic of information asymmetry in the big data era by pointing out how big data analytics alleviate signaling and search costs in P2P lending credit risk management. We provide a theory on the economics of big data with its roots in the loan sector and identify a number of tough challenges and research prospects. (Yan et al., 2015)

Innovation, technology, and globalization have completely transformed the banking industry worldwide. Banks face competition from non-financial firms that provide payment services, and FinTech is today the backbone of the banking industry. Internet companies, social media platforms, and search engines are "interfering" with traditional banking services. Banking has been transformed by the rapid rise of FinTech, necessitating innovative solutions. Banks are being pushed to increase their investments in FinTech, reconsider their service distribution channels, especially B2C models, standardize their backoffice services, and more as a result of these changes. The expansion of financial technology poses a challenge to traditional banks, according to many experts in the field. Because it provides more adaptability, better functionality, and the ability to aggregate services, some see FinTech as a problem that can be turned into an opportunity. This research examines recent banking trends in order to highlight the opportunities and threats posed by FinTech to the banking industry. Fast adoption of FinTech may give banks a leg up in the market. This research examines recent advancements in FinTech and banking by analyzing data from surveys of the financial services industry in different areas and data from well-known institutions in the US and Europe. The authors examined the development of financial innovation and technology, assessed FinTech practices, and emphasized the most important dangers that banks encounter from both a micro and macro perspective when it comes to financial innovation and FinTech. Research indicates that financial institutions and authorities should lessen the dangers associated with developing FinTech. Non-financial corporations have been stepping up their competitiveness, according to FinTech industry data. Commercial banks may use the report's practical guidance to strengthen their financial innovation position and better manage risks.(Romanova & Kudinska, 2016)

The findings show that innovations in the banking industry based on FinTech have systemic elements in both the global and Thai settings. The results of the studies reveal that the innovation process's systemic features are the product of interactions between the invention's complexity and the innovators' management skills. Banking sector innovation based on FinTech is trending in the right direction, thanks to the analytical implications on innovation's systemic character. Relevance and uniqueness: The creation of the systemic innovation model is the paper's primary contribution that demonstrates its uniqueness and worth. In order to examine the systemic features shared by all inventions across all sectors, this study builds a systemic innovation model. Additionally, the model may be used to monitor the trajectory and growth of technology.

So, the model may be used to predict how innovation competition will spread in the banking market. (Wonglimpiyarat, 2017)

There has been a resounding demand for more social and environmental responsibility from social movements in the last several years. Customers no longer trust banks, despite the fact that these institutions are vital to economic growth. Now that we're in the Fintech era, banks may take use of emerging technologies that provide their clients more transparency. Stakeholders, including regulators, society at large, shareholders, and workers, all benefit greatly from CSR initiatives that raise awareness about social issues. With that in mind, our research zeroes in on financial institutions whose operations and investments are purpose-built to promote environmental responsibility. This paper's main contribution is that it demonstrates how various kinds of banks respond differently, leading to the emergence of alternative business models. The main difference between sustainable banks and conventional banks is that the former seek to fulfill stakeholder demands while the latter aim to contribute to sustainable development via the implementation of CSR policies. Commercial banks and ethical banks may be distinguished. In order to ensure economic growth and social and environmental sustainability, it is important to find a balance between these two competing priorities.(Costa-Climent & Martínez-Climent, 2018)

The 13th and 15th centuries saw the rise of Italian towns like Genoa, Venice, and Florence, which would later become contemporary worldwide financial hubs. London had surpassed New York and Singapore as the preeminent worldwide financial hub by the turn of the twentieth century. The major decision-makers who deal in monetary and commodity capital all congregate in these hubs. Their financial services include a wide range of industries, from investment and commercial banking to proprietary trading, private equity, hedge funds, private wealth management, and venture capital. The world's most important hubs will most certainly continue to play this role for the foreseeable future. While certain shifts in global finance, such as China's "Belt & Road" initiative, FinTech, and high-frequency trading on exchanges, present existing networks at the top with new opportunities and threats, and these shifts will cause financial center networks to change and adapt. (Meyer, 2019)

This article presents a new Fog Computing solution that has been designed specifically for the financial technology sector. With the use of predictive systems, it recommends a banking entity's products to customers through the process of providing personalized customer service. Improving customer support services is the driving force behind this research. More specifically, we want to achieve higher levels of security, process transparency and agility, and lower costs associated with entity management. Fog nodes in the proposed architecture process data with light intelligent agents, enabling the deployment of contextual recommendation systems and, to enhance the system's efficiency over time, setting up a cloud-based case-based reasoning system. Product recommendations for mortgages, loans, retirement plans, and other financial goods are based on a hybrid recommendation system that uses collaborative filtering and content-based filtering. The essay analyses the provided architecture within the framework of commercial banking and validates and simulates the data. To achieve this goal, it demonstrates the application of the suggested recommendation system, which stands in for the various communication channels and potential devices. Employees will be able to take on more varied and adaptable responsibilities thanks to the suggested architecture's potential to boost physical channel customer service while simultaneously generating technical support to increase office managers' resolution capacity. Also, the underlying processes can continue to follow a one-stop shop model, which is great for the banking services model as it evolves in offices. (Hernández-Nieves et al., 2020)

Research on online banking has, up until recently, mostly ignored the de-motivating variables that drive actual online banking behavior in favor of studying the motivating elements that cause people to really engage in online banking. Nevertheless, the elements linked to the former remain underexplored and incomplete in emerging nations such as those in Sub-Saharan Africa. This research aims to look at how online identity theft affects Ghanaian consumers' desire to use e-banking by drawing on the Technology Threat Avoidance Theory (TTAT). In order to conduct the analyses, a quantitative survey was administered to 393 clients of two prominent commercial banks in Ghana. All of the replies were legitimate. Perceived online identity theft has a negative mediated-relationship between it and the intention to engage in e-banking transactions, but it positively and significantly predicts "fear of financial loss," "fear of reputational damage," and "security and privacy concern" according to the PLS-SEM results. To our knowledge, this is the first research to specifically examine online banking using the TTAT framework. To ensure the sustainable expansion of e-banking transactions in a developing economy setting, the research provides banks with a realistic instrument for assessing consumers' limitation or aversion towards Fintech. Without taking other participants in the financial sub-sector into account, the research is restricted to examining solely Ghanaian banking institutions. In the latter section of the article, we propose several avenues for further investigation. (Jibril et al., 2020)

In order to better understand the connection between knowledge management and Fintech innovation, this study will examine the moderating effects of age, sex, education, experience, and position on managers in commercial banks in Lebanon. A theoretical framework grounded on knowledge-based theory and informed by a thorough literature study was established to achieve this objective. This study's data came from 181 participants who filled out a self-administered questionnaire. Managers from commercial banks in Lebanon were the intended responders. According to the study's empirical results, Knowledge management services

have a positive and statistically significant relationship with innovation in Fintech. Among the demographic variables examined, the results reveal that the only ones impacting the relationship between knowledge management and Fintech innovation in commercial banks operating in Lebanon are position and experience. This suggests that these factors moderate the relationship. Banking managers may use the study's results as a springboard to enhance their innovation strategies via knowledge management, and future academics can use them to better understand the interconnected nature of the constructs' issues. Also included in the concluding parts are suggestions for more study, its limits, and potential future paths. (Al-Dmour et al., 2021)
This article mainly focuses on the relationship between financial technology and banks' risk-taking attitude. The expansion of Fintech's Robo-Advisor and similar mature applications would have the greatest impact on small and medium-sized banks, according to our study. This paper uses a benchmark regression model to analyze Peking University's municipal digital financial inclusion score using data from 155 SMB banks' annual reports between 2011 and 2016. Based on our findings, banks are far more cautious today than they were before to Fintech's emergence. The results of the robustness test were unaffected when this index was substituted with the bank's risk-taking index or the Fintech development index. Using the urban innovation index as an instrumental variable, we were able to overcome the endogenous problem and produce consistent estimate findings. The rise of Fintech will influence the bank's risk-taking via several channels, including as the bank's internal interest margin, managerial skills, the intensity of external competition, and residents' willingness to save. This is according to the test of the intermediate effect. The capacity of Fintech to decrease risk-taking is more pronouncedly felt by banks in China's western and eastern regions, large banks, and urban commercial banks, as shown in the heterogeneity research.(Deng et al., 2021)
Financing is a challenge for small and medium-sized businesses due to issues including significant operational risks and a low real estate percentage. Small and medium-sized businesses (SMEs) may find a viable financing option via commercial bank supply chain financing, which also helps with corporate financing challenges. But it hasn't been able to fully innovate or evolve due to a few of its current issues. The "blockchain + supply chain finance" dual-chain paradigm has effectively addressed the banking industry's shortcomings in developing supply chain financial services. This article proposes optimization suggestions for Zheshang Bank's accounts receivable chain in supply chain finance, uses the bank's platform as a case study to examine the benefits and drawbacks of blockchain technology, and more. (Meng & Du, 2021)
A more competitive financial system, a thriving FinTech industry, and better service for consumers are all possible thanks to platform-based banking. By using application programming interfaces, platform-based banking gives users access to a network of data from financial institutions. Platform banking makes it simple to demonstrate the creation, access, and sharing of data. For the benefit of banking professionals in Iran, the purpose of this research is to provide best practices for commercial bank platform banking. Combining qualitative and quantitative methodologies, the present research employed a mixed-method approach. This study's quantitative approach makes use of a structural equation model derived from the work of Strauss and Corbin, while its qualitative technique is rooted in the grounded theory method. The three-stage coding process that began with open coding and continued with axial and selective coding was the primary method for obtaining qualitative data from semi-structured interviews. Using structural equations and SmartPLS software, the suggested model was analyzed and explained in the quantitative phase using the descriptive survey approach. The interview codes informed the extraction of 373 final codes, which were organized into 25 sub-classes, with six main classes derived from fifty-one concepts. We searched for correlations between our variables and evaluated our hypothesis in the quantitative phase of the research. The findings indicate that the platform banking model consists of six main components: economic management, banking process reform, customer experience management, infrastructure engineering and implementation mechanisms, digital strategy management of customers, and the ability to combine knowledge partnerships with rival businesses while achieving structural productivity and digital governance. Having these parts handled properly is crucial when building a platform banking model. Furthermore, the results corroborate the theoretical model that was put out by means of the structural equation model. The findings were good according to all metrics of structural model fit. (Arayesh et al., 2022)
Banks incur pre- and post-loan risk as a result of credit operations because of the knowledge asymmetry in the lending market. By analyzing data from by looking at a selection of fintech companies that were set up by commercial banks in China between 2014 and 2018, we can find out whether fintech is able to reduce these risks and, more precisely, what management strategies it uses. Fintech may reduce credit activity-related pre-loan risk, according to the data; this impact is particularly noticeable in banks where management owns a larger percentage of the company. Banking fintech does not substantially impact post-loan risk reduction since regulators are increasingly responsible for this aspect of post-loan risk management. New empirical evidence is added to the current literature on the effect of fintech on financial institutions in this article. (Zhang et al., 2022)
Global financialized capitalism has been reliant on digital platforms as foundational infrastructures for accumulation due to their user-friendliness and fundamental data-gathering, administration, and analytical methodologies. The IT industry is leading the way in this trend. In an effort to digitally enclose customers, large IT giants in the US and China are partnering with FinTech startups and expanding their platformed services to banking incumbents. The conventional banking sector is also teaming up with new fintech companies. In view of the growing dependence on American Big Tech platforms, this paper analyzes platform

finance in the EU as a state-mediated and power-laden interaction between mainly "domestic" (EU) financial incumbents and "foreign" (non-EU) Big Tech companies. The European Commission's 2020 European Strategy for Data serves as the starting point for the study. We retrace the movement of code terms inside "the Brussels Bubble" before and after the proposal by analyzing relevant documents. Despite its role in the 2008 financial meltdown, the EU's current financial system portrays itself as a solution to Big Tech's dominance on platforms outside of the EU. Incumbent financial institutions are using the EU's "technological sovereignty" to protect their market dominance and position themselves as digital financial champions throughout Europe. This changes the Big Tech "threat" into a case for strategic deregulation and Big Tech's compulsory data sharing in the name of keeping the playing field equal. An alignment of interests between the business goals of platformizing European banks and the interests of the European Union regarding data protection is the result of these processes of strategic coupling. (Bassens & Hendrikse, 2022)

Using data collected from a sample of Chinese businesses listed on the A-share market between 2011 and 2021, this research analyzes the impact of financial technology (FinTech) and green bonds on enterprises' capacity to fund energy efficiency initiatives. We use the quantile-on-quantile technique, which gives us data at the global and national levels showing the interaction between the variables and lets us look at the interdependence of time series in each economy independently. The findings demonstrate that enterprises may significantly lessen the impact of financial constraints caused by FinTech development via increased interbank competition and direct and indirect business financing. Across all quantiles of the data, our estimations demonstrate that green bond financing increases the energy efficiency of the nations we selected. The most promising groups to reap the benefits of FinTech's moderating influence include non-state owned organizations, small and medium-sized businesses, and the faster-growing eastern half of China. Businesses with high rates of innovation or low rates of social responsibility performance are the ones that primarily benefit from the immediate ameliorating impact of financial technology's decreased lending requirements. This is due to the fact that companies that exhibit both traits are more inclined to go into uncharted territory and create innovative goods. This discovery is examined in terms of its theoretical and practical implications. (Chen, 2023)

This research aims to examine how conventional banks' bottom lines are impacted by the introduction of financial technology. The commercial banks listed at the Amman Stock Exchange—ASE—will be the primary focus of the research, which will use financial data from 2012 to 2020. In this research, we sought to answer concerns about financial inclusion (FI), automation (Auto), and alternative payment methods (APMs). One hundred and fifteen surveys were sent out to all commercial banks that are listed on the Amman Stock Exchange—ASE. This study used the FinTech dimension as an independent variable and the financial performance of Jordanian commercial banks as a dependent variable. Using multivariate regression analysis, we looked at how the two were related. Business banks in Jordan track their financial success by looking at three key metrics: total deposits, total loans, and net profit margin. These indicators were positively and significantly affected by all three FinTech characteristics (FI, APMs, and Auto.), according to the study. As a result, banks are rapidly investing in financial technology tools and applications to entice new clients and retain the ones they currently have in order to survive the fierce competition in the banking business. (Kaddumi et al., 2023)

Objectives:

1. To know the year wise publication trend.
2. To analyse the relationship between the authors.
3. Meta analysis to future research gap.
4. Future research.

Research Methodology:

A thorough literature study is the backbone of this paper's research technique, which aims to examine how commercial banks are incorporating Fintech. The major goal is to shed light on the commercial banking sector's Fintech acceptance and implementation by highlighting important trends, obstacles, and possibilities. The search technique entails searching appropriate academic databases using well chosen search phrases in order to gather relevant material. First, we will check the titles and abstracts to make sure they are relevant. Then, we will read the complete texts of the studies that passed our screening. Detailed information on each study's publication, aims, methodology, results, and implications will be thoroughly gathered throughout data extraction. The listed studies will be evaluated for rigor using quality assessment criteria. In order to detect commonalities in the literature, we will utilize thematic analysis, and to synthesize the results quantitatively, we will use meta-analysis. Please note that all reports will be prepared in accordance with the PRISMA standards. A conference presentation or publication in a peer-reviewed journal will be used to distribute the synthesized results. The systematic literature study's findings will be validated and proven relevant by expert evaluation. All things considered, the goal of this study technique is to shed light on how commercial banks are integrating Fintech, which will help both stakeholders and academics better understand this rapidly evolving subject.

Meta Analysis:

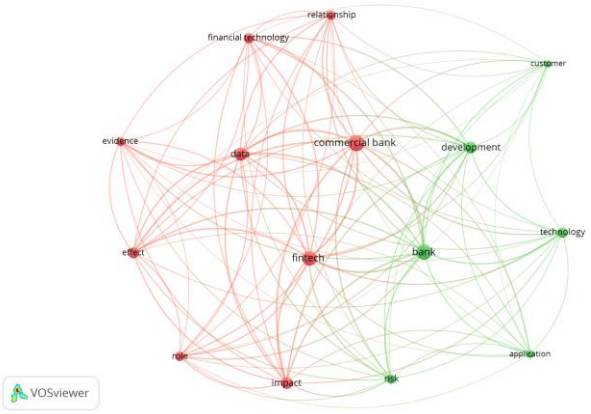

Figure 3 Relationship between the terms

The meta-analysis of Fintech literature based on terms identified from titles and abstracts reveals significant insights into the thematic landscape of research in the field. Out of a total of 4,443 terms identified, 19 terms meet the minimum occurrence threshold of 26. The removal of generic terms such as "study," "China," "paper," and "research" streamlines the analysis to focus on more substantive and specific themes. The visualization of relationships among terms, represented by the thickness of lines connecting them, provides a nuanced understanding of their interconnectedness. Thicker lines indicate stronger relationships between terms, while thinner lines suggest more subtle associations.

The meta-analysis underscores several key themes prevalent in Fintech literature. Prominent terms such as "digital," "technology," and "innovation" highlight the central role of technology and digitalization in Fintech innovation and transformation. The strong connections between these terms suggest a cohesive narrative around the technological drivers of Fintech development. Additionally, terms like "financial," "services," and "banking" underscore the intersection of Fintech with traditional financial institutions and services, indicating a focus on its impact on the broader financial ecosystem.

Furthermore, terms such as "payment," "blockchain," and "cryptocurrency" reveal specific areas of interest within Fintech research, reflecting a growing emphasis on emerging technologies and their applications in areas like digital payments and decentralized finance. The connections between these terms suggest an integrated approach to exploring the opportunities and challenges posed by technological innovations in the financial sector.

Moreover, terms like "regulation," "security," and "privacy" highlight the regulatory and ethical considerations surrounding Fintech adoption and implementation. The presence of these terms, along with their interconnections, suggests a recognition of the importance of addressing regulatory and ethical concerns to ensure the responsible and sustainable development of Fintech solutions.

Overall, the meta-analysis offers valuable insights into the multifaceted nature of Fintech research, revealing interconnected themes around technology, innovation, financial services, regulation, and security. By identifying and visualizing the relationships among key terms, the analysis provides a comprehensive overview of the thematic landscape of Fintech literature, guiding future research directions and informing scholarly discourse in the field.

Selected Terms:

Term id	Terms	occurrences
1	application	39
2	bank	136
3	commercial bank	155
4	customer	33
5	data	107
6	development	80
7	effect	78
8	evidence	50
9	financial technology	64
10	fintech	127
11	impact	85
12	relationship	54
13	risk	58
14	role	54
15	technology	61

Figure 4 Selected Terms

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.463	23.085	23.085	3.463	23.085	23.085	2.916	19.440	19.440
2	1.889	12.590	35.675	1.889	12.590	35.675	2.013	13.419	32.859
3	1.718	11.455	47.130	1.718	11.455	47.130	1.832	12.215	45.073
4	1.606	10.705	57.835	1.606	10.705	57.835	1.684	11.227	56.301
5	1.227	8.178	66.013	1.227	8.178	66.013	1.457	9.713	66.013
6	.842	5.613	71.627						
7	.800	5.337	76.963						
8	.673	4.487	81.451						
9	.665	4.432	85.883						
10	.586	3.907	89.790						
11	.554	3.695	93.486						
12	.415	2.769	96.254						
13	.335	2.232	98.486						
14	.227	1.514	100.000						
15	-1.001E-013	-1.008E-013	100.000						

Extraction Method: Principal Component Analysis.

Figure 5 Variance table

The table displays the results of a Principal Component Analysis (PCA) that was performed to investigate the extent to which each dataset component explains the total variance. The results show the initial eigenvalues, the sums of squared loadings for extraction and rotation, the percentages of variance and cumulative percentages for each component, and the analysis also shows the percentages of variance.

Component 1 accounts for the highest variance, with an initial eigenvalue of 3.463, explaining 23.085% of the total variance. This component retains its significance throughout both the extraction and rotation stages of the analysis, contributing to a cumulative variance of 23.085%. Component 2 follows closely behind, with an initial eigenvalue of 1.889 and a cumulative variance of 35.675%.

As the analysis progresses, subsequent components continue to explain additional variance in the dataset, albeit at decreasing percentages. Components 3, 4, and 5 contribute to cumulative variances of 47.130%, 57.835%, and 66.013%, respectively. The contribution of each successive component gradually diminishes, with the cumulative variance plateauing at 100.000% after the 14th component.

Overall, the PCA results highlight the distribution of variance across different components within the dataset. The initial components capture the majority of the variance, with subsequent components explaining smaller proportions. This interpretation underscores the importance of understanding the contribution of each component to the overall variance explained in the dataset, providing valuable insights into the underlying structure and patterns present in the data.

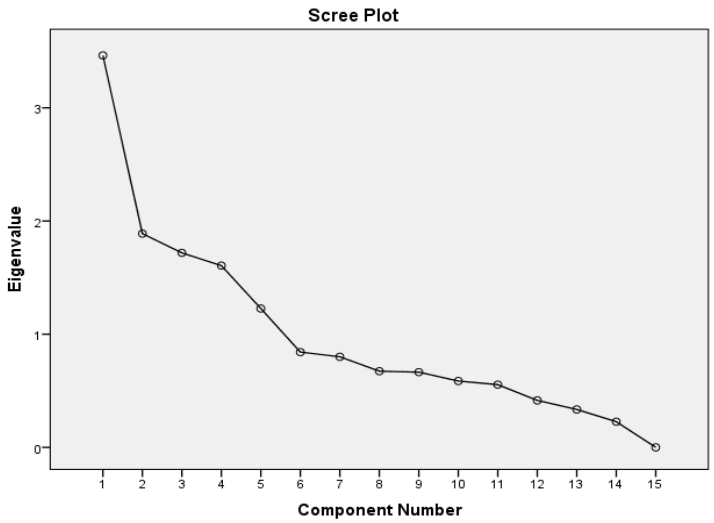

Figure 6 Scree plot

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
VAR00001					.403
VAR00002					.163
VAR00003			.668		
VAR00004					
VAR00005	.585				
VAR00006			.438		
VAR00007	.647				
VAR00008	.717				
VAR00009				.853	
VAR00010				.744	
VAR00011		.763			
VAR00012	.529				
VAR00013					.743
VAR00014		.639			
VAR00015					.055

Figure 7 Rotational matrix

Research Gap

The rotated component matrix reveals the relationships between variables (now representing various aspects of Fintech) and the extracted components.

Component 1: The terms "effect" (0.647), "evidence" (0.717), "financial technology" (0.853), "impact" (0.763), "relationship" (0.529), "risk" (0.743), and "role" (0.639) all have substantial loadings on this component. These variables contribute significantly to Component 1, indicating a theme related to the effects, evidence, and impact of financial technology on various aspects such as risk, relationship, and role within the financial sector.

Component 2: "data" (0.585) and "development" (0.438) exhibit notable loadings on Component 2. These variables suggest a distinct aspect related to the development and utilization of data within the context of Fintech applications.

Component 3: "commercial bank" (0.668) and "financial technology" (0.853) display substantial loadings on Component 3. This component represents a theme associated with the integration and utilization of financial technology within commercial banking operations.

Component 4: "application" (0.403), "bank" (0.163), "fintech" (0.744), and "risk" (0.743) demonstrate loadings on Component 4. These variables contribute to Component 4, potentially indicating a theme related to the application and risk implications of Fintech within banking environments.

Component 5: "technology" (0.055) exhibits a loading on Component 5, albeit to a lesser extent compared to other components. This variable may represent a distinct aspect related to the technological underpinnings of Fintech applications.

Overall, the rotated component matrix provides insights into the underlying structure of the data, revealing distinct themes and relationships between variables within the Fintech domain. These interpretations offer valuable insights into the factors driving variation in the dataset, facilitating a deeper understanding of the impact and role of financial technology within the banking and financial services industry.

Future research Study:

1. Exploration of Regulatory Implications: Despite the significant focus on the impact of financial technology (Fintech) on various aspects such as risk and relationship within the financial sector, there is a notable absence of research addressing the regulatory implications of Fintech integration in commercial banking operations. Future research could explore how regulatory frameworks influence the adoption and implementation of Fintech solutions in banks, as well as their implications for compliance and risk management practices.

2. Examination of Customer-Centric Approaches: While Component 1 highlights the effects and impact of Fintech on various aspects of the financial sector, there is limited exploration of customer-centric approaches to Fintech integration in commercial banks. Future research could investigate how Fintech innovations influence customer experiences, preferences, and behaviors, and how banks can leverage these insights to enhance customer engagement and satisfaction.
3. Analysis of Data Governance and Privacy Concerns: Component 2 underscores the significance of data and its development within the context of Fintech applications. However, there is a lack of research addressing data governance and privacy concerns associated with Fintech integration in commercial banks. Future studies could examine how banks manage and safeguard customer data in the era of Fintech, addressing privacy concerns, data security measures, and regulatory compliance requirements.
4. Evaluation of Fintech Adoption Strategies: Component 3 highlights the integration and utilization of financial technology within commercial banking operations. However, there is limited research on the adoption strategies employed by banks to implement Fintech solutions effectively. Future research could explore the factors influencing banks' adoption decisions, including organizational readiness, technological infrastructure, and strategic alignment with business objectives.
5. Investigation of Emerging Fintech Applications: While Component 4 suggests themes related to the application and risk implications of Fintech within banking environments, there is a need for research on emerging Fintech applications and their potential impact on commercial banking operations. Future studies could explore innovative Fintech solutions such as blockchain, artificial intelligence, and decentralized finance, and their implications for banking business models, operational efficiency, and risk management practices.
6. Examination of Technological Advancements: Component 5 highlights the technological underpinnings of Fintech applications. However, there is limited research on the implications of emerging technological advancements for Fintech integration in commercial banks. Future studies could investigate the potential of emerging technologies such as quantum computing, Internet of Things (IoT), and 5G networks to transform banking operations and reshape the Fintech landscape.

Overall, these future research gaps provide opportunities for scholars and practitioners to further explore and advance our understanding of Fintech integration in commercial banks, addressing emerging challenges, and leveraging opportunities for innovation and growth in the financial services industry.

References

1. Al-Dmour, R., Al-Dmour, A., Rababeh, N., & Al-Dmour, H. (2021). The influence of knowledge management processes on FinTech innovation: Lebanon evidence. *International Journal of Knowledge and Learning*, *14*(1), 63 – 85. https://doi.org/10.1504/IJKL.2021.115032
2. Arayesh, M. B., Rezaeirad, M., Aidi, M., & Lamuki, T. G. (2022). Modeling the platform-based banking in commercial banks of Iran. *Journal of Banking Regulation*, *23*(4), 351 – 367. https://doi.org/10.1057/s41261-021-00169-x
3. Bassens, D., & Hendrikse, R. (2022). Asserting Europe's technological sovereignty amid American platform finance: Countering financial sector dependence on Big Tech? *Political Geography*, *97*. https://doi.org/10.1016/j.polgeo.2022.102648
4. Chen, H. (2023). Fintech and investment risk of digital finance: mediating role of clean energy and green bonds through the dynamics of spill over. *Environmental Science and Pollution Research*, *30*(34), 82286 – 82296. https://doi.org/10.1007/s11356-023-28181-w
5. Costa-Climent, R., & Martínez-Climent, C. (2018). Sustainable profitability of ethical and conventional banking. *Contemporary Economics*, *12*(4 Special Issue), 519 – 530. https://doi.org/10.5709/ce.1897-9254.294
6. Deng, L., Lv, Y., Liu, Y., & Zhao, Y. (2021). Impact of fintech on bank risk-taking: Evidence from China. *Risks*, *9*(5). https://doi.org/10.3390/risks9050099
7. Hernández-Nieves, E., Hernández, G., Gil-González, A.-B., Rodríguez-González, S., & Corchado, J. M. (2020). Fog computing architecture for personalized recommendation of banking products. *Expert Systems with Applications*, *140*. https://doi.org/10.1016/j.eswa.2019.112900
8. Jibril, A. B., Kwarteng, M. A., Botchway, R. K., Bode, J., & Chovancova, M. (2020). The impact of online identity theft on customers' willingness to engage in e-banking transaction in Ghana: A technology threat avoidance theory. *Cogent Business and Management*, *7*(1). https://doi.org/10.1080/23311975.2020.1832825
9. Kaddumi, T. A., Baker, H., Nassar, M. D., & A-Kilani, Q. (2023). Does Financial Technology Adoption Influence Bank's Financial Performance: The Case of Jordan. *Journal of Risk and Financial Management*, *16*(9). https://doi.org/10.3390/jrfm16090413
10. Meng, L., & Du, C. (2021). Zheshang Bank's "blockchain + Supply Chain Finance" Accounts Receivable Financing Model of Research. In W. F. & Z. S.M. (Eds.), *E3S Web of Conferences* (Vol. 275). EDP Sciences. https://doi.org/10.1051/e3sconf/202127501074

11. Meyer, D. R. (2019). Financial Centers, International. In *International Encyclopedia of Human Geography, Second Edition*. Elsevier. https://doi.org/10.1016/B978-0-08-102295-5.10062-9
12. Romanova, I., & Kudinska, M. (2016). Banking and fintech: A challenge or opportunity? *Contemporary Studies in Economic and Financial Analysis*, *98*, 21 – 35. https://doi.org/10.1108/S1569-375920160000098002
13. Van Den Bosch, J., & Gilsing, V. (2014). Innovation projects and venturing at rabobank: Creating a new dynamic. In *Corporate Venturing: Organizing for Innovation*. Edward Elgar Publishing Ltd. https://doi.org/10.4337/9781783476602.00011
14. Wonglimpiyarat, J. (2017). FinTech banking industry: a systemic approach. *Foresight*, *19*(6), 590 – 603. https://doi.org/10.1108/FS-07-2017-0026
15. Yan, J., Yu, W., & Zhao, J. L. (2015). How signaling and search costs affect information asymmetry in P2P lending: the economics of big data. *Financial Innovation*, *1*(1). https://doi.org/10.1186/s40854-015-0018-1
16. Zhang, A., Wang, S., Liu, B., & Liu, P. (2022). How fintech impacts pre- and post-loan risk in Chinese commercial banks. *International Journal of Finance and Economics*, *27*(2), 2514 – 2529. https://doi.org/10.1002/ijfe.2284