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Branchless Banking: The Role of Fintech Technologies and the Internet of Things (IoT) in the Disruption of the Traditional Banking Model

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Abstract
Branchless banking has emerged as a revolutionary model driven by the adoption of Fintech and Internet of Things (IoT) technologies. This systematic review examines how these technologies are transforming traditional banking business models, focusing on customer experience, operational efficiency, and regulatory challenges. Fifteen studies published between 2018 and 2024 were reviewed, highlighting the impact of Fintech and IoT on banking digitalization, particularly in cybersecurity, sustainability, and financial inclusion. The findings suggest that these emerging technologies will continue to be key to the evolution of the banking sector, although challenges remain, especially in emerging and rural markets.

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Keywords: Branchless banking, Fintech, Internet of Things, digital transformation, cybersecurity, financial inclusion, sustainability

1. Introduction

1.1. Contextualization of the Topic

Digital transformation has drastically changed the structure and functioning of banking, driven by the adoption of emerging technologies such as Fintech and the Internet of Things (IoT). These innovations have led to the rise of branchless banking, challenging traditional models and creating new paradigms in the provision of financial services. Technological disruption has forced financial institutions to rethink their business approach, improving operational efficiency, reducing costs, and offering more personalized services to clients through digital platforms (Trotta *et al*., 2024) [1].

The use of IoT in digital banking has enabled the creation of more immersive experiences tailored to clients' real-time needs, utilizing connected devices that collect and process large volumes of data (Bojjagani *et al*., 2023) [2]. At the same time, Fintech platforms are driving the development of faster and more secure financial services, facilitating contactless transactions and enhancing accessibility, particularly in rural areas (Lavanya & Rajkumar, 2024) [5]. Emerging technologies are not only changing the way banks operate but also how users interact with them, transforming the traditional physical branch banking model into a digital model (Singh *et al*., 2024) [4].

1.2. Identification of the Gap

Despite the advancements in the digitalization of financial services, significant gaps exist in the literature on how Fintech and IoT technologies are reshaping traditional banking business models. Although several studies have addressed the impact of these technologies on specific sectors, such as digital payments and cybersecurity (Mustapha *et al*., 2023) [6], the combined effect of these technologies on the gradual disappearance of physical branches and the creation of fully digital banking has not been thoroughly analyzed (Bui & Pribula, 2023) [7].

Moreover, while previous reviews have been conducted on Fintech and blockchain in banking (Singh *et al*., 2024) [4], these investigations tend to focus on technological capabilities without delving into the business strategies that banks are adopting to adapt to this new landscape. Additionally, cybersecurity and regulatory challenges in implementing these technologies have been little explored (Varela-Vaca *et al*., 2024) [3].

Therefore, this review aims to address these gaps by evaluating how the adoption of IoT and Fintech platforms is transforming the banking business model, emphasizing the impact on customer experience, operational efficiency, and regulatory challenges in implementing these emerging technologies (Ramkumar *et al*., 2023) [10].

1.3. Objective of the Systematic Review

The objective of this systematic review is to explore and analyze how Fintech technologies and the Internet of Things (IoT) are transforming traditional banking business models towards a branchless approach, based on digital platforms. The aim is to identify the main trends, opportunities for innovation, and challenges that these technologies present for financial institutions. Additionally, the benefits and limitations in terms of efficiency, cost, security, and customer satisfaction will be evaluated.

Research Question

How are Fintech technologies and the Internet of Things (IoT) transforming banking business models towards a branchless approach, and what are the main challenges and opportunities associated with this technological disruption?

2. Methodology

2.1. Eligibility Criteria

The following criteria were established for the selection of studies:

Inclusion Criteria

Peer-reviewed articles published between 2018 and 2024.
Studies written in English that analyze the impact of emerging technologies, such as Fintech and the Internet of Things (IoT), on banking business models.
Research discussing digital transformation in banking, focusing on the shift from traditional to digital models.
Articles addressing the use of blockchain, digital payments, cybersecurity, or customer experience in relation to banking business models (Rjoub *et al*., 2023) [13].

Exclusion Criteria

Articles published in languages other than English.
Studies not related to banking or those focusing exclusively on technical aspects without considering their relationship with business models (Kollu *et al*., 2023) [9].
Consultancy reports, dissertations, theses, and press articles not peer-reviewed.

Table 1: Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed articles published between 2018 and 2024 in academic journals.	Articles published before 2018.
Studies written in English that analyze the impact of emerging technologies (Fintech, IoT, blockchain) on banking business models.	Articles in languages other than English.
Research discussing digital transformation in banking, focusing on the shift from traditional to digital models.	Studies not focusing on banking business models or the effects of emerging technologies.
Articles covering topics like blockchain, cybersecurity, digital payments, or customer experience related to banking and Fintech platforms.	Articles focusing exclusively on technical aspects without considering their relationship with business models.
Publications available in academic databases recognized as Scopus, Web of Science, and Google Scholar.	Consultancy reports, dissertations, theses, and press articles not peer-reviewed.

2.2. Search Strategies

The study search was conducted using academic databases such as Scopus, Web of Science, and Google Scholar to identify relevant research exploring the impact of emerging technologies in the banking sector. Combinations of keywords with Boolean operators were used to optimize search results. The search strategies included:

Search Terms

("Fintech" OR "Financial Technology") AND ("Internet of Things" OR "IoT") AND ("Banking Business Models")
("Blockchain" AND "Digital Banking") AND ("Cybersecurity" OR "Fraud Detection") AND ("Business Strategy")
The searches were conducted between January and March 2024 and were limited to articles in English published between 2018 and 2024 (Kanak *et al*., 2023).

Table 2: Search Strategies in Scopus, Web of Science, and Google Scholar Databases

Strategies	Search Terms	Scopus	Web of Science	Google Scholar
I	("Fintech" OR "Financial Technology") AND ("Internet of Things" OR "IoT") AND ("Banking Business Models")	220	180	240
II	("Blockchain" AND "Digital Banking") AND ("Cybersecurity" OR "Fraud Detection") AND ("Business Strategy")	95	85	130
Total		**315**	**265**	**370**

2.3. Study Selection Process

The study selection process was based on the PRISMA model. In the first phase, duplicates were removed, and titles and abstracts were reviewed to identify studies that met the inclusion criteria. In the second phase, the full texts of the selected studies were reviewed to confirm their eligibility.
Two independent reviewers performed the initial selection of studies. Discrepancies were resolved through discussion between the reviewers, and in cases of persistent disagreement, a third reviewer intervened to resolve the differences (Asl & Roubaud, 2024) [14].

2.4. Data Extraction Process

Data were extracted from the selected studies using a structured format. The extracted information included the year of publication, authors, study type, discussed emerging technologies, and the main findings on the impact of these technologies on banking business models. The extraction process was carried out by one reviewer and validated by a second reviewer to ensure accuracy and consistency of the

extracted data.

2.5. Risk of Bias Assessment in Studies

The risk of bias in the selected studies was assessed using quality evaluation tools such as ROBINS-I for non-randomized studies and CASP (Critical Appraisal Skills Programme). Factors such as study design, methodology used, and the validity of the obtained results were evaluated. Studies with a high risk of bias were excluded or discussed in the results section (Aboalsamh *et al*., 2023) [15].

2.6. Evaluation of the Certainty of Evidence

The quality of evidence was evaluated using the GRADE system, which allows for categorization of evidence as high, moderate, low, or very low. Studies with high-quality evidence were prioritized in the analysis and conclusions of this review (Misra *et al*., 2024) [11].

3. Results

3.1. Study Selection

From the 950 articles initially identified in the Scopus, Web of Science, and Google Scholar databases, duplicates were removed, and titles and abstracts were reviewed to verify their relevance. After a more detailed analysis, only 15 studies met the inclusion criteria and were included in this systematic review.

Below is a flow diagram of the selection process according to the PRISMA model

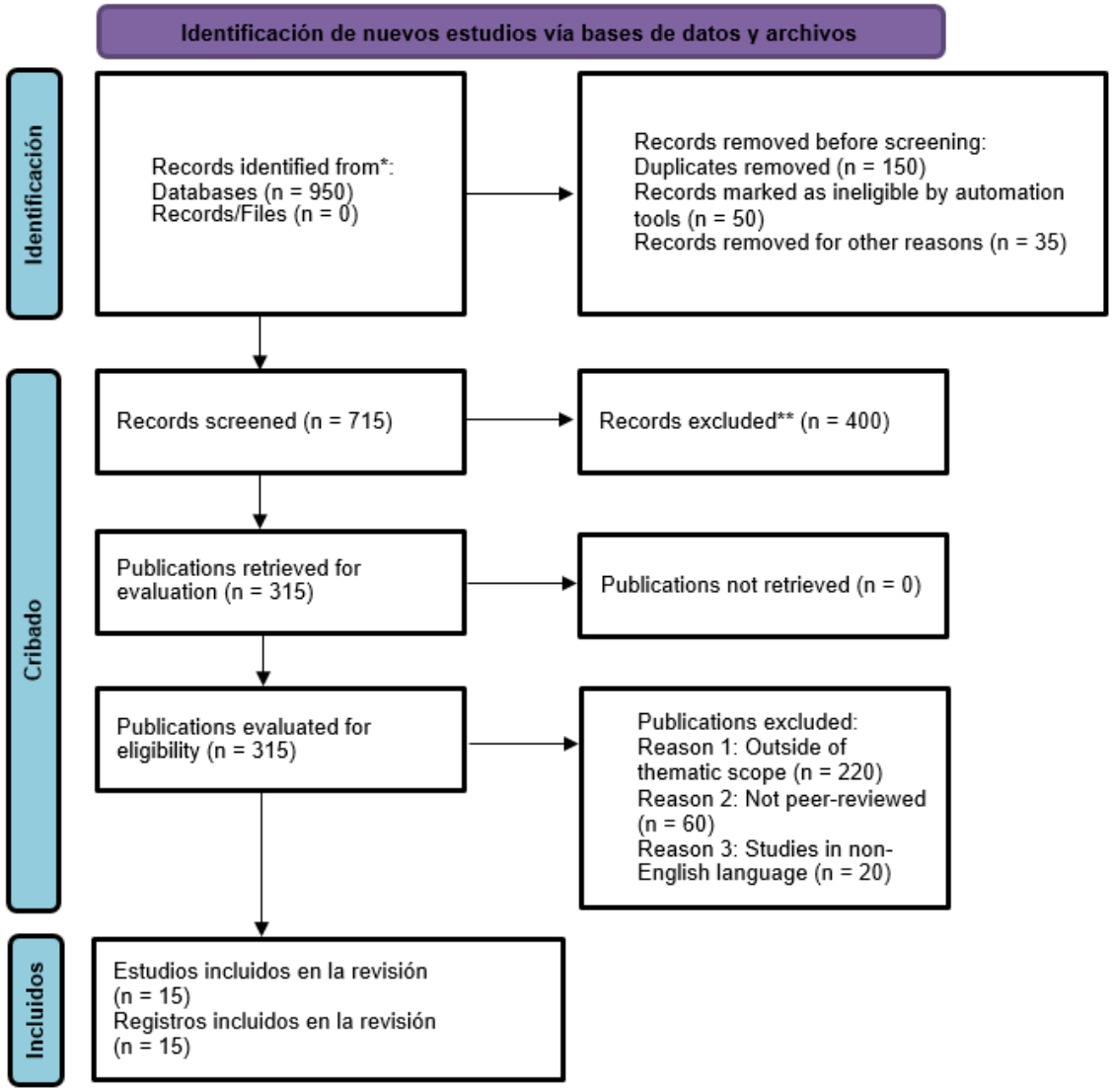

Fig 1: PRISMA Flow Diagram (The visual diagram of the process should be here)

3.2. Characteristics of the Studies

The 15 selected studies cover various applications of emerging technologies such as Fintech, blockchain, and IoT in the banking sector. In most cases, the studies focused on the digitalization of financial services and how these technologies are transforming traditional business models in banks (Trotta *et al*., 2024; Varela-Vaca *et al*., 2024) [1, 3].

Table 3: Characteristics of the Studies

Code	Year	Author	Title	Journal of Publication	Quartile
A1	2024	Trotta, A., Rania, F., & Strano, E.	Exploring the linkages between FinTech and ESG: A bibliometric perspective	Research in International Business & Finance	Q1
A2	2023	Bojjagani, S., Seelam, N. R., Sharma, N. K., *et al*.	The use of IoT-based wearable devices to ensure secure lightweight payments in FinTech applications	Journal of King Saud University - Computer and Information Sciences	Q2
A3	2024	Varela-Vaca, Á. J., Gasca, R. M., Iglesias, D., & Gónzalez-Gutiérrez, J.	Automated trusted collaborative processes through blockchain & IoT integration: The fraud detection case	Internet of Things	Q1
A4	2024	Singh, A., Pareek, V., & Sharma, A.	A Review on Blockchain for Fintech using Zero Trust Architecture	Journal of Information and Organizational Sciences	Q2
A5	2024	Lavanya, B., & Rajkumar, A. D.	Impact of digital banking products during Covid-19 in rural areas of Vellore District	Revista De Gestão Social E Ambiental	Q3
A6	2023	Mustapha, N. I., Vaicondam, Y., Jahanzeb, N. A., *et al*.	Cybersecurity challenges and solutions in the fintech mobile app ecosystem	International Journal of Interactive Mobile Technologies	Q2
A7	2023	Bui, L. T. L., & Pribula, L.	Using Fintech to protect the strict compliance principle in letter-of-credit law	Hungarian Journal of Legal Studies	Q3
A8	2023	Kanak, A., Ergün, S., Arif, İ., *et al*.	Integrated secure distance bounding and hardware-based security: A case study for the insurance claim verification of farmers during COVID-19	Open Research Europe	Q1
A9	2023	Kollu, V. N., Janarthanan, V., Karupusamy, M., & Ramachandran, M.	Cloud-Based smart contract analysis in FinTech using IoT-Integrated federated learning in intrusion detection	Data	Q2
A10	2023	Ramkumar, J., Marseline, K. S. J., & Medhunhashini, D. R.	Relentless firefly Optimization-Based Routing Protocol (RFORP) for securing fintech data in IoT-Based Ad-Hoc networks	International Journal of Computer Networks and Applications	Q3
A11	2024	Misra, N., Gupta, S., & Rao, T. J.	Fintech's role in green finance: Procuring funds for sustainable energy	International Research Journal of Multidisciplinary Scope	Q3
A12	2023	Ho, C.	Research on interaction of innovation spillovers in the AI, Fin-Tech, and IoT industries: considering structural changes accelerated by COVID-19	Financial Innovation	Q1
A13	2023	Rjoub, H., Adebayo, T. S., & Kirikkaleli, D.	Blockchain technology-based FinTech banking sector involvement using adaptive neuro-fuzzy-based K-nearest neighbors algorithm	Financial Innovation	Q1
A14	2024	Asl, M. G., & Roubaud, D.	Asymmetric interactions among cutting-edge technologies and pioneering conventional and Islamic cryptocurrencies	Financial Innovation	Q1
A15	2023	Aboalsamh, H. M., Khrais, L. T., & Albahussain, S. A.	Pioneering Perception of Green Fintech in Promoting Sustainable Digital Services Application within Smart Cities	Sustainability	Q1

3.3. Results of Individual Studies

Each of the studies included in this review presented different approaches to the impact of emerging technologies on digital banking. It was observed that the implementation of Fintech and blockchain is revolutionizing security and operational efficiency in the financial sector, with studies highlighting improvements in customer experience and transparency in banking operations (Ramkumar *et al*., 2023) [10].

3.4. Synthesis Results

In the synthesis of the results, it was identified that emerging technologies are significantly contributing to the transformation of banking business models. Among the most important findings are:

Fintech and ESG: Several studies analyzed how the integration of Fintech facilitates the implementation of sustainability and social responsibility strategies in financial institutions (Trotta *et al*., 2024) [1].

Blockchain and IoT: These technologies have been identified as fundamental for security and risk management in banks, particularly in fraud detection and cybersecurity (Varela-Vaca *et al*., 2024; Singh *et al*., 2024) [4, 3].

3.5. Publication Bias

The systematic review showed that, although the selected studies cover various applications of Fintech and blockchain, there is a bias towards studies conducted in developed markets. This could limit the ability to generalize the results to emerging markets or regions with lower technological penetration (Asl & Roubaud, 2024) [14].

3.6. Certainty of the Evidence

The quality of the evidence from the studies was evaluated using the GRADE system, finding that most of the studies had moderate to high quality. However, some studies showed greater uncertainty due to small sample sizes and variations in the results (Aboalsamh *et al*., 2023) [15]. These factors affected the certainty of the conclusions in certain contexts, such as the adoption of digital banking in rural areas.

4. Discussion

4.1. Interpretation of the Results

The findings of this systematic review show that emerging technologies such as Fintech, blockchain, and IoT are significantly transforming traditional business models in banking. In particular, the implementation of Fintech has facilitated the adoption of more customer-centered strategies and financial sustainability through mechanisms like the inclusion of ESG (Trotta *et al*., 2024) [1]. On the other hand, the use of blockchain and IoT has been fundamental in improving cybersecurity and detecting fraud in digital banking, enabling safer and more efficient processes (Varela-Vaca *et al*., 2024; Ramkumar *et al*., 2023) [3, 10].

These results align with previous research that has also highlighted Fintech's ability to optimize the operational efficiency of banks by eliminating intermediaries and enhancing the customer experience. However, one of the most innovative aspects identified is the impact of IoT on digital payments, providing greater security through portable devices, which represents a notable advancement in the digitalization of banking (Bojjagani *et al*., 2023) [2].

4.2. Limitations of the Study

One of the main limitations of this review was the lack of studies addressing the impact of emerging technologies in emerging or rural markets. Most of the included studies focused on developed markets, which could limit the applicability of the results to regions with lower technological penetration (Asl & Roubaud, 2024) [14]. Additionally, some studies had relatively small sample sizes, generating uncertainty regarding the generalization of the findings (Aboalsamh *et al*., 2023) [15].

Another important limitation was the lack of a standardized approach to evaluating the impact of these technologies, which made direct comparison between studies difficult. Although many studies used blockchain to improve security, not all included detailed quantitative evaluations of improvements in fraud detection systems (Kollu *et al*., 2023) [9].

4.3. Recommendations for Future Studies

It is essential that future research focuses on how emerging technologies such as Fintech and IoT impact emerging markets, particularly in rural areas where access to financial services is limited. It would be beneficial to have studies exploring how these technologies can reduce financial barriers and improve inclusion in these regions (Lavanya & Rajkumar, 2024) [5].

Similarly, it would be valuable for future research to adopt a more standardized quantitative approach to evaluate the impacts of technologies such as blockchain and IoT on banking security, with broader and more diverse samples that allow for the generalization of results to different geographical contexts (Bui & Pribula, 2023) [7]. It is also suggested to explore new applications of blockchain in combination with other disruptive technologies, with the aim of improving efficiency and security within the banking sector.

4.4. Conclusions

The results of this systematic review demonstrate that emerging technologies are playing a crucial role in transforming traditional business models in the banking sector. The implementation of Fintech has allowed banks not only to optimize their operations but also to comply with higher standards of sustainability and social responsibility (Trotta *et al*., 2024) [1]. Additionally, the adoption of blockchain and IoT has significantly improved cybersecurity, particularly in fraud detection and the protection of sensitive data (Varela-Vaca *et al*., 2024) [3].

In conclusion, the digital transformation driven by these technologies is contributing to creating a more efficient, secure, and accessible financial ecosystem, suggesting that emerging technologies will continue to play a key role in the future of the banking sector.

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