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Fintech, Innovation Ecosystems, and Financial Inclusion

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Abstract

This study explores the transformative role of financial technology (FinTech) within the broader context of innovation ecosystems and its interconnections with financial inclusion. Financial technology has grown significantly in recent years. It encompasses sectors such as digital payments, blockchain, artificial intelligence, regulatory technology and insurance technology, reshaping the operational dynamics of financial systems, improving efficiency, competition, and transparency. In turn, the rapid adoption of data-intensive technologies introduces new regulatory and ethical challenges. Following an approach based on an examination of scientific literature the study first emphasizes the need to move beyond a technology-centric view and adopt an ecosystem-oriented perspective. This view highlights the interaction between technological advances, institutional frameworks, and market structures, as well as their impact on innovation. The analysis also shows that global connections and collaborations within FinTech ecosystems favor the development and diffusion of new innovations. Furthermore, FinTech and its ecosystem promote financial inclusion by reducing barriers to entry, making access to services affordable, and tailoring solutions to diverse customer needs. This benefits disadvantaged and underbanked populations, thereby expanding economic participation and reducing inequality. Given that current literature does not explicitly highlight the interrelationship among FinTech, innovation ecosystems, and financial inclusion, this study — without pretending to be exhaustive — underscores their interconnection. It demonstrates how collaborative technological innovation can expand access to financial services, despite the challenges and problems that remain to be solved. The article concludes that financial technology should be understood as a systemic force with profound implications for economic transformation, regulatory adaptation, the democratization of access, and the reduction of inequality.

Keywords: Fintech, digital technologies, financial inclusion, innovation ecosystems, technological innovation, regulation

JEL Classification: G2, G32, F30, O31

1. Introduction

The integration of technological innovations into the financial services industry is the domain of FinTech. The goal is to improve efficiency, reduce transaction costs, and offer more accessible and consumer-focused services. FinTech includes various activities, such as payments and money transfers, digital banking, wealth management, lending and crowdfunding, blockchain-based solutions, cryptocurrencies, insurance technology (Insurtech), regulatory technology (Regtech). Empirical literature (e.g., Bogaard et al. 2024; Chen & Guo, 2024) suggests that technological innovation is fundamentally reshaping both the structural composition and operational performance of financial systems. While developments in financial technology (e.g., digital payments and robo-advisory services) have some positive effects, such as accelerating transaction speeds and intensifying competition, the growing reliance on data-intensive processes introduces significant risks. In particular, the advent of generative artificial intelligence (GenAI), as highlighted by Bhattacharyya et al. (2025), offers strong efficiency potential but also introduces new risks to the model. Furthermore, Leitner et al. (2024) emphasize that AI presents new regulatory, ethical, and stability challenges for both industry practitioners and policymakers. In this context, FinTech startups play a key role in driving growth and transformation in the financial sector. They are agile disruptors offering faster, more convenient, and increasingly personalized alternatives to traditional services. In turn, established companies are forced to adopt innovative solutions internally or pursue strategic partnerships and acquisitions to maintain their competitive advantage.

A comprehensive understanding of FinTech requires an ecosystem-oriented perspective and this contribution develops within this perspective. Innovation and competition increasingly take place at the ecosystem level, where technological developments intersect with institutional arrangements, regulatory frameworks, and prevailing market structures that involve all stakeholders. This is not just a question of efficiency and competitiveness, but also of fintech's potential to promote financial inclusion by offering accessible and adaptable financial products and services, because a core objective of FinTech is to deliver innovative, accessible, and adaptable digital products that can serve populations typically excluded from traditional financial channels, such as in countries like India or among expatriate workers in many Gulf nations. Literature does not particularly highlight the relationship between FinTech, innovation ecosystems, and financial inclusion. This paper aims to fill this gap by examining the FinTech sector, the role of ecosystems in shaping innovation, the risks associated with technological progress, and the implications for financial inclusion, while also analyzing their interrelationships. So, the paper is guided by four central research questions: (1) How is technological innovation reshaping the financial system? (2) What role does the innovation ecosystem play and what risks emerge as technologies evolve? (3) How does FinTech influence financial inclusion? (4) What is the nature of the interrelationships between FinTech, innovation ecosystems, and financial inclusion?

The goal is to contribute to a deeper understanding of how innovation and its ecosystem are transforming the financial services industry, the implications for financial inclusion, and to provide new insights for future research.

The article begins by reviewing the relevant literature, presenting the growth of the FinTech sector in recent years, and illustrating the study's methodology. This contribution then analyzes the interaction between FinTech, innovation ecosystems, and inclusion. It concludes with a discussion of the topics covered and suggests proposals for improving FinTech’s performance, with a specific focus on financial inclusion.

2. Literature Review on Fintech

The literature on FinTech is wide and continues to grow, providing insights into both its potential and challenges. Our analysis, though limited, aims to understand the interconnections between FinTech, the innovation ecosystem, and financial inclusion—aspects that appear to be insufficiently emphasized in existing research.

Relevant topics discussed in the literature include cryptocurrencies. Böhm et al. (2015), Balcilar et al. (2017), and Bouri et al. (2017) analyze Bitcoin and its characteristics, such as volatility, return performance, hedging and diversification properties, efficiency, and regulatory considerations. Other areas that have attracted significant academic attention, as Bajwa et al. (2022) suggest, are crowdfunding, mobile payments, and blockchain.

The technological, regulatory, strategic, and social perspectives of FinTech are commonly addressed in the literature. Technological innovation is profoundly reshaping the financial system, which is undergoing a sustained process of digital transformation. In particular, the relationship between technological innovation, digital technologies, and the development of FinTech—along with the related risks and opportunities—has been explicitly and extensively analyzed.

Caciatori Junior and Cherobim (2020) observe that the advent of new technologies—such as big data, distributed ledger technology, cloud computing, artificial intelligence, and machine learning—together with their diffusion among consumers, particularly digital natives, has catalyzed the expansion of FinTech. Mungoli (2023), Nama et al. (2023), and Kumar (2024) emphasize that emerging technologies enable FinTech firms to optimize operational efficiency, provide personalized services, and improve organizational agility, and that long-term competitiveness crucially depends on sustained innovation and scalability, which in turn is due to the interdependence between technological capabilities and strategic ecosystem management. Osmani et al. (2021), Nejad, 2021, and Kou and Lu, (2025) highlight the driving role of artificial intelligence (AI), machine learning, blockchain, augmented and virtual reality, and quantum computing, which represent cutting-edge technologies. These technologies are providing increasingly flexible platforms for the provision of financial services. They are transforming the execution of financial transactions in areas such as payments, cryptocurrencies, blockchain applications, and cross-border settlements, thus improving overall financial performance.

Wang, Xiuping, and Zhang (2021) claim that FinTech development has been associated with increased profitability, accelerated innovation, and improved risk management. de Ridder & Burnie (2024), examining mobile payments and digital banking services, point out that digitalized payment systems are becoming more secure, reducing concerns about mistaken payments, fraud and errors, thus facilitating the provision of more adaptable and resilient financial solutions.

Moreover, Barroso and Laborda (2022) argue that contemporary technological advances not only reshape business models in financial services but also promote greater diversity through the emergence of new models, emphasizing

that digital transformation—understood as an ongoing organizational process of structural change driven by the pervasive diffusion of digital technologies—constitutes the defining feature of FinTech.

Fintech is distinguished by technological innovations including mobile banking, peer-to-peer lending platforms, blockchain-based infrastructures, robo-advisory services, and digital wallets. Taken collectively, these developments signify a paradigmatic reconfiguration of financial intermediation, insofar as they advance accessibility, transparency, and efficiency, while simultaneously destabilizing conventional banking models and regulatory architectures.

Innovation ecosystems emerge as a central theme in the technological perspective. Although a universal definition has not yet been established, Siddiqui and Rivera (2022) define FinTech ecosystems as networks of interactions between startups, regulators, investors, and institutions. These ecosystems drive industry transformation by fostering collaboration among diverse stakeholders, with open banking infrastructure and APIs serving as critical enablers, as highlighted by Palmié et al. (2020), and Lee and Shin (2018). In addition, Kou and Lu (2025) point out that, given the development of emerging technologies such as AI, machine learning, blockchain, AR/VR, and quantum mechanics, the advancement of financial services and their performance emerges as a substantial challenge and has become increasingly contingent upon cross-sectoral collaboration that fosters innovation; furthermore, these advances improve efficiency, reduce transaction costs, broaden access, and strengthen risk management. Berman et al. (2022) also observe that this dynamic collaboration fosters innovation. In their view, FinTech innovation has contributed to a substantial increase in entrepreneurial entry, supporting the development of startups while intensifying competitive pressure on incumbents.

Moreover, as Gai et al. (2018) emphasize, data-driven applications and associated hardware play a critical role in advancing financial technology, enabling the development of new features and functionalities across a wide range of financial sectors.

Schilirò (2020) argues that the rapid pace of technological innovation has profoundly reshaped the financial landscape, although several unsolved problems remain, such as the digital divide. However, emerging technologies are significantly enriching the range of financial services offered, with financial innovation encompassing not only the creation of new instruments (e.g., derivatives, exchange-traded funds, cryptocurrencies), but also new delivery mechanisms (e.g., robo-advisors, digital onboarding), the rise of new institutions (e.g., neobanks, peer-to-peer lending platforms), and the development of advanced trading and clearing infrastructures.

From a strategic perspective, FinTech is radically reshaping business models, competitive strategies, and value creation. Ng et al. (2024) identify several "strategic logics" that underpin the commercial viability of FinTech platforms. These include "positioning logic," which focuses on acquiring and maintaining advantageous market positions; "leveraging logic," which aims to leverage unique resources and capabilities; and "optimality logic," which prioritizes organizational adaptability to specific contexts. Taken together, these logics illustrate how FinTech firms align technological capabilities with long-term strategic objectives. Consistent with this, Reyses-Mercado (2021) emphasizes that strategies focused on innovative business models have also improved the capacity of Fintech companies to serve both the banked and underbanked populations, with important implications for financial inclusion.

The social dimension of FinTech highlights the tension between inclusion and exclusion. The literature on FinTech and financial inclusion is extensive. In particular, Jha and Dangwal (2024) provide a literature review on the relationship between FinTech services and financial inclusion. They focus on lower-middle-income and upper-middle-income group nations, confirming the interest in financial inclusion for disadvantaged populations. As several scholars argue (e.g., Gabor & Brooks, 2017; Schilirò, 2021; Ha et al., 2025; Demirgüç-Kunt et al., 2022), FinTech innovations such as mobile banking, digital wallets, and peer-to-peer lending can reduce barriers to entry and expand access for disadvantaged groups, thus democratizing financial services in developing economies and among marginalized populations. Kishor et al. (2025) particularly emphasize that FinTech's ability to improve efficiency and reduce costs in financial services can promote greater financial inclusion, which in turn helps achieve equitable development. Conversely, Ozili (2018) emphasizes that these same innovations risk reinforcing exclusion for individuals lacking digital literacy, access to smartphones, or reliable internet connectivity.

Adoption of financial technology has also been analyzed in the literature. Among the factors that appear to influence the adoption of FinTech, Demirgüç-Kunt et al. (2022) and Frost (2020) note that it is typically higher in contexts where unmet demand for financial services coincides with favorable demographic factors, such as a young population, which strengthens trust in new providers and, in turn, improves financial inclusion. In contrast, Ozili (2018) and Chen et al. (2021) underline the importance of digital literacy, strengthening resilience, and

empowerment—and not just participation—when discussing financial inclusion. Furthermore, Del Sarto and Ozili (2025), in their bibliometric analysis, explore how FinTech is transforming financial inclusion in emerging markets, focusing on mobile banking, peer-to-peer lending, and blockchain technologies.

However, the persistence of the digital divide, particularly among older people and rural populations, highlights the need for appropriate policies from public institutions, as well as inclusive design from financial institutions to ensure equitable access. Inclusive and accessible financial technology solutions remain the fundamental goal and challenge for policymakers, developers, and financial institutions. In this light, Schilirò (2021) argues that crucial innovations in the financial system stem from the persistent need for greater accessibility. The rise of FinTech has profound implications for financial inclusion, as it provides disadvantaged and unbanked populations—especially in emerging economies—with access to mobile banking services, digital wallets, and alternative credit scoring mechanisms. FinTech thereby reduces geographic, economic, and social barriers to the formal financial system. These tools aim to democratize access to finance, promoting economic participation and supporting broader development goals, such as poverty reduction and gender equality. Unfortunately, these benefits are not universally achieved. The digital divide, low financial literacy, and regulatory disparities can hinder inclusive adoption. Consequently, realizing FinTech's full potential depends on supportive infrastructure, effective governance, and targeted policy interventions.

Systemic integration, resilience, and inclusiveness are essential dimensions for understanding the transformative role of FinTech in reshaping financial markets and institutions. Lee (2024), for example, focuses on the dual impact of technologies on financial inclusion and innovation risks. He examines the integration of digital platforms, machine learning (ML), and large language models (LLM) in improving accessibility to financial services for underserved populations, while also raising regulatory challenges related to data privacy, and algorithmic bias. Also, the blockchain technology, characterized by decentralization, transparency, and disintermediation, contributes to financial inclusion and efficiency, although it faces challenges of scalability and regulatory fragmentation.

Therefore, the rapid evolution of FinTech introduces, in addition to its advantages, new risks and vulnerabilities. These include algorithmic risks (e.g., bias, opacity, and failures in autonomous decision-making), concerns about privacy, data ownership, and cybersecurity, as well as emerging threats (e.g., deepfakes and synthetic identity fraud). Regulatory differences between jurisdictions further complicate operations, as FinTech innovations often exceed existing legal frameworks. This creates uncertainty regarding compliance and consumer protection. A key regulatory challenge is balancing the promotion of innovation with the protection of financial stability.

Regarding the implications of FinTech for market efficiency, the literature provides mixed results. Sironi (2016) and Navaretti et al. (2017), for example, suggest that innovations such as robo-advisors, algorithmic trading, and blockchain can improve transparency, pricing, and capital allocation. Arner et al. (2017) and Zetzsche et al. (2020), in turn, emphasize that risks related to volatility, regulatory gaps, and algorithmic biases can undermine these benefits if not properly managed.

The analysis of the literature suggests several key considerations. First, the FinTech sector relies on the synergy of multiple stakeholders, each of whom contributes to the ecosystem's evolution. Second, FinTech develops most robustly within innovation ecosystems composed of startups, established financial institutions, regulators, investors, and technology providers. These ecosystems foster continuous financial innovation while also providing critical infrastructure, such as accelerators, regulatory sandboxes, and strategic partnerships, that enable startups to develop and scale new solutions. As Siddiqui and Rivera (2022) argue, they foster experimentation, facilitate knowledge diffusion, and support collaborative value creation. Third, innovation ecosystems can play a crucial intermediary role in translating technological potential into inclusive outcomes, by providing the necessary technological, institutional, and regulatory framework that enable FinTech to grow responsibly. In this regard, Zetzsche et al. (2017) highlight how regulators, for example, design sandboxes to balance innovation with consumer protection. Haddad and Hornuf (2019), in turn, highlight how investors channel resources into socially impactful FinTech initiatives. Fourth, knowledge networks within ecosystems also promote the dissemination of best practices, such as interoperability standards that facilitate cross-platform access for underserved users, thereby highlighting the relationship between the innovation ecosystem and financial inclusion.

Overall, the literature review seems to indicate that FinTech operates in a complex ecosystem that includes startups, established financial institutions, technology providers, investors, regulators, and consumers. This environment fosters collaboration, knowledge sharing, and resource exchange, enabling continuous innovation and the development of more efficient, accessible, and user-centric financial services. Innovation ecosystems support financial technology through infrastructure such as innovation hubs, accelerators, and regulatory

sandboxes, which favor startups' growth, scalability, and integration with incumbents. Although challenging to manage, collaboration between startups and established institutions is particularly important, as it combines agility and market access.

Policymakers should play a dual role, both as promoters and regulators within the FinTech ecosystem, balancing the encouragement of innovation with the need to ensure financial stability, consumer protection, and fair competition. Their role can directly shape the ecosystem's growth and influence inclusiveness and equity in access to financial services and innovations among different segments of the population.

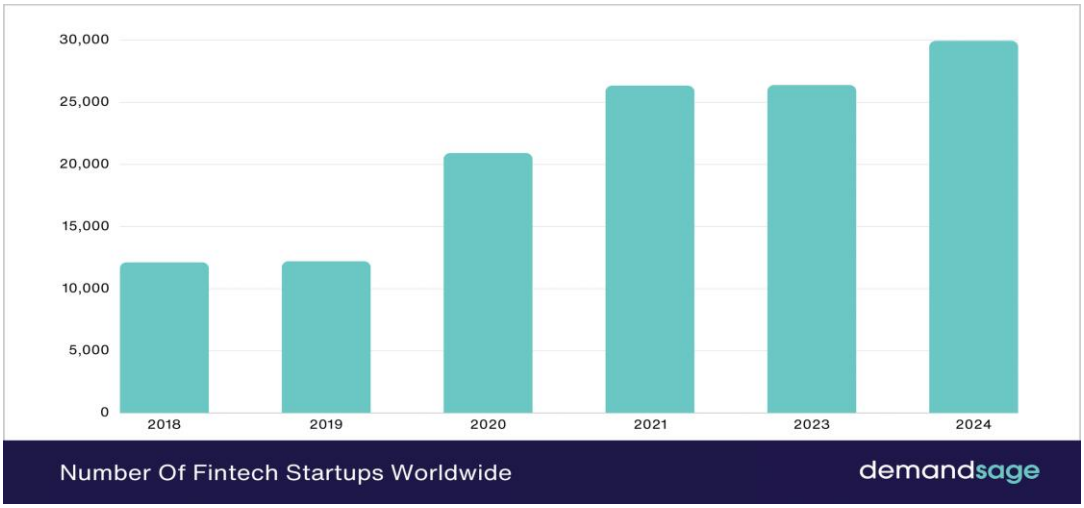
Future research should investigate the coevolution of FinTech and its ecosystem, driven by collaborative innovation and supported by enabling regulatory frameworks—elements essential for achieving financial inclusion. This coevolutionary view thus underscores the interconnections between innovation ecosystems and financial inclusion. While existing studies have examined these three areas individually, their interconnectedness has not been systematically analyzed. This research aims to fill this gap. Analyzing FinTech through the lens of innovation ecosystems and financial inclusion, as well as associated risks, offers a more comprehensive framework for assessing its transformative impact on the financial services industry and developing strategies for maximizing its benefits while mitigating its negative effects.

3. The Growth of FinTech

FinTech has grown significantly in recent years. This expansion, marked by the increasing number of FinTech startups and their innovative attitude, was fueled by robust growth in the banking sector, rapid digitalization, changing customer preferences, and growing support from investors and regulators.

Mordor Intelligence (2025) highlights that the global FinTech market is valued at $320.81 billion in 2025 and is expected to reach $652.80 billion by 2030, with a compound annual growth rate (CAGR) of 15.27% over the forecast period. The main drivers of this growth include harmonized regulatory frameworks facilitating cross-border expansion, the adoption of real-time payment systems improving transaction efficiency, and the increasing availability of open banking data. Furthermore, in 2024, digital payments accounted for 46.2% of the FinTech market share, while retail customers accounted for 62.1% of the market. The key role of the artificial intelligence segment is underlined by Research and Markets (2025), which forecasts its growth from $22.5 billion in 2023 to nearly $79.4 billion by 2030, with a compound annual growth rate (CAGR) of approximately 19.8%. Artificial intelligence initiatives within FinTech encompass a wide range of applications, including advanced fraud detection systems, automated compliance solutions, the optimization of operational processes, and predictive risk management. This substantial increase in AI investments reflects evolving priorities, including the enhancement of operational efficiency, the scaling of personalized services, and the mitigation of risks. As FinTech firms increasingly integrate AI into their operations—such as through the automation of compliance workflows or the refinement of credit scoring—returns on investment are beginning to materialize, although research continues to highlight implementation challenges and the need for more effective deployment strategies.

Let’s examine the expansion of FinTech startups worldwide, as illustrated by the histograms in Figure 1.



Source: demandsage (Kumar, 2025)

Figure 1. Number of FinTech Startups Worldwide

Figure 1 illustrates that, at the global level, the number of FinTech startups rose from approximately 12,000 in 2018 to nearly 30,000 by 2024, a significant increase of more than 2.5 times.

This also reflects a broader expansion of the FinTech ecosystem, with over 29,955 startups globally as of 2024. Table 1 presents detailed findings regarding this numerical increase.

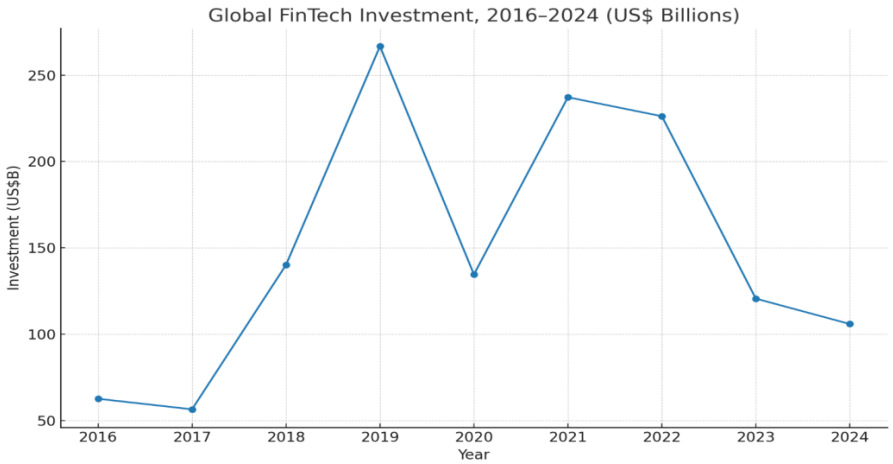
Table 1. Number of Fintech Startups Worldwide, 2018–2024

Year	**Number of Fintech Startups**
2018	121,1
2019	12,211
2020	20,925
2021	26,346
2023	26,393
2024	29,955

Source: demandsage (Kumar, 2025)

Table 1 illustrates a significant acceleration of innovation, showing that the number of FinTech startups more than doubled between 2019 and 2021. By 2024, the Americas—primarily the U.S.—led in startup density, followed by Europe, the Middle East, and Africa (EMEA), and then the Asia-Pacific (APAC) region. The dramatic increase in startups over a six-year period points to more vibrant ecosystems, deeper funding pools, and higher regulatory engagement globally, indicating the maturity of FinTech innovation ecosystems. While the U.S. (Americas) remains dominant, EMEA is catching up, and APAC is steadily expanding, reflecting a global diffusion of FinTech innovation. The proliferation of startups likely correlates with the introduction of localized, accessible FinTech solutions, which are key to reaching underserved populations. This observation confirms our hypothesis regarding the important relationship between the diffusion of FinTech innovation and financial inclusion.

Figure 2 illustrates the evolution of global FinTech investment between 2016 and 2024.



Source: Global FinTech Network (2024).

Figure 2. Global Fintech Investment, 2016-2024 (US$ Billions)

The data shown in Figure 2 reveal three distinct phases. First, a period of steady growth culminated in an unprecedented surge in 2018–2019, driven by rapid adoption of digital payments, blockchain applications, and heightened venture capital activity. Second, following a brief contraction in 2020 linked to the COVID-19 shock, investment rebounded sharply in 2021, reaching its peak as digital financial services became central to economic

resilience. Third, from 2022 onwards, the sector entered a phase of normalization, with investment declining to USD 105.9 billion in 2024—its lowest level since 2017. This downturn reflects macroeconomic headwinds, tighter monetary conditions, and increased scrutiny of FinTech business models. Despite the decline, investment levels remain substantially higher than in the pre-2018 period, suggesting that FinTech has consolidated its role as a structural component of the global financial ecosystem.

4. Methodology of the Study

This study adopts an approach grounded in the most relevant literature to examine the potential and challenges of FinTech. The research does not employ the various quantitative or systematic tools typically used in review research (e.g., Kunisch et al., 2023), including bibliometric analysis (e.g., Donthu et al., 2021), systematic literature reviews (Randles, & Finnegan, 2023), bibliometric-systematic literature reviews (e.g., Marzi, et al., 2024), and content analysis (e.g. Gaur & Kumar, 2018). Instead, it makes a different methodological choice that may appear traditional given the volume of recent research. The method consists of carefully examining the significant, though limited, literature to identify the central themes—FinTech, innovation ecosystems, and financial inclusion—and their interconnections. So, the approach investigates how they are analyzed not only individually but also in relation to one another.

This methodology is rooted in our view that a primary purpose of FinTech is to use financial innovation to provide more convenient and accessible products to populations excluded from traditional financial channels. Therefore, the scope of this research is to investigate more deeply the interrelationship among FinTech, the innovation ecosystem, and financial inclusion. To ensure transparency, the search strategy started by employing the keyword FinTech. Scopus found 9,693 documents in its dataset. A huge number revealing the growing interest in this topic by scholars. Subsequently, by restricting the search to articles published after 2016, I added the following keywords to further narrow the sample: "technological innovation", "innovation ecosystem," "digital technologies," financial inclusion and interconnections," and “regulation”, primarily on the Scopus database. I then analyzed the most relevant papers identified. However, I acknowledge the limitations concerning the quantity of papers reviewed and the specific criteria chosen.

Although the investigation is not exhaustive, it allows us to focus on the above-mentioned interrelationship. This specific aspect appears to be insufficiently explored in the current literature, and this contribution aims to help fill that gap. The analysis is largely theoretical but incorporates descriptive empirical evidence, as shown in Section 3, drawing on secondary data from reliable international sources to ensure both relevance and credibility. Essentially, the study does not purport to offer definitive answers; instead, it aims to offer new insights for future research by contributing to a deeper understanding of key topics, including FinTech, innovation ecosystems, and financial inclusion and the interconnections among them.

5. Analysis: The Interconnectedness of FinTech, Innovation Ecosystems, and Financial Inclusion

The interconnection among FinTech, the innovation ecosystem, and financial inclusion holds central relevance for this study. This interconnection represents a dynamic process where technological progress, institutional arrangements, and social objectives continually shape and reinforce one another. The existing literature, as reviewed in Section 2, primarily emphasizes FinTech technological innovation, ecosystems, and regulatory issues. While it frequently focuses on the strong relationship between FinTech and the innovation ecosystem, and also examines the relation between FinTech and financial inclusion, it seems to overlook the comprehensive interrelationship connecting all three dimensions.

Ecosystems are indeed crucial for FinTech innovation. These ecosystems involve a multiplicity of interconnected actors that form networks, exploit network effects (Gawer & Cusumano, 2014), and drive innovation. As Woodsville (2024) points out, the main actors in these ecosystems are startups, banks, and regulators. Their collaboration is crucial to the ecosystems' success, where AI technology is increasingly emerging as a driving force for change in the functioning of financial services.

Furthermore, disruptive technologies bring a broader reconfiguration of industry structures, operations, and regulatory frameworks, with significant implications for market efficiency. In this regard, the approach of Christensen’s (1997) disruptive innovation theory provides valuable lenses for analyzing these dynamics—particularly the mechanisms through which FinTech innovations initially target underserved market segments before eventually challenging incumbents. The disruptive force of FinTech innovations is underlined by Philippon (2019), who argues that they not only blur industry boundaries, facilitate disintermediation, and revolutionize product delivery but also democratize access to financial services and provide new gateways to entrepreneurship. However, these innovations simultaneously create significant challenges in terms of privacy, regulation, and law enforcement. Meanwhile, Breidbach et al. (2020) offer an analysis of the digital

transformation of financial services systems through FinTech, which involves disruptive innovations, and outline a research agenda.

Nejad (2021) and Osmani et al. (2021) are among those who emphasize the importance of financial inclusion. They argue that achieving sustainable impact requires implementing inclusive growth strategies, ensuring that ecosystems not only promote disruption but also provide equitable access and resilience to the entire financial system. Furthermore, Khairani et al. (2025) highlight that financial inclusion is important not only for the underserved population but also for capital management. The study by Dhavamani et al. (2024) is particularly important for understanding the relationship between the FinTech ecosystem and the promotion of financial inclusion, as the ecosystem facilitates the reduction of transaction costs and the improvement of efficiency. This work specifically focuses on establishing FinTech ecosystems in resource-constrained settings, such as a financially marginalized region in India. However, this type of research is still limited.

Our analysis highlights that the permeability of financial systems, characterized by relatively low barriers to entry for new players, further enhances interconnectivity and exchange. Collaboration between agile startups and established institutions is essential, fostering mutual growth and more effective innovation. This distributed and collaborative architecture accelerates financial innovation, creating an environment conducive to the rapid emergence of new products and services.

The theoretical framework this study makes explicit posits that the innovation ecosystem serves as the enabling environment that facilitates the development and scaling of FinTech solutions, which in turn act as the mechanisms for expanding financial inclusion. Furthermore, the interconnections among FinTech, ecosystems, and financial inclusion are not unidirectional but are characterized by complex feedback loops. Achieving greater financial inclusion creates a positive feedback loop that strengthens the entire ecosystem by:

- Fostering a larger market: A newly included population represents a vast, untapped market for FinTech companies, which attracts more investment and competition, thereby boosting the ecosystem.
- Generating valuable data: Increased usage generates data that allows both regulators and FinTech firms to refine policies and products, leading to more responsible and targeted innovation.

Inevitably, tensions exist: rapid innovation can outpace regulatory capacity, which, in turn, can generate risks of exclusion through digital divides, algorithmic bias, or predatory lending practices. Consequently, as Sahay et al. (2020) emphasize, inclusive outcomes depend not only on technological dynamism but also on ecosystem governance, institutional trust, and equitable access.

Therefore, FinTech can provide solutions that promote inclusion—by offering accessible, mobile-friendly, and personalized services that reduce barriers for disadvantaged and unbanked populations, expanding access to credit, payments, savings, and investment tools—yet this potential is not guaranteed. Achieving it requires appropriate support policies. Policymakers face the critical challenge of balancing innovation promotion with the need to safeguard financial stability and consumer protection, and they must simultaneously establish effective regulatory frameworks to enhance the accessibility and inclusiveness of the financial ecosystem.

Overall, the interrelationship among FinTech, innovation ecosystems, and financial inclusion is extremely relevant, demonstrating how collaborative technological innovation can expand access to financial services while driving the sector's sustainable transformation, creating both opportunities and challenges. Fintech draws momentum from ecosystems that facilitate collaboration, while ecosystems, in turn, draw legitimacy and direction from their ability to provide inclusive financial solutions. Supported by stakeholder collaboration and institutional regulation, FinTech ecosystems are able to effectively reshape traditional financial services into more accessible, user-centric, and equitable solutions. This transformation promotes financial inclusion and broader economic participation—a critical topic that deserves further research.

6. Discussion and Conclusion

Fintech is much more than a simple fusion of finance and technology. It is the engine that is profoundly transforming and revolutionizing the way individuals, businesses, and institutions access, manage, and interpret financial services. With the recent surge in advanced technologies such as artificial intelligence, blockchain, open banking, and integrated finance, FinTech has reached a new stage. Despite persistent challenges, the FinTech sector is continuously growing across all regions, characterized by the vibrancy and diversity of its innovation ecosystem, thus contributing to broader economic empowerment and the reduction of inequalities.

The literature demonstrates that financial technology improves efficiency, alters consumer habits, promotes financial inclusion, ensures secure transactions, offers personalized services, and, overall, expands economic opportunities. However, it requires significant risk management capabilities and poses cybersecurity challenges,

while simultaneously demanding adaptive regulatory arrangements from institutions. Several scholars (e.g., Gabor & Brooks, 2017; Ozili, 2018; Nejad; 2021; Schilirò, 2021; Demirgüç-Kunt et al., 2022; Dhavamani et al., 2024; Ha et al., 2025; Khairani et al., 2025; Kishor et al., 2025; Del Sarto & Ozili, 2025) have underscored that FinTech innovations reduce barriers to entry and expand access for disadvantaged groups, thereby emphasizing financial inclusion and the democratization of financial services, especially across developing economies, emerging markets, and marginalized populations. Crucially, while this dimension of financial inclusion is highly relevant and widely studied, the interconnection with innovation ecosystems remains under-analyzed in the FinTech literature.

In terms of theoretical contribution, this research adds to the broad body of knowledge on FinTech by highlighting the complex interconnections among innovation ecosystems and financial inclusion. Specifically, this study focused on the profound relationship among these three dimensions and addressed several research questions, investigating: how technological innovation is reshaping the financial system; the role of the innovation ecosystem; the new risks emerging from technological evolution; and the influence of financial technology and the innovation ecosystem on financial inclusion and their interrelations.

The research has emphasized that innovation in FinTech develops within a complex ecosystem characterized by continuous technological advancement, customer-centric design, collaboration among stakeholders, and increasing sophistication. Crucially, our analysis highlights that FinTech's innovation ecosystem promotes financial inclusion by lowering barriers to entry for underserved and unbanked populations. It achieves this through digital and mobile products that are both more affordable and accessible than traditional financial services. Furthermore, data-driven solutions and personalized offerings that address the specific needs of different customer segments further foster inclusion. This inclusion broadens access to credit, payments, savings, and investment opportunities for previously marginalized groups. In this context, AI is a powerful tool that enables FinTech companies to assess the creditworthiness of the unbanked who lack formal credit histories, ensuring services are appropriate and tailored to their needs. The emphasis on the interconnection between the innovation ecosystem and financial inclusion is a hallmark of this study.

Moreover, the analysis suggested that policymakers must balance the promotion of innovation with the need to safeguard financial stability and consumer protection, while simultaneously shaping the inclusiveness and accessibility of financial innovation. This represents a critical challenge that must be addressed.

In conclusion, although the methodology presents limitations and the research does not claim to be exhaustive, this contribution underscores that financial technology operates as a systemic force with profound implications for the democratization of access, regulatory adaptation, and, ultimately, the reduction of inequality. Building upon the findings of this study, avenues for future research consist of addressing the gap in the current literature to further explore this interconnection. Future research should specifically focus on: FinTech's role in financial inclusion in developing countries and emerging markets; the specific needs of marginalized populations; gender and financial inclusion; and promoting rural development, while always taking into account the human-centered aspects of FinTech. Furthermore, the significant role of AI in FinTech—not only in boosting efficiency, productivity, detecting fraudulent transactions, and improving security systems, but also in decision-making and compliance—presents a vital avenue for future analysis.

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Not applicable.

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