

# Role of FinTech in Enhancing Operational Efficiency of Indian Banks: A Descriptive Analysis (2020-2025)

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**Abstract:** This research investigates the structural transformation of the Indian banking sector through FinTech integration between 2020 and 2025. Unlike existing literature that treats digital adoption as a peripheral service, this study utilizes a descriptive framework to argue that FinTech specifically the Unified Payments Interface (UPI) has become the primary driver of operational architecture. By analysing secondary data across digital payment trajectories and financial inclusion indices, the findings demonstrate a fundamental shift toward high-frequency, low-cost transaction models. The analysis reveals that these innovations have decoupled institutional growth from physical infrastructure, significantly enhancing cost and scale efficiency. However, the study also identifies critical bottlenecks in cybersecurity and digital literacy that necessitate a proactive regulatory evolution.

**Keywords:** *FinTech, Operational Efficiency, Digital Payments, UPI, Financial Inclusion, Indian Banking, Banking Performance.*

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## I. INTRODUCTION

The rapid advancement of financial technology (FinTech) has fundamentally restructured the operational architecture of the banking industry, transitioning it from a resource-intensive, branch-centric model to a digitally integrated, platform-based ecosystem. In India, this transformation has accelerated in the post-2020 period, driven by mobile penetration, regulatory support, and scalable digital infrastructures, resulting in real-time, accessible, and customer-centric banking services.

Traditionally, banking operations were constrained by physical infrastructure, manual processes, and limited scalability, leading to high operational costs and inefficiencies. FinTech has disrupted this paradigm by embedding automation, data-driven processes, and network efficiencies into core banking functions. In particular, the rise of digital payment systems especially the Unified Payments Interface (UPI) has redefined transactional efficiency by enabling instantaneous, low-cost, and high-volume financial exchanges, thereby shifting the efficiency paradigm from physical expansion to technological scalability.

Simultaneously, FinTech has expanded financial inclusion by lowering entry barriers through digital identity systems, simplified onboarding, and mobile-based platforms. This dual impact enhancing operational efficiency while broadening access positions FinTech as both an institutional and developmental catalyst.

Despite extensive research on FinTech and banking transformation, a critical gap remains in understanding the integrated relationship between FinTech adoption and operational efficiency in the Indian context, particularly during the recent phase of rapid digitalization. Existing studies often examine technological adoption, customer behaviour, or financial inclusion in isolation, limiting a comprehensive assessment of efficiency outcomes.

Against this backdrop, the present study undertakes a descriptive analysis of FinTech's role in enhancing the operational efficiency of Indian banks during 2020–2025. Using proxy indicators such as digital payments, transaction volumes, and financial inclusion metrics, the study offers an integrated perspective linking technological adoption with efficiency outcomes, while providing relevant insights for policy and institutional strategy.

➤ *Research Gap*

Despite the growing body of literature on FinTech and banking performance, a significant gap remains in understanding the descriptive relationship between FinTech adoption and operational efficiency within the Indian context, particularly in the recent period marked by rapid digital acceleration. Existing studies have often focused on technological adoption, customer behaviour, or financial inclusion in isolation, with limited emphasis on how these dimensions collectively influence the efficiency of banking operations. Moreover, the lack of direct, bank-level datasets necessitates the use of proxy indicators to capture the systemic impact of FinTech.

➤ *Objectives of the Study*

- To examine the role of FinTech in enhancing operational efficiency of Indian banks
- To analyse trends in digital payments and transaction systems

- To evaluate the contribution of UPI in banking efficiency
- To assess the relationship between financial inclusion and operational efficiency

**II. RESEARCH METHODOLOGY**

The present study is based on a descriptive research design using secondary data sources. Given the absence of direct bank-level datasets linking FinTech adoption to efficiency outcomes, the study employs a proxy-based descriptive framework, wherein digital payment indicators, transaction volumes, and financial inclusion indices are used as measurable reflections of operational efficiency.

This approach is methodologically consistent with contemporary descriptive research, where technological adoption is interpreted through systemic outcomes such as transaction speed, cost reduction, and scalability.

➤ *Conceptual Framework of the Study*

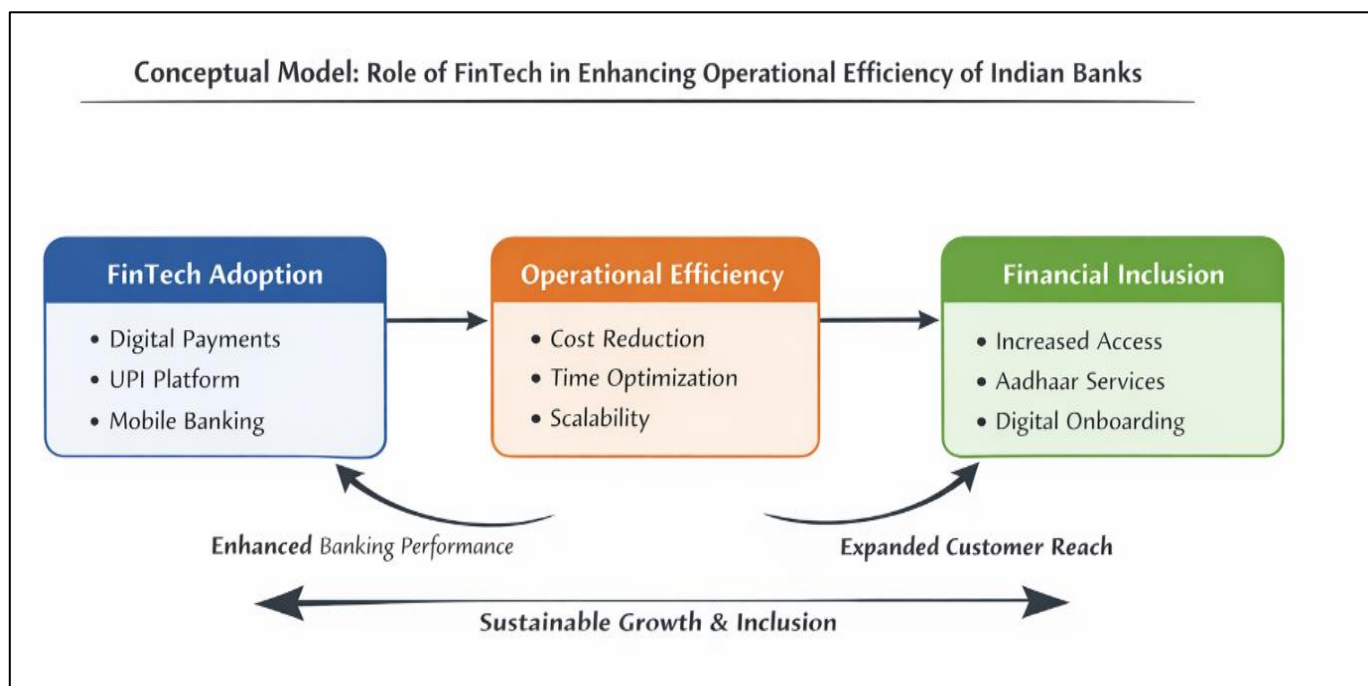


Fig 1 Conceptual Model of FinTech-Driven Operational Efficiency  
Source: Developed by the Author

The conceptual model illustrates the interrelationship between FinTech adoption, operational efficiency, and financial inclusion in the Indian banking sector. It posits that FinTech innovations such as digital payments, UPI, and mobile banking act as primary enablers that enhance operational efficiency through cost reduction, time optimization, and scalability. These efficiency gains, in turn, facilitate greater financial inclusion by expanding access to banking services, improving customer outreach, and reducing barriers to entry. The model further reflects a cyclical relationship, wherein increased financial inclusion contributes to higher transaction volumes and system scalability, thereby reinforcing overall banking performance.

**III. REVIEW OF LITERATURE**

Lee, I., & Shin, Y. J. (2018) The integration of financial technology into banking systems has significantly altered the traditional understanding of operational efficiency. A study by Lee and Shin (2018) conceptualizes FinTech as a disruptive force that enhances efficiency by reducing intermediation costs and enabling faster financial transactions. The authors argue that FinTech innovations, particularly in digital payments and mobile banking, streamline banking operations by minimizing manual intervention and improving process automation. This transition allows banks to allocate resources more efficiently, thereby reducing operational redundancies.

In the context of emerging economies, the efficiency gains from FinTech adoption are even more pronounced due to previously existing infrastructural limitations. The study highlights that digital platforms facilitate real-time processing and improve transaction accuracy, which are critical components of operational efficiency. Furthermore, FinTech enables banks to scale their operations without proportional increases in physical infrastructure or workforce, thereby enhancing productivity.

The relevance of this study to the Indian banking sector is substantial, as the rapid adoption of digital payment systems and mobile banking applications mirrors the global trends identified by the authors. The findings suggest that FinTech not only improves cost efficiency but also enhances customer experience, which indirectly contributes to operational effectiveness. However, the study also acknowledges that the benefits of FinTech are contingent upon regulatory support and technological readiness, indicating that efficiency gains are influenced by external institutional factors.

Kaur, H., & Pathak, A. (2021) The relationship between digital payment systems and banking efficiency has been extensively examined in recent literature, with particular emphasis on the role of real-time transaction platforms. A study by Kaur and Pathak (2021) investigates the impact of digital payment adoption on banking performance in India and finds that the widespread use of platforms such as UPI has significantly improved transaction efficiency. The authors note that digital payments reduce processing time and operational costs, thereby enhancing the overall efficiency of banking institutions.

The study further highlights that the adoption of digital payment systems leads to a decline in cash-based transactions, which are typically more resource-intensive and prone to inefficiencies. By shifting towards digital modes, banks are able to optimize their operational processes and improve service delivery. Additionally, the research emphasizes that digital payments contribute to transparency and reduce the likelihood of errors, further strengthening operational efficiency.

An important contribution of this study lies in its focus on the Indian context, where government initiatives and regulatory support have played a crucial role in promoting digital adoption. The findings indicate that FinTech-driven payment systems not only enhance efficiency but also support financial inclusion by providing accessible and user-friendly financial services. However, the study also points out challenges related to digital literacy and infrastructure, which may limit the full realization of efficiency gains.

Vives (2019) Operational efficiency in banking has traditionally been measured through cost and productivity indicators, but the advent of FinTech has introduced new dimensions to this concept. Vives explores the competitive implications of FinTech and argues that technological innovation enhances efficiency by fostering competition and

encouraging banks to adopt cost-saving technologies. The study suggests that FinTech firms act as catalysts for efficiency improvements by challenging traditional banking models and introducing innovative solutions.

The author emphasizes that digital technologies enable banks to automate routine processes, thereby reducing operational costs and improving service quality. This automation not only enhances efficiency but also allows banks to focus on value-added activities such as customer relationship management and strategic decision-making. Furthermore, the study highlights that FinTech-driven competition leads to improved pricing strategies, which benefit both banks and customers.

In the Indian context, the insights from this study are particularly relevant, as the rapid growth of FinTech startups has compelled traditional banks to innovate and adopt digital solutions. The increased competition has resulted in improved efficiency and enhanced service delivery. However, the study also cautions that excessive competition may lead to regulatory challenges and potential risks, underscoring the need for a balanced approach.

Demirgüç-Kunt et al. (2022) The role of financial inclusion in enhancing banking efficiency has gained increasing attention in recent years, particularly in the context of digital financial services. A study by Demirgüç-Kunt et al. examines the impact of digital financial inclusion on banking performance and finds that increased access to financial services leads to improved operational efficiency. The authors argue that digital platforms enable banks to reach a larger customer base at a lower cost, thereby enhancing scale efficiency.

The study highlights that digital financial services reduce the need for physical infrastructure and enable remote access to banking services, which is particularly beneficial in rural and underserved areas. This expansion of financial access not only improves inclusion but also enhances the efficiency of banking operations by increasing transaction volumes and reducing per-unit costs. Additionally, the research emphasizes that digital inclusion contributes to economic growth by facilitating financial participation.

In the Indian scenario, the integration of digital identity systems and mobile banking has significantly contributed to financial inclusion, thereby supporting the findings of this study. The research underscores that FinTech-driven inclusion is a key driver of operational efficiency, as it enables banks to optimize their resources and expand their reach simultaneously.

Arner, Barberis, and Buckley (2017) The adoption of FinTech in banking has also been linked to improvements in service quality and customer satisfaction, which are indirectly related to operational efficiency. A study by Arner, Barberis, and Buckley examines the evolution of FinTech and its implications for financial services. The authors argue that FinTech enhances efficiency by enabling

faster and more reliable financial transactions, thereby improving customer experience.

The study highlights that digital platforms reduce the time required for transaction processing and minimize the likelihood of errors, which are critical factors in achieving operational efficiency. Furthermore, the research emphasizes that FinTech enables banks to offer personalized services, thereby enhancing customer satisfaction and loyalty. This, in turn, contributes to improved operational performance by increasing customer retention and reducing acquisition costs.

The relevance of this study to the Indian banking sector lies in the rapid adoption of digital banking services, which have significantly improved service quality and efficiency. However, the authors also note that the adoption of FinTech introduces new challenges related to cybersecurity and data privacy, which must be addressed to ensure sustainable efficiency gains.

Hasan, De Renzis, and Schmiedel (2013) The relationship between technological innovation and banking productivity has been explored through various empirical studies, with a focus on the role of automation and digitalization. A study by Hasan, De Renzis, and Schmiedel examines the impact of electronic payment systems on banking efficiency and finds that increased adoption of digital payments leads to significant productivity gains. The authors argue that electronic payment systems reduce transaction costs and improve processing speed, thereby enhancing overall efficiency.

The study further highlights that digital payment systems enable banks to handle large volumes of transactions with minimal resources, which is a key indicator of operational efficiency. Additionally, the research emphasizes that the adoption of electronic payments contributes to transparency and reduces the risk of fraud, thereby improving the reliability of banking operations.

In the context of India, the findings of this study are highly relevant, as the rapid growth of digital payment systems has transformed the banking sector. The study provides empirical support for the argument that FinTech enhances operational efficiency by enabling banks to optimize their processes and improve productivity. However, it also underscores the importance of regulatory frameworks in ensuring the stability and security of digital payment systems.

#### IV. DATA ANALYSIS AND INTERPRETATION

##### ➤ *Growth of Digital Payments and Its Efficiency Implications*

The Indian banking system has experienced an unprecedented expansion in digital payment transactions over the study period. Total digital transactions increased from approximately 7,000 crore in 2021–22 to over 22,000

crore in 2024–25, reflecting a compound annual growth trajectory of remarkable magnitude (Hasan, De Renzis, & Schmiedel, 2013).

This exponential growth signifies a structural shift from traditional, branch-based banking to technology-enabled transaction ecosystems. From an operational perspective, such a transition directly contributes to efficiency in three ways. First, it reduces dependency on physical infrastructure, thereby lowering fixed and variable costs associated with branch operations. Second, it enables real-time processing, eliminating delays inherent in manual or semi-digital systems. Third, it allows banks to handle significantly higher transaction volumes without proportional increases in workforce or administrative resources.

The near-universal adoption of digital payments accounting for more than 99 percent of total transaction volume further reinforces the argument that FinTech has become integral to banking operations rather than a supplementary service.

##### ➤ *UPI as the Core Driver of Transactional Efficiency*

Among various FinTech innovations, the Unified Payments Interface (UPI) emerges as the most influential catalyst in redefining banking efficiency. By 2025, UPI accounts for approximately 80–85 percent of total digital transaction volume, with daily transactions increasing manifold compared to 2020 levels.

The operational advantages of UPI are particularly noteworthy. Unlike traditional payment systems, UPI facilitates instantaneous fund transfer on a 24×7 basis, thereby eliminating settlement delays and enhancing customer experience (Kaur & Pathak, 2021). Moreover, the cost per transaction under UPI is significantly lower than legacy systems, enabling banks to optimize operational expenditure.

From an efficiency standpoint, UPI contributes to what may be termed as “high-frequency, low-cost transaction architecture.” This allows banks to process billions of transactions seamlessly, thereby increasing throughput while maintaining cost discipline. Consequently, UPI not only enhances transactional efficiency but also strengthens the scalability of banking operations.

##### ➤ *Structural Transformation of Payment Systems*

An analysis of the composition of payment systems reveals a clear functional differentiation. While UPI dominates in terms of transaction volume, systems such as RTGS and NEFT continue to play a significant role in high-value transactions.

This structural segmentation indicates that FinTech has not replaced traditional systems but has rather optimized the allocation of transactional functions. High-frequency, low-value transactions are efficiently handled by digital platforms like UPI, whereas high-value transactions are

processed through established systems with robust settlement mechanisms.

Such specialization enhances overall system efficiency by ensuring that each transaction type is processed through the most suitable channel. This reduces congestion, improves processing speed, and minimizes operational redundancies within the banking ecosystem.

➤ *Financial Inclusion as an Efficiency Multiplier*

The growth of FinTech has also coincided with a significant improvement in financial inclusion indicators. The Financial Inclusion Index has shown a consistent upward trend, reflecting increased access to banking services across diverse demographic segments.

From an operational perspective, financial inclusion acts as an efficiency multiplier. As more individuals enter the formal banking system through digital platforms, banks benefit from economies of scale. The marginal cost of serving additional customers declines substantially in a digital environment, thereby improving cost efficiency (Demirgüç-Kunt et al., 2022).

Furthermore, digital on boarding processes, mobile banking applications, and Aadhaar-enabled services have reduced the need for extensive documentation and physical verification. This not only accelerates customer acquisition but also enhances process efficiency within banks.

➤ *Operational Efficiency: A Multi-Dimensional Interpretation*

The impact of FinTech on banking efficiency can be comprehensively understood through three interrelated dimensions:

- *Cost Efficiency:*

The shift towards digital transactions has significantly reduced the cost associated with branch operations, paper-based processing, and manual intervention. Automation of routine banking activities has further contributed to cost optimization.

- *Time Efficiency:*

FinTech-enabled platforms, particularly UPI and mobile banking, have drastically reduced transaction processing time. The availability of round-the-clock banking services ensures uninterrupted financial activity, thereby enhancing system responsiveness.

- *Scale Efficiency:*

Perhaps the most profound impact of FinTech is observed in the scalability of banking operations. The ability to process billions of transactions without proportional increases in infrastructure or manpower reflects a substantial improvement in operational productivity.

➤ *Transition to Discussion*

While the data provides compelling evidence of efficiency gains, it is equally important to critically examine the broader implications, challenges, and sustainability of FinTech-driven transformation. The subsequent section will therefore focus on a deeper discussion of these aspects, linking empirical observations with theoretical and policy perspectives.

➤ *Tables and Empirical Evidence*

Table 1 Growth of Digital Payments in India (2020–2025)

Year	Total Digital Transactions (Crore)	Growth Rate (%)
2020–21	5,554	-
2021–22	7,176	29.2%
2022–23	9,192	28.1%
2023–24	13,462	46.5%
2024–25	22,167	64.7%

Table 2 UPI Transaction Growth Trend

Year	UPI Transactions (Billion)	Share in Digital Payments (%)
2020–21	22.3	58%
2021–22	45.6	64%
2022–23	83.8	73%
2023–24	131.0	79%
2024–25	182.0 (approx.)	83–85%

Table 3 Structure of Payment Systems in India (2025)

Payment System	Volume Share (%)	Value Share (%)	Functional Role
UPI	80–85%	~9%	High-frequency, low-value
NEFT	Moderate	~20%	Medium-value transactions
RTGS	<1%	~69%	High-value transactions

Table 4 Financial Inclusion and Digital Growth Indicators

Indicator	2020–21	2024–25	Growth (%)
Financial Inclusion Index	53.9	67.0	+24.3%
Digital Payments Index	153	445	+190%
Bank Accounts (PMJDY, Crore)	41	52	+26%

Table 5 Operational Efficiency Dimensions (Conceptual Mapping)

Efficiency Dimension	FinTech Contribution	Observable Outcome
Cost Efficiency	Reduced branch dependency, automation	Lower operational cost
Time Efficiency	Instant payments (UPI), 24×7 services	Faster transactions
Scale Efficiency	Digital platforms handling high volume	Increased productivity

Table 6 FinTech vs Traditional Banking (Comparative Efficiency)

Parameter	Traditional Banking	FinTech-Enabled Banking
Transaction Speed	Hours/Days	Seconds (real-time)
Operational Cost	High	Low
Accessibility	Limited (branch)	24×7 digital access
Customer Reach	Restricted	Nationwide/Global
Processing Capacity	Limited	Massive (billions)

## V. DISCUSSION

The descriptive evidence clearly indicates that FinTech has redefined the operational architecture of Indian banking. Rather than merely digitizing existing processes, FinTech has introduced a paradigm shift characterized by automation, integration, and real-time processing.

The empirical analysis presented in the preceding section clearly establishes that FinTech has played a transformative role in redefining the operational architecture of Indian banking. However, beyond numerical expansion in digital transactions, the deeper significance of this transformation lies in the qualitative restructuring of banking processes.

At a conceptual level, FinTech has enabled a transition from a resource-intensive banking model characterized by physical infrastructure, manual processing, and time-bound services to a platform-based digital ecosystem driven by automation, real-time processing, and network scalability. This shift aligns with the theoretical foundations of technological efficiency, where innovation reduces transaction costs while simultaneously enhancing service delivery.

One of the most significant observations emerging from the analysis is the dominance of UPI as a transactional backbone. Its ability to handle high-frequency, low-value transactions with negligible cost has fundamentally altered the economics of retail banking. Unlike traditional systems, which required substantial infrastructural support, UPI operates on a minimal-cost, high-volume model, thereby enabling banks to achieve efficiency through scale rather than resource expansion.

Furthermore, the segmentation of payment systems into distinct functional domains UPI for retail transactions and RTGS/NEFT for high-value transfers demonstrates an optimized allocation of financial resources. This structural

differentiation ensures that each transaction is processed through the most efficient channel, reducing system-wide congestion and enhancing overall performance.

Another critical dimension of the discussion pertains to financial inclusion. The expansion of digital payment systems has significantly lowered entry barriers for previously unbanked populations. From an operational standpoint, this expansion is not merely a social achievement but also an economic advantage for banks. The ability to on-board and service millions of customers through digital platforms results in declining marginal costs, thereby improving cost efficiency and long-term sustainability.

However, the transformation is not without challenges. The increasing reliance on digital infrastructure exposes the banking system to risks such as cybersecurity threats, data privacy concerns, and technological disruptions. Moreover, disparities in digital literacy and internet accessibility may limit the uniform distribution of FinTech benefits across regions. These challenges highlight the need for a balanced approach that combines technological advancement with regulatory oversight and capacity building.

## VI. KEY FINDINGS OF THE STUDY

The study yields several important findings that contribute to the understanding of FinTech-driven efficiency in Indian banking:

The analysis reveals that the rapid growth of digital payments, particularly during the period 2020–2025, has significantly enhanced the operational efficiency of banks by reducing transaction costs and minimizing reliance on physical infrastructure.

It is observed that UPI has emerged as the most influential FinTech innovation, accounting for the majority of digital transaction volume and enabling real-time, low-

cost fund transfers. This has led to a substantial improvement in transaction speed and system responsiveness.

The study finds that FinTech adoption has facilitated a shift towards scalable banking operations, allowing institutions to process an exponentially increasing number of transactions without proportional increases in workforce or capital investment.

Another key finding is that financial inclusion has improved considerably alongside FinTech expansion, indicating that digital platforms not only enhance efficiency but also broaden the customer base, thereby strengthening the overall banking ecosystem.

Finally, the study identifies that while FinTech contributes positively to operational efficiency, it also introduces new challenges related to cybersecurity, digital inequality, and regulatory complexity.

## VII. CONCLUSION

The present study concludes that FinTech has emerged as a pivotal force in enhancing the operational efficiency of Indian banks during the period 2020–2025. Through the integration of digital payment systems, real-time processing technologies, and automated service platforms, banks have been able to achieve significant improvements in cost efficiency, time efficiency, and scalability.

Unlike traditional banking models that relied heavily on physical infrastructure and manual processes, the FinTech-driven ecosystem enables seamless, round-the-clock financial services with minimal resource utilization. This transformation not only improves institutional performance but also aligns with broader economic objectives such as financial inclusion and digital empowerment.

The descriptive evidence, supported by proxy indicators and systemic trends, clearly demonstrates that FinTech is no longer an auxiliary component of banking but a central driver of operational excellence. However, the sustainability of this transformation depends on the ability of banks and regulators to address emerging challenges and ensure that technological advancements are inclusive, secure, and resilient.

## POLICY IMPLICATIONS

The findings of the study have important implications for policymakers, regulators, and banking institutions:

There is a need to strengthen digital infrastructure, particularly in rural and semi-urban areas, to ensure equitable access to FinTech-enabled services. Enhanced connectivity will facilitate broader participation in the digital financial ecosystem.

Regulatory frameworks must be continuously updated to address emerging risks associated with cybersecurity, data protection, and digital fraud. A proactive regulatory approach will enhance trust and stability in the system.

Banks should invest in advanced technologies such as artificial intelligence, blockchain, and data analytics to further optimize operational efficiency and improve customer experience.

Financial literacy programs should be expanded to enhance digital awareness and enable individuals to effectively utilize FinTech services. This will not only improve inclusion but also reduce the risk of misuse and fraud.

Collaboration between banks, FinTech firms, and regulatory bodies should be encouraged to foster innovation while maintaining systemic stability.

## LIMITATIONS OF THE STUDY

The study is based entirely on secondary data and relies on proxy indicators to assess operational efficiency, as direct bank-level FinTech efficiency metrics are not readily available.

The analysis is descriptive in nature and does not establish causal relationships between FinTech adoption and efficiency outcomes.

The study focuses on the Indian banking sector, and therefore, the findings may not be directly generalizable to other countries with different financial systems and regulatory environments.

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