

Digital Financial Inclusion in India: The Role of UPI, FinTech and Mobile Banking

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Abstract

Digital financial inclusion has emerged as an important component of India's strategy for promoting inclusive economic growth, improving access to financial services and reducing dependence on cash transactions. The expansion of the Unified Payments Interface (UPI), financial technology (FinTech), mobile banking, Aadhaar-enabled services and digital banking infrastructure has transformed the delivery of financial services to households, small businesses and underserved communities. This study examines the role of UPI, FinTech and mobile banking in promoting digital financial inclusion in India, with particular emphasis on accessibility, affordability, transaction convenience and the participation of low-income households and micro, small and medium enterprises (MSMEs). The study adopts a descriptive and empirical research approach based on secondary data from the Reserve Bank of India (RBI), the National Payments Corporation of India (NPCI), the Department of Financial Services and other institutional publications available by June 2025. The analysis considers trends in digital payments, the development of mobile-based financial services, and the opportunities and challenges associated with digital financial inclusion. The RBI's Financial Inclusion Index reached 64.2 in March 2024, recording year-on-year growth of 6.8 per cent. This indicates progress in the availability, usage and quality of financial services. The study finds that digital payment infrastructure can reduce transaction barriers, facilitate small-value payments and improve access to formal financial services. However, digital illiteracy, unreliable connectivity, cyber fraud, privacy concerns and unequal access to smartphones continue to constrain inclusive participation. The article recommends strengthening digital financial literacy, consumer protection, cybersecurity, regional-language interfaces and accessible banking services.

Keywords: *Digital financial inclusion; UPI; FinTech; mobile banking; digital payments; financial literacy; inclusive growth; India.*

Introduction

Financial inclusion refers to the availability and effective use of affordable financial products and services by individuals and businesses, particularly those traditionally excluded from formal financial institutions. These services include savings accounts, payments, credit, insurance, pensions and remittance facilities. In a developing economy such as India, financial inclusion is closely associated with poverty reduction, household financial security, entrepreneurship and balanced regional development. Traditional banking systems have expanded substantially, but geographical distance, documentation requirements, transaction costs and limited financial awareness have historically restricted access for certain sections of the population.

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Digital technology has created new opportunities to address these barriers. Mobile phones, internet banking, digital payment platforms and interoperable payment systems allow customers to undertake financial transactions without visiting a bank branch for every transaction.

India's digital financial ecosystem has developed through several complementary initiatives:

- Jan Dhan accounts: Expansion of access to formal banking.
- Aadhaar-enabled services: Digital identity and authentication infrastructure.
- UPI: Instant bank-to-bank payments through interoperable applications.
- Mobile banking: Access to account information, transfers and other banking services through mobile devices.
- FinTech platforms: Technology-enabled payments, lending, savings and financial management.
- Digital financial literacy: Helping users understand financial products, transaction procedures and fraud prevention.

The RBI's Annual Report 2024–25, released on 29 May 2025, documents continuing efforts to deepen financial inclusion, expand digital payment access and improve financial literacy.

Nevertheless, access to a bank account does not automatically guarantee meaningful financial inclusion. Effective inclusion requires that individuals can use financial services safely, regularly and affordably. Therefore, the relationship between digital infrastructure and actual financial participation deserves systematic examination.

Statement of the Problem

Despite substantial growth in digital banking and payments, the benefits of digital financial services are not necessarily distributed equally. Rural households, elderly people, low-income workers, small traders and individuals with limited digital literacy may face difficulties in accessing or using digital financial services.

The central research problem is to understand whether the expansion of UPI, FinTech and mobile banking is contributing to broader financial participation and what barriers continue to prevent disadvantaged groups from benefiting fully.

The study therefore examines digital financial inclusion not only as an increase in transaction volumes but also as a question of accessibility, affordability, reliability, consumer protection and effective use.

Review of Literature

Demirgüç-Kunt et al. (2022)

The Global Findex Database 2021 published by the World Bank examines account ownership, digital payments, savings and financial resilience across countries. It documents the expansion of formal account ownership and the growing importance of digital payments, while highlighting continuing differences in financial access and usage. The report provides an international framework for analysing the relationship between digital payments and financial inclusion.

Beck, Demirgüç-Kunt and Levine (2007)

Beck, Demirgüç-Kunt and Levine examine financial inclusion through the accessibility of banking services and the barriers faced by households and firms. Their research provides a foundation for understanding how institutional arrangements, costs and access restrictions influence participation in formal finance.

Ozili (2018)

Ozili analyses the implications of digital finance for financial inclusion and financial stability. The study discusses the potential of digital financial services to reduce transaction costs and extend financial access, while recognising risks associated with consumer protection, technological dependence and financial-system vulnerabilities.

Sahay et al. (2020)

The International Monetary Fund's research on digital financial inclusion explores how digital technologies can expand access to financial services. It also discusses the importance of regulatory frameworks, digital infrastructure, competition and financial literacy in ensuring that technological progress produces inclusive outcomes.

The RBI's Annual Report 2024–25 provides institutional evidence on India's financial inclusion initiatives. The report records a Financial Inclusion Index of 64.2 for March 2024, up 6.8 per cent year on year, and describes measures involving digital payments, financial literacy and access to banking services.

Research gap

Existing research discusses digital payments, banking access and financial technology from several perspectives. However, an integrated assessment of UPI, FinTech and mobile banking is useful because these systems perform complementary functions.

UPI facilitates payments, mobile banking provides access to bank accounts and associated services, and FinTech firms introduce additional digital financial products. This article brings these dimensions together and examines their implications for inclusive finance in India, while distinguishing transaction growth from evidence of improved household welfare.

Objectives of the Study

The principal objectives are:

1. To examine the growth of digital financial inclusion in India.
2. To analyse the role of UPI in expanding digital payment access.
3. To study the contribution of FinTech and mobile banking to financial inclusion.
4. To examine the benefits of digital financial services for rural households, small businesses and underserved communities.
5. To identify the major barriers to effective digital financial inclusion.
6. To suggest policy measures for improving accessibility, security and the inclusive use of digital financial services.

Research Methodology**Research design**

The study follows a descriptive and analytical research design based on secondary data. It combines quantitative indicators of digital payments and financial inclusion with a qualitative assessment of technological, institutional and socioeconomic barriers.

Sources of data

The study uses information from the following sources:

- Reserve Bank of India, Annual Report 2024–25.
- National Payments Corporation of India, UPI product statistics.

- Department of Financial Services, Ministry of Finance.
- World Bank, Global Findex Database 2021.
- Published academic research on digital finance and financial inclusion.

Period of study

The analysis focuses on developments up to June 2025. The principal statistical reference periods are 2017–18 to 2023–24 for aggregate digital payments, March 2022 to March 2024 for the RBI Financial Inclusion Index, and October 2019 to December 2024 for monthly UPI transaction growth.

Analytical tools

The following methods are used:

- Percentage growth and comparative analysis.
- Tabular presentation of secondary data.
- Bar and column diagrams.
- Descriptive interpretation of institutional indicators.

No primary household survey or econometric estimation is undertaken. Consequently, the study identifies patterns and plausible mechanisms but does not claim to establish that digital payments alone caused improvements in household income, poverty or welfare.

Conceptual Framework

Digital financial inclusion can be understood as a process in which digital infrastructure enables access to financial services, which in turn may improve financial participation and economic opportunities.

1. **Digital Infrastructure** - Bank accounts, smartphones, connectivity and digital identity
2. **Digital Financial Channels** - UPI, mobile banking, internet banking and FinTech platforms
3. **Financial Participation** - Payments, savings, remittances, credit and insurance
4. **Potential Development Outcomes** - Lower transaction barriers, business opportunities and improved financial resilience

Empirical Analysis and Interpretation

Growth of digital payments in India

Digital payments have expanded considerably in India, supported by payment infrastructure, mobile connectivity, banking access and the adoption of digital transaction methods.

The Department of Financial Services reports that the number of digital payment transactions increased from 2,071 crore in 2017–18 to 18,737 crore in 2023–24. Their reported value increased from ₹1,962 lakh crore to ₹3,659 lakh crore over the same period.

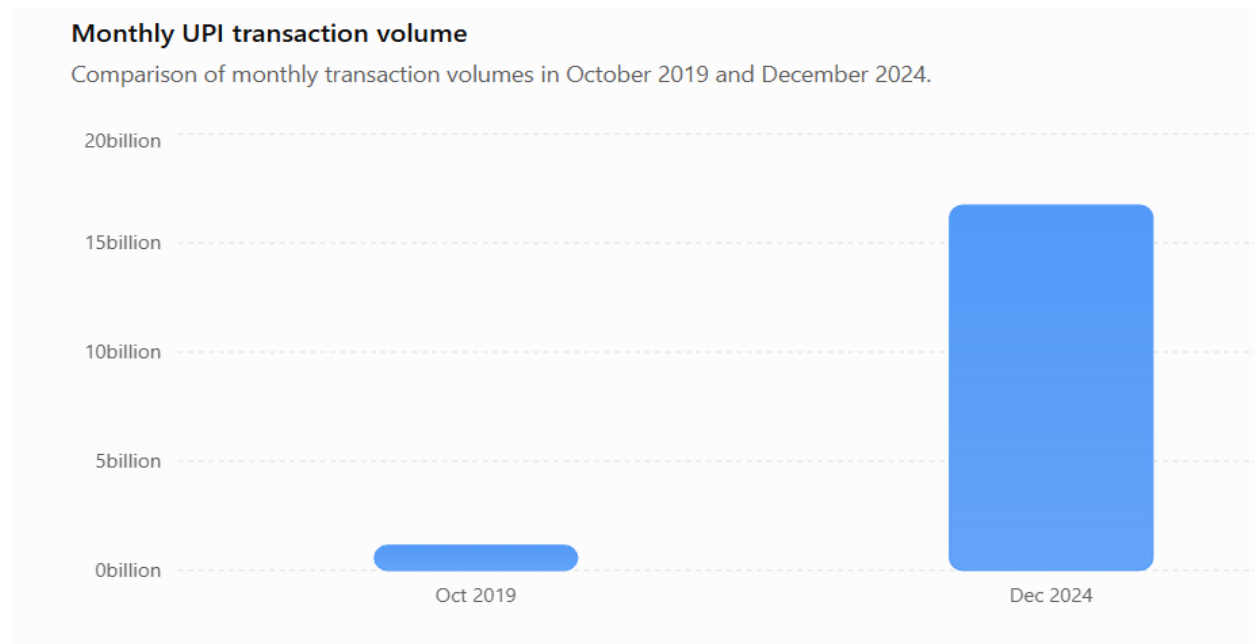
Table 1. Growth of digital payments in India

Indicator	FY 2017–18	FY 2023–24
Transaction volume (crore)	2,071	18,737
Transaction value (₹ lakh crore)	1,962	3,659
Change in volume, relative to FY 2017–18 —		Approximately 805%
Change in value, relative to FY 2017–18 —		Approximately 86.5%

The data indicate that digital transaction volume expanded much faster than aggregate transaction value. This is consistent with the increasing use of digital payments for routine, relatively small transactions, although the aggregate figures alone cannot establish changes in the average transaction size or identify which user groups account for the increase.

Figure 1. Aggregate digital payment transactions

Transaction volume (crore), FY 2017–18 and FY 2023–24



Source: Department of Financial Services, Annual Report 2024–25. Author's presentation.

Growth of UPI

The Unified Payments Interface, developed by NPCI, allows users to transfer money between participating bank accounts through supported payment applications. It facilitates person-to-person (P2P) transfers and person-to-merchant (P2M) payments.

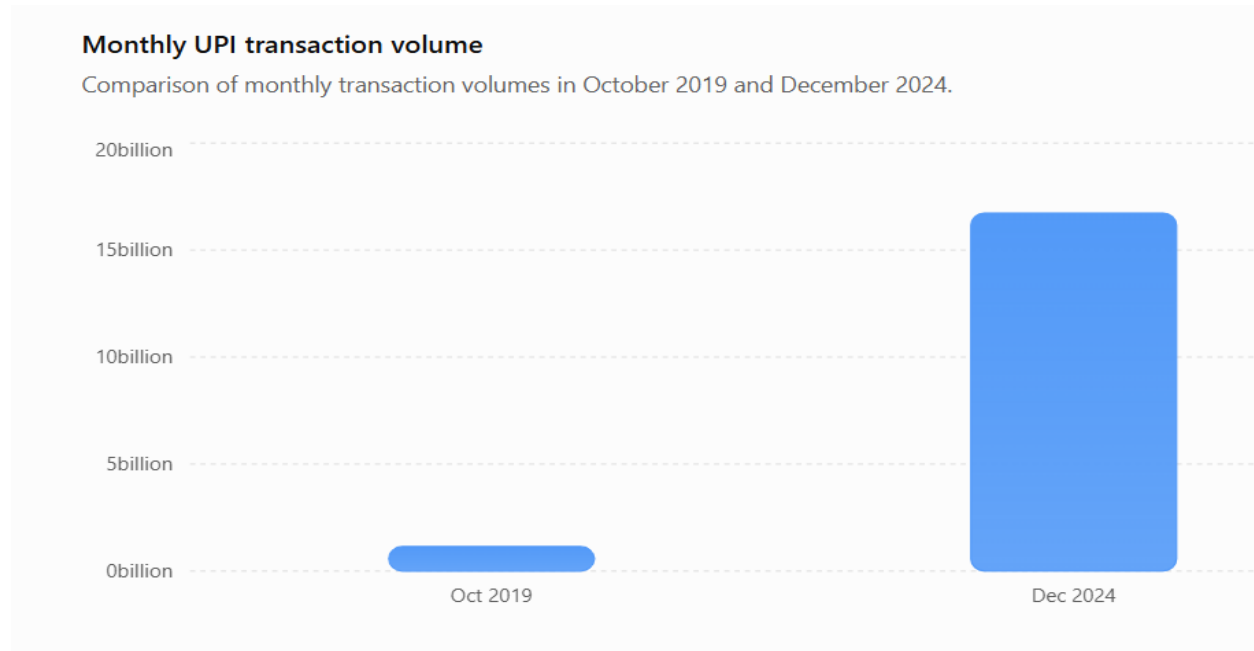
The Department of Financial Services reports that monthly UPI transactions increased from 1.14 billion in October 2019 to 16.73 billion in December 2024.

Table 2. Selected indicators of UPI expansion

Month	UPI transactions (billion)
October 2019	1.14
December 2024	16.73
Absolute increase (billion)	15.59
Multiple of October 2019 volume	Approximately 14.7 times
Percentage increase	Approximately 1,367.5%

Figure 2. Increase in monthly UPI transactions

Transactions in billions



Source: Department of Financial Services, Annual Report 2024–25.

The increase reflects the growing use of UPI for everyday transactions, including retail purchases, bill payments and transfers between individuals. UPI's interoperability allows customers of different participating banks to transact using compatible applications.

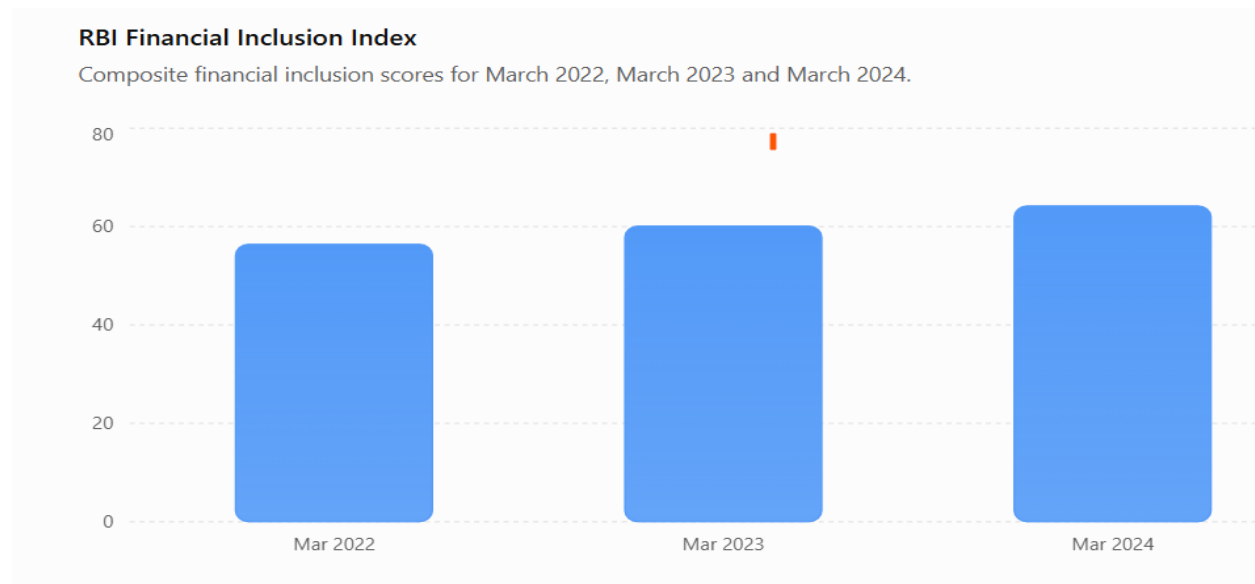
However, transaction volume is not equivalent to the number of unique users. A single individual or business may initiate numerous transactions. Therefore, UPI volume should be interpreted as an indicator of payment-system usage rather than a direct measure of the number of financially included people.

Financial Inclusion Index

The RBI's Financial Inclusion Index (FI-Index) provides a composite measure of financial inclusion across three dimensions: access, usage and quality of financial services. The index is scaled from 0 to 100.

Table 3. RBI Financial Inclusion Index

Reference period FI-Index	
March 2022	56.4
March 2023	60.1
March 2024	64.2

Figure 3. Financial Inclusion Index, India

Source: RBI

The index increased by 7.8 points between March 2022 and March 2024. This indicates improvement in the composite measure of financial inclusion. Nevertheless, the index incorporates several dimensions of finance and should not be interpreted as an outcome attributable exclusively to UPI or mobile banking.

Interpretation of the empirical evidence

The indicators provide three important observations.

First, aggregate digital payment activity has increased substantially. This establishes the growing importance of digital channels in India's payment system.

Second, UPI's monthly transaction volume has expanded considerably since 2019. Its role in low-value and routine transactions makes it relevant to the financial activities of households and small merchants.

Third, the RBI Financial Inclusion Index has improved over the period examined. This is consistent with broader progress in financial access and usage, but it does not by itself establish a causal relationship between digital payment adoption and financial inclusion.

Taken together, the evidence supports the view that digital payment infrastructure is an important component of India's financial inclusion process. More detailed household-level research is needed to measure its distributional effects.

Role of UPI in Digital Financial Inclusion

UPI has changed the way individuals and businesses transfer money and make payments. Its contribution to financial inclusion can be examined through the following dimensions.

- ❖ **Low-cost and convenient transactions:** UPI enables instant account-to-account transfers without requiring customers to visit bank branches for routine payments. This reduces the time and effort associated with many everyday transactions.
- ❖ **Inclusion of small merchants:** Street vendors, small retailers, self-employed workers and local service providers can receive digital payments through supported applications and merchant payment facilities.

Digital transaction records may also help businesses maintain accounts and document cash flows. However, receiving digital payments does not automatically provide access to credit. Lending decisions continue to depend on eligibility, repayment capacity, lender policies and applicable regulations.

- ❖ **Person-to-person transfers:** UPI supports transfers between family members, workers and other individuals. This can facilitate remittances and household financial management, including transfers to relatives in rural areas.
- ❖ **Government and utility payments:** Digital payment infrastructure can simplify the payment of bills, fees and other obligations. When integrated with appropriate government systems, it can also complement the delivery of public services and benefit transfers.
- ❖ **Limitations:** UPI use depends on factors such as access to an appropriate device or payment channel, bank-account availability, user authentication, connectivity and the ability to identify fraudulent requests. Digital payments should therefore complement, rather than completely replace, accessible cash and assisted banking options.

Role of FinTech in Financial Inclusion

Financial technology, commonly known as FinTech, refers to the use of digital technologies to provide or improve financial services. FinTech includes payment applications, digital lending platforms, technology-enabled insurance, personal finance tools and digital investment services.

- ❖ **Digital payments:** FinTech applications offer convenient interfaces through which customers can initiate payments, view transactions and manage recurring expenses.
- ❖ **Digital credit:** Technology-enabled lending can simplify application procedures and support faster assessment of borrowers. Digital transaction histories may provide additional information about business activity, but they should not be treated as a substitute for responsible credit assessment. Automated credit decisions also create risks involving data quality, privacy, algorithmic bias and inappropriate lending. Effective oversight and transparent loan terms are essential.
- ❖ **Savings, insurance and investment:** FinTech platforms can improve the discoverability and accessibility of savings, insurance and investment products. However, digital availability alone does not ensure that products are affordable, suitable or understood by customers.
- ❖ **Opportunities for MSMEs:** Micro and small enterprises can use digital payments, online accounting and technology-enabled financial services to improve record-keeping and manage business transactions. These facilities may support formalisation, but the resulting benefits depend on business size, digital skills, costs and the availability of suitable financial products.
- ❖ **Consumer protection:** FinTech growth must be accompanied by effective safeguards concerning customer consent, data collection, cybersecurity, complaint resolution and responsible lending. Consumers should be able to identify the regulated institution responsible for a financial product and understand its charges and risks.

Role of Mobile Banking

Mobile banking allows customers to access selected banking services through mobile applications and, where supported, other mobile-based channels. It is broader than UPI because it may include account balances, transaction histories, fund transfers, deposits, loan repayments and service requests.

Mobile banking can support financial inclusion in the following ways:

- Convenience: Customers can access services without making frequent branch visits.
- Time savings: Routine banking activities can be completed remotely.
- Financial management: Digital statements and transaction histories can help users track spending.

- Rural access: Mobile channels can complement bank branches, business correspondents and assisted service centres.
- Financial awareness: Notifications and digital records may help customers monitor account activity.

Yet mobile banking is not equally accessible to everyone. Limited smartphone ownership, low digital literacy, language barriers, disability-related accessibility issues and unreliable internet connectivity can restrict adoption.

In areas with weak connectivity or among customers using basic phones, assisted banking and suitable non-smartphone payment options remain relevant.

Benefits of Digital Financial Inclusion

- ❖ Lower transaction barriers: Digital channels can reduce travel, waiting time and the effort involved in making routine payments, particularly for people who live far from bank branches.
- ❖ Support for small businesses: Digital receipts and transaction records may assist bookkeeping and help businesses document sales and payments.
- ❖ Greater participation in formal finance: When combined with suitable products and consumer safeguards, digital channels can help customers use formal payment, savings and other financial services.
- ❖ Improved financial management: Account histories and digital records may help households and firms monitor their cash flows and organise expenses.

These are potential benefits rather than outcomes guaranteed for every user. Their actual extent depends on the reliability, affordability and suitability of the services provided.

Major Challenges to Digital Financial Inclusion

- ❖ **Digital illiteracy:** Some users lack the skills required to install applications, authenticate transactions, recognise fraudulent messages or resolve failed payments. Financial literacy programmes need to include practical digital skills.
- ❖ **Cyber fraud and online scams:** Phishing, impersonation, fraudulent payment requests, malicious applications and social-engineering attacks can cause financial losses. Users need clear information about secure transactions, while financial institutions need effective monitoring and grievance mechanisms.
- ❖ **Digital divide:** Differences in device ownership, internet access, electricity availability and digital skills can create unequal opportunities across rural and urban locations and among income groups.
- ❖ **Gender-related barriers:** Women may face constraints involving personal access to mobile phones, control over household finances, time, mobility and digital skills. Access to a bank account alone does not necessarily provide independent control over financial resources.
- ❖ **Privacy and data security:** Digital financial services may involve the collection and processing of sensitive personal and transactional information. Inadequate consent, excessive data collection or insecure systems can undermine consumer trust.
- ❖ **Connectivity and transaction failures:** Poor connectivity, technical outages, authentication difficulties and delayed reversals can create uncertainty and additional costs for customers. Effective complaint handling and timely resolution of failed transactions are therefore important.
- ❖ **Unequal access to formal credit:** A high volume of digital payments does not necessarily mean that households or small businesses can obtain affordable credit. Borrowers may remain excluded because of limited income, insufficient documentation, lack of credit history or lender-specific eligibility requirements.

Major Findings of the Study

The principal findings emerging from the secondary-data analysis are as follows.

1. Expansion of digital payments: Aggregate digital payment volume rose from 2,071 crore transactions in FY 2017–18 to 18,737 crore in FY 2023–24.
2. Rapid growth of UPI: Monthly UPI transaction volume increased from 1.14 billion in October 2019 to 16.73 billion in December 2024. This indicates the increasing importance of UPI in India's retail payment ecosystem.
3. Improvement in the financial inclusion indicator: The RBI FI-Index reached 64.2 in March 2024, representing annual growth of 6.8 per cent.
4. Complementary roles of technology: UPI, FinTech and mobile banking provide different but interconnected services. Payment infrastructure, access to bank accounts and suitable financial products must work together to support meaningful inclusion.
5. Potential benefits for small businesses: Digital payments and transaction records can assist small merchants with collections and bookkeeping, although access to credit or increased profits cannot be assumed from payment adoption alone.
6. Continuing digital exclusion: Digital literacy, connectivity, device access and language barriers can prevent some individuals from using available services.
7. Consumer protection remains essential: Fraud prevention, privacy safeguards, transparent charges and accessible grievance redressal are necessary to maintain confidence in digital financial services.
8. Need for broader evaluation: Payment volumes and composite financial inclusion indicators demonstrate system-level changes but cannot, on their own, establish the causal impact of digital finance on poverty, income or household welfare.

Suggestions and Policy Recommendations

1. **Strengthen digital financial literacy:** Banks, colleges, local governments and financial education institutions should conduct practical training on UPI, mobile banking, PIN security, fraud recognition, safe payment practices and grievance redressal. Programmes should use regional languages and include demonstrations rather than relying only on written instructions.
2. **Improve rural digital infrastructure:** Continued investment in reliable internet connectivity, telecommunications and supporting infrastructure can improve the usability of digital financial services in underserved areas.
3. **Promote inclusive and accessible design:** Payment and banking applications should provide clear instructions, regional-language interfaces, accessible features for persons with disabilities and simplified processes for first-time users.
4. **Strengthen cybersecurity and consumer protection:** Financial institutions and relevant authorities should improve fraud detection, customer alerts, secure authentication, complaint tracking and timely resolution of unauthorised transactions. Customers should receive clear information on the procedures for reporting fraud and disputing transactions.
5. **Support women and vulnerable groups:** Financial literacy initiatives should reach women, elderly people, low-income households, persons with disabilities and communities with limited digital access. Where appropriate, assisted digital banking can help users learn to transact independently while protecting their credentials and privacy.
6. **Encourage responsible FinTech development:** Regulation and supervision should promote transparency, responsible lending, secure handling of personal data and clear disclosure of fees. Digital credit providers should ensure that borrowers understand repayment obligations and the total cost of borrowing.

7. **Improve access for MSMEs:** Small businesses should receive training in digital bookkeeping, payment reconciliation and fraud prevention. Suitable financial products may be developed to address the working-capital needs of viable micro and small enterprises.
8. **Retain assisted and alternative service channels:** Digital financial inclusion should not require every customer to use a smartphone independently. Business correspondents, bank branches, accessible customer support and suitable alternative payment channels remain important for people who face technological or accessibility barriers.
9. **Measure meaningful inclusion:** Policy evaluation should go beyond transaction volume. Relevant indicators include active account usage, unique users, failed transactions, the cost of payments, fraud incidence, access to formal savings and credit, and differences across gender, income and geographical groups.
10. **Strengthen institutional coordination:** The RBI, NPCI, commercial banks, FinTech providers, telecommunications operators and government agencies should coordinate efforts to improve service reliability, financial literacy and access to complaint-resolution mechanisms.

Scope for Further Research

Future empirical research could use household surveys or district-level data to examine differences in digital financial inclusion across rural and urban areas, income groups and gender categories. A study focused on Telangana could investigate UPI adoption among small merchants, self-help groups, agricultural households and rural consumers. Such research could collect primary data on digital literacy, frequency of use, transaction failures, fraud awareness and access to formal credit. More advanced studies could employ regression analysis or other suitable statistical methods to examine whether digital payment adoption is associated with improved financial access after accounting for income, education, internet connectivity and other relevant characteristics. Causal claims would require an appropriate identification strategy and sufficiently reliable data.

Conclusion

Digital financial inclusion has become an important dimension of India's financial and economic development. The expansion of UPI, FinTech and mobile banking has changed the delivery of payment services and created additional opportunities for households, small businesses and individuals who face barriers to conventional banking. The empirical evidence presented in this study demonstrates substantial growth in aggregate digital payment transactions, an increase in monthly UPI transaction volume and improvement in the RBI's Financial Inclusion Index. These developments indicate the increasing importance of digital infrastructure in India's financial system. However, they should not be interpreted as conclusive proof that digital technology alone has reduced poverty, increased household incomes or eliminated financial exclusion. UPI facilitates convenient digital payments, mobile banking extends access to account-based services, and FinTech introduces additional technology-enabled financial products. Their combined contribution to financial inclusion depends on affordability, reliability, digital literacy, appropriate regulation and effective consumer protection. The study concludes that India's next stage of digital financial inclusion should focus not only on increasing transaction volumes but also on ensuring that financial services are accessible, secure and useful to disadvantaged communities. Strengthening digital financial literacy, improving rural connectivity, protecting customer data, addressing gender-related barriers and supporting responsible FinTech development are essential policy priorities. Ultimately, digital financial inclusion should be assessed by whether individuals and businesses can access and use appropriate financial services safely and effectively. A coordinated approach involving the government, RBI, banks, NPCI, FinTech providers and educational institutions can help ensure that digital financial development contributes to more inclusive and sustainable economic growth.

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