International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

Assessing The Impact of Upi on Financial Inclusion in India: Evidence from Digital Payment Trends (2016 – 2024)

Aaminah Firdos
Assistant Professor, Department of Commerce
BMS College of Commerce and Management
aaminah@bmsccm.ac.in

ABSTRACT

India's financial landscape has undergone a paradigm shift since the introduction of the Unified Payments Interface (UPI) in 2016 by the National Payments Corporation of India (NPCI). Despite decades of banking expansion initiatives, financial account ownership in India stood at only 53% in 2014, leaving a substantial proportion of the population outside the formal financial system. This study examines the role of UPI-driven digital payments in advancing financial inclusion, with particular focus on rural populations, low-income households, and micro-enterprises.

Employing a descriptive and analytical approach, the study draws on secondary data from NPCI transaction reports, Reserve Bank of India publications, the World Bank Global Findex Database (2014–2021), and peer-reviewed literature. The analysis traces UPI's growth from 17.9 million transactions in FY 2016-17 to over 131 billion by FY 2023-24, examining geographic expansion, adoption patterns, and their relationship with financial inclusion indicators.

The findings reveal substantial UPI penetration beyond metropolitan centres into semi-urban and rural areas, alongside an improvement in financial account ownership from 53% (2014) to 78% (2021). The study acknowledges the concurrent influence of PMJDY, Aadhaar, and the JAM framework on these outcomes. However, persistent barriers — including digital literacy deficits, limited smartphone and internet access, rising cybersecurity risks, and gender-related digital disparities — continue to constrain inclusive digital finance. The study recommends targeted digital literacy programmes, accelerated rural digital infrastructure, robust consumer protection frameworks, and gender-inclusive FinTech solutions as prerequisites for deepening sustainable financial inclusion in India.

Keywords: UPI, Financial Inclusion, Digital Payments, FinTech, Digital Finance.

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

1. INTRODUCTION

India's experience with financial inclusion has never been straightforward. Successive governments launched ambitious initiatives over several decades — from bank nationalisation, to Regional Rural Banks, to the Pradhan Mantri Jan Dhan Yojana (PMJDY) in 2014 — yet the World Bank's Global Findex survey that year recorded financial account ownership at only 53% among Indian adults (World Bank, 2014). For a country of India's scale and developmental ambitions, this figure reflected a structural gap that conventional banking had consistently failed to close.

The launch of UPI by the National Payments Corporation of India (NPCI) in April 2016 marked a decisive shift. Unlike earlier digital banking channels that required internet banking credentials and complex interfaces, UPI offered a real-time, interoperable payment system with no charge to individual users, operable through any smartphone. Built on the broader policy architecture of the JAM Trinity — Jan Dhan accounts, Aadhaar-based identity, and Mobile connectivity — UPI held the promise of extending financial services to the margins of the economy in ways that brick-and-mortar banking could not.

Whether that promise has translated into meaningful inclusion for the most excluded populations is the central question this paper examines. Transaction volumes alone do not tell us whether rural households, daily wage earners, and informal workers have genuinely benefited. Using secondary data from multiple institutional sources, this paper traces what UPI has delivered on financial inclusion, where it has been most effective, and where important gaps remain.

2. OBJECTIVES OF THE STUDY

(1) To trace UPI adoption in India from its inception in 2016 through FY 2023-24.

(2) To examine the relationship between UPI's growth and measurable changes in financial inclusion indicators.

(3) To identify structural and socioeconomic barriers that continue to limit UPI's inclusive reach.

(4) To propose evidence-grounded policy recommendations for deepening financial inclusion through digital payments.

3. REVIEW OF LITERATURE

3.1 Financial Inclusion: A Concept with Many Layers

Financial inclusion refers, at its broadest, to ensuring that individuals and businesses — regardless of income, location, or social background — have meaningful access to financial services: safe savings, fund transfers, credit, and insurance. The World Bank (2021) treats an adult as financially included if he or she holds an

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

account at a bank or other regulated financial institution or uses a mobile money service. This is a useful starting point, but most researchers agree that account ownership is only the first step.

Sarma (2008) proposed an Index of Financial Inclusion that goes beyond counting accounts, combining three dimensions — banking penetration, availability of banking services, and actual usage — a multidimensional approach especially relevant to India. The PMJDY programme opened hundreds of millions of accounts from 2014 onward, yet a significant share remained dormant, with zero balances and little or no transaction activity. Cámara and Tuesta (2014) reinforce this point through a multidimensional index built on access, usage, and barriers, showing that genuine inclusion requires active engagement with financial services, not merely nominal access.

3.2 Digital Finance and Inclusion: Evidence from Around the World

Research on digital finance and financial inclusion has produced broadly encouraging findings. Ozili (2018), writing in the *Borsa Istanbul Review*, argues that digital finance can extend formal financial services to poor and underserved populations at low cost, while cautioning that its benefits depend on supporting regulation and infrastructure. The Kenyan M-Pesa experience — which extended financial access to millions of previously unbanked rural households — is widely cited as evidence that well-designed technology can achieve what decades of branch-led policy could not.

Demir et al. (2022) add a distributional dimension: using quantile regression on a large cross-country panel, they show that FinTech reduces income inequality, with financial inclusion acting as a key channel for this effect. Sahay et al. (2015) of the IMF show that greater financial inclusion is associated with higher economic growth, although the gains diminish at very high levels of inclusion and must be balanced against financial-stability risks. Morgan and Pontines (2018) find that a higher share of lending to small and medium enterprises supports financial stability, chiefly by lowering non-performing loans — a finding relevant to India's large informal and micro-enterprise sector.

3.3 India's Path: From Jan Dhan to UPI

India's financial inclusion strategy has been built around the JAM Trinity — Jan Dhan accounts for banking access, Aadhaar for biometric identity verification, and Mobile connectivity as the delivery channel — a framework first set out in the Economic Survey 2014-15 (Ministry of Finance, 2015). PMJDY opened accounts at scale; Aadhaar reduced the cost and documentation burden of customer verification; and expanding mobile networks provided the infrastructure through which digital services could travel. Gabor and Brooks (2017) caution, however, that such digital-inclusion architectures also expand data-driven surveillance and commercial interests, a reminder that inclusion outcomes should be assessed rather than assumed.

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

UPI provided the payment layer that gave this architecture practical utility. Before UPI, a Jan Dhan account holder in a rural district had limited ways to use that account in everyday life without visiting a physical branch. UPI's interoperable, open-architecture design permitted third-party consumer applications such as PhonePe and Google Pay to build on NPCI's payment infrastructure, which drove competitive innovation and mass adoption (NPCI, 2024). The demonetisation of November 2016 gave many users a first, often involuntary, experience of digital payments; however, Ghosh and Hom Chaudhury (2022) find that education and income became even stronger determinants of digital finance use after demonetisation, suggesting that the shock alone did not close the digital divide.

4. RESEARCH METHODOLOGY

This study is descriptive and analytical in nature and relies on secondary data. NPCI publishes annual and monthly UPI transaction statistics; the RBI provides system-level payment data, fraud statistics, and regulatory context; the World Bank Global Findex Database offers three comparable rounds of financial inclusion data for India (2014, 2017, and 2021); TRAI publishes telecom penetration statistics; and the National Statistical Office (NSO) provides household-level data on digital skills. Together, these institutional sources provide sufficient depth to identify trends and patterns without primary data collection.

Data on UPI transaction volumes and values from FY 2016-17 to FY 2023-24 were compiled and examined for growth patterns and phase characteristics. Financial inclusion indicators — principally account ownership, account inactivity, and the share of adults making or receiving digital payments — were drawn from the Findex surveys and analysed against UPI's expansion timeline. PMJDY progress reports were used to place UPI within the broader policy framework (Ministry of Finance, 2024). Growth rates are reported as compound annual growth rates (CAGR) computed over the seven annual intervals between FY 2016-17 and FY 2023-24.

A critical methodological limitation must be acknowledged: several policy interventions — PMJDY, Aadhaar, direct benefit transfers, the JAM framework, and UPI itself — operated simultaneously throughout the study period, and the COVID-19 pandemic intervened in 2020-21. Isolating UPI's independent contribution to changes in financial inclusion using secondary data alone is not possible. The study therefore identifies temporal associations and qualitative relationships rather than causal effects, and this limitation is carried through the interpretation of findings.

5. ANALYSIS AND DISCUSSION

5.1 Eight Years of Extraordinary Growth

In FY 2016-17, UPI's first full operational year, the platform processed around 17.9 million transactions worth approximately Rs. 6,947 crore (about Rs. 69.5 billion) — modest numbers reflecting a platform that was new

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

and not yet integrated into the consumer applications that would later drive mass adoption. By FY 2023-24, volumes had grown to over 131 billion transactions valued at nearly Rs. 200 lakh crore (NPCI, 2024). This corresponds to a compound annual growth rate in transaction volume of approximately 257 per cent over the seven years — an expansion with few parallels among real-time payment systems worldwide. According to ACI Worldwide (2024), India recorded 129.3 billion real-time transactions in calendar year 2023, about 49 per cent of the global total and more than the next ten largest real-time payment markets combined.

Table 1: Growth of UPI, FY 2016-17 to FY 2023-24

Indicator	FY 2016-17	FY 2023-24
Transaction volume	≈ 17.9 million	≈ 131 billion
Transaction value	≈ Rs. 6,947 crores	≈ Rs. 199.9 lakh crore
CAGR of volume (7 years)	—	≈ 257%

Source: NPCI (2024), UPI product statistics; CAGR is computed .

Three phases characterise this trajectory. Between 2016 and 2018, adoption was largely urban and was accelerated by the demonetisation shock. Between 2019 and 2020, consumer applications achieved significant scale and merchant QR-code acceptance created a network effect. From 2020-21 onward, the COVID-19 pandemic made contactless payment a necessity rather than a preference, and the launch of UPI123Pay by the RBI in March 2022 extended the platform to feature-phone users without requiring internet access — a potential audience of more than 40 crore (400 million) feature-phone subscribers previously outside the mainstream UPI ecosystem (RBI, 2022).

5.2 Moving Beyond the Metros: Geographic Spread

Early adoption was concentrated in large metropolitan centres such as Mumbai, Delhi, Bengaluru, Hyderabad, and Chennai. Industry and media reports since 2019 point to a meaningful shift, with UPI use spreading into tier-2 and tier-3 towns and into states historically characterised by low banking penetration and cash-dependent economies, such as Uttar Pradesh, Bihar, Odisha, and Rajasthan. The rapid fall in the share of government transfers, wages, and domestic remittances received in cash between 2014 and 2021 (World Bank, 2021) is consistent with this broadening of digital payment use beyond the metros.

In rural finance, the change is tangible. Microfinance borrowers and self-help groups increasingly make repayments and deposits digitally rather than through cash collected by field agents. Each digital transaction adds to a borrower's financial footprint, creating a record where none existed before. This represents inclusion deepening, not merely expanding.

5.3 Financial Inclusion Indicators

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

The World Bank Global Findex Database provides the most reliable longitudinal view of India's progress (Table 2). Account ownership among Indian adults rose sharply from 53 per cent in 2014 to 80 per cent in 2017, and stood at 78 per cent in 2021 — statistically little changed (World Bank, 2017; World Bank, 2021). In other words, the large gains in account ownership occurred in the 2014–17 window dominated by PMJDY, before UPI reached scale. The story of 2017–2021, the period covering the bulk of UPI's growth, is one of usage rather than access: the share of adults who made or received a digital payment rose from 22 per cent in 2014 to 29 per cent in 2017 and 35 per cent in 2021, while the share of account owners with inactive accounts fell from 38 per cent in 2017 to 35 per cent in 2021.

Table 2: Selected Financial Inclusion Indicators for India (Global Findex)

Indicator (% of adults aged 15+)	2014	2017	2021
Account ownership	53	80	78
Made or received a digital payment	22	29	35
Inactive accounts (% of account owners)	—	38	35

Source: World Bank Global Findex Database (2014, 2017, 2021). Inactive accounts are those with no deposit, withdrawal or digital payment in the past 12 months.

These figures require careful interpretation. Much of the increase in account ownership reflects PMJDY rather than UPI, and many newly opened accounts were initially dormant. What UPI appears to have contributed is activation: by giving Jan Dhan account holders practical everyday uses — receiving wages, paying merchants, sending remittances — it created genuine demand for financial engagement rather than just nominal account ownership. Yet the scale of the remaining challenge is clear: India's 35 per cent account-inactivity rate in 2021 was the highest among the economies surveyed, and inactivity was markedly higher among women (about 42 per cent) than men (about 30 per cent) (World Bank, 2021).

UPI's most underappreciated contribution may be its credit-enabling function. Traditional lenders assess credit risk through formal financial records — income statements, loan histories, asset documentation — which rarely exist for a daily wage worker or small informal trader. UPI transaction histories are increasingly used by FinTech lenders and some banks as alternative inputs into credit assessment, making a first formal loan possible on the basis of a consistent digital payment record. This extends financial inclusion into a dimension that account-opening statistics do not capture, although systematic evidence on its scale is still limited.

5.4 Barriers That Remain

Against this progress, several structural barriers have proved stubborn. Digital skills remain uneven: the NSS 78th Round Multiple Indicator Survey (2020-21) found that only about one-third of young people in rural areas could perform a basic task such as copying and pasting within a document, compared with around three-fifths in urban areas (NSO, 2023). First-generation digital users — often unfamiliar with phishing, fake QR

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

codes, and social-engineering scams — are the most exposed as digital payment fraud rises. According to the RBI, frauds reported by banks in the card, internet and digital payments category rose from 6,699 cases involving Rs. 277 crore in 2022-23 to 29,082 cases involving Rs. 1,457 crore in 2023-24 (RBI, 2024). Each fraud incident in a rural community can deter a much wider circle from adopting digital payments.

Rural connectivity remains a constraint. TRAI data show rural tele-density of about 59 per cent at the end of March 2024, against more than 133 per cent in urban areas (TRAI, 2024). UPI123Pay addresses this partially for feature phones, but most of the ecosystem's functionality requires a smartphone and stable mobile data. Finally, the gender digital divide is significant: GSMA (2023) reports that women in India were about 40 per cent less likely than men to use mobile internet in 2022. Although its subsequent report shows this gap narrowing to about 30 per cent in 2023 (GSMA, 2024), it remains among the widest of the countries surveyed, which means that UPI's benefits are reaching women at substantially lower rates — limiting gains along one of the dimensions where they would matter most.

6. KEY FINDINGS

The analysis yields the following key findings:

(1) UPI transaction volume grew from about 17.9 million in FY 2016-17 to over 131 billion in FY 2023-24 — a compound annual growth rate of approximately 257 per cent — making India the world's largest real-time payment market, with about 49 per cent of global real-time transactions in 2023.

(2) UPI use has progressively extended beyond the metros into tier-2, tier-3, semi-urban, and rural areas, accompanied by a sharp decline in the share of wages, government transfers, and remittances received in cash.

(3) Account ownership in India rose from 53 per cent (2014) to 80 per cent (2017) and was 78 per cent in 2021; the gains in access were driven mainly by PMJDY. UPI's contribution is more visible in usage — adults making or receiving digital payments rose from 22 per cent (2014) to 35 per cent (2021) — but cannot be isolated from PMJDY, Aadhaar, and other JAM-related interventions.

(4) UPI's most distinctive contribution to financial inclusion may be its credit-enabling function: generating digital transaction histories for previously credit-invisible individuals that can serve as alternative inputs into formal credit assessment.

(5) Persistent barriers — digital skill gaps, uneven rural connectivity, a sharp rise in digital payment fraud, high account inactivity, and the gender digital divide — continue to limit UPI's inclusive reach.

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

(6) Transaction volume growth is insufficient as a measure of inclusive success; active usage, account inactivity, fraud incidence, and the equity of geographic and gender access provide a more complete picture.

7. CONCLUSION AND POLICY RECOMMENDATIONS

India's UPI story is, by any fair assessment, a remarkable achievement. In less than a decade, the country has built the world's most actively used real-time payment system, and its geographic expansion is beginning to translate transactional scale into genuine financial engagement for populations that were long excluded. The evidence on digital payment usage, the decline of cash in wages and transfers, and the emerging credit-enabling function of UPI transaction histories all point in a broadly positive direction.

At the same time, an honest assessment recognises what remains unresolved. Account ownership has plateaued while a third of accounts remain inactive. Digital skills have not kept pace with adoption. Fraud is rising precisely as first-generation users enter the system. Rural connectivity, while improving, is still uneven. And the gender digital divide means that women — who often stand to gain the most from financial inclusion — remain underrepresented among active users. Infrastructure is necessary but not sufficient: building a world-class payment system is one achievement; ensuring that it genuinely serves all segments of society is another, ongoing task.

Based on the evidence reviewed in this study, five policy recommendations are proposed:

(a) **Digital Financial Literacy:** Structured, vernacular-language financial and digital literacy programmes should be delivered through Business Correspondent networks, Anganwadi centres, and self-help group structures, covering both how to use UPI and how to identify and respond to payment fraud.

(b) **Smartphone and Data Access:** Public-private partnership models, potentially supported through the Digital Bharat Nidhi (formerly the Universal Service Obligation Fund), should bring affordable smartphones and mobile data plans within reach of low-income households.

(c) **Rural Broadband as a Financial Inclusion Priority:** BharatNet rollout should be treated as a financial-services access priority, with coverage targets aligned to districts showing the weakest financial inclusion indicators.

(d) **Consumer Protection Against Fraud:** Regulatory frameworks for digital payment fraud liability, resolution timelines, and consumer redressal must be strengthened and made accessible, particularly for low-literacy first-time users.

(This work is licensed under a Creative Commons Attribution 4.0 International License.)

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

(e) **Gender-Inclusive FinTech Design:** UPI products, onboarding processes, and outreach should be co-designed with women users in mind, incorporating voice-based interfaces, simplified transaction flows, and delivery through existing women's self-help group networks.

Future research employing primary survey data in rural districts would allow more precise causal analysis of UPI's impact on household financial behaviour, credit access, and economic mobility — filling a gap that this secondary-data study, by design, could not fully address.

REFERENCES

[1] ACI Worldwide. (2024). *Prime Time for Real-Time 2024*. Omaha, NE: ACI Worldwide, in partnership with GlobalData.
[2] Cámara, N., & Tuesta, D. (2014). Measuring financial inclusion: A multidimensional index. *BBVA Research Working Paper*, No. 14/26. Madrid: BBVA Research.
[3] Demir, A., Pesqué-Cela, V., Altunbas, Y., & Murinde, V. (2022). Fintech, financial inclusion and income inequality: A quantile regression approach. *The European Journal of Finance, 28*(1), 86–107.
[4] Gabor, D., & Brooks, S. (2017). The digital revolution in financial inclusion: International development in the fintech era. *New Political Economy, 22*(4), 423–436.
[5] Ghosh, C., & Hom Chaudhury, R. (2022). Determinants of digital finance in India. *Innovation and Development, 12*(3), 343–362.
[6] GSMA. (2023). *The Mobile Gender Gap Report 2023*. London: GSMA.
[7] GSMA. (2024). *The Mobile Gender Gap Report 2024*. London: GSMA.
[8] Ministry of Finance, Government of India. (2015). *Economic Survey 2014-15* (Vol. I). New Delhi: Department of Economic Affairs.
[9] Ministry of Finance, Government of India. (2024). *Pradhan Mantri Jan Dhan Yojana: Progress report*. New Delhi: Department of Financial Services.
[10] Morgan, P. J., & Pontines, V. (2018). Financial stability and financial inclusion: The case of SME lending. *The Singapore Economic Review, 63*(1), 111–124.
[11] National Payments Corporation of India (NPCI). (2024). *UPI product statistics*. Retrieved from https://www.npci.org.in/what-we-do/upi/product-statistics
[12] National Statistical Office (NSO). (2023). *Multiple Indicator Survey in India, NSS 78th Round (2020-21)*. New Delhi: Ministry of Statistics and Programme Implementation.
[13] Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review, 18*(4), 329–340.
[14] Reserve Bank of India. (2022). *Reserve Bank of India launches (a) UPI for feature phones (UPI123Pay) and (b) 24x7 helpline for digital payments (DigiSaathi)* [Press release 2021-2022/1830, 8 March 2022]. Mumbai: RBI.
[15] Reserve Bank of India. (2024). *Annual Report 2023-24*. Mumbai: Reserve Bank of India.
[16] Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Mitra, S., Kyobe, A., Mooi, Y. N., & Yousefi, S. R. (2015). Financial inclusion: Can it meet multiple macroeconomic goals? *IMF Staff Discussion Note* SDN/15/17. Washington, DC: International Monetary Fund.
[17] Sarma, M. (2008). Index of financial inclusion. *ICRIER Working Paper* No. 215. New Delhi: Indian Council for Research on International Economic Relations.
[18] Telecom Regulatory Authority of India (TRAI). (2024). *The Indian telecom services yearly performance indicators 2023-24*. New Delhi: TRAI.
[19] World Bank. (2014). *The Global Findex Database 2014: Measuring financial inclusion around the world*. Washington, DC: World Bank.
[20] World Bank. (2017). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. Washington, DC: World Bank.
[21] World Bank. (2021). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. Washington, DC: World Bank.

(This work is licensed under a Creative Commons Attribution 4.0 International License.)