

Fintech and Financial Inclusion: A Statistical Study on Digital Banking

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Abstract: Banking services have been transformed by the rapid expansion of financial technology (Fintech) in India, especially through platforms like Aadhaar-enabled systems, mobile banking and UPI. The role of Fintech in advancing financial inclusion is investigated in this study. The study examines trends in digital transaction volumes, account ownership and financial usage patterns using secondary data from the World Bank and the National Payments Corporation of India (NPCI) among others.

The relationship between Fintech adoption and financial inclusion metrics including account penetration, under-developed area outreach and gender disparities is investigated using statistical and analytical methods. The results indicate that account ownership and digital transactions have significantly increased, which is indicative of the growing adoption of Fintech services in both urban and semi-urban areas. But there are still disparities in rural usage, which suggests that certain policy changes are required.

This study is significant as it highlights the way in which Fintech can be a source of growth and a bridge for underserved groups, particularly in the under-developed states in India where financial inclusion has been low for a long time. Through its engagement of digital adoption with trends of inclusion, the research offers policymakers, regulators and banks insights to develop more focused interventions. It also emphasises the need for transparency and for enhancing digital literacy and infrastructure so that the benefits of Fintech reach the most disadvantaged.

Keywords: Fintech, Financial Inclusion, Digital Banking

Introduction

Financial inclusion has now become a pillar of inclusive growth in the 21st century and it makes sure that everybody can have access to necessary financial services at an affordable and sustainable price. In India, this agenda has been taken forward by an unprecedented blend of policy interventions as well as technology-driven innovations. Government-directed programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY) built on this momentum by opening millions of bank accounts, thereby extending the coverage of the formal banking network ((Nimbrayan et al., 2018). These initiatives have been strengthened by the fast expansion of digital finance, particularly the Unified Payments Interface (UPI), which has revolutionized Indias' method of transacting as it offers low-cost, interoperable and real-time payment systems (Sahoo et al., 2024)

Across the globe, the role of digital finance in driving inclusion has been highly documented. The Global Findex Database (2025) points to mobile penetration and digital payments systems having provided opportunities for millions of people in low and middle - income economies to access savings, credit and remittance services. Yet, it also emphasizes the continuing challenges of digital literacy, infrastructure shortfalls and gender inequalities that limit the transformative potential of financial technologies (*The Global Findex Database 2025*). These concerns have been raised in Indian research as well, which observes that even with a 15-fold rise in digital payments between 2017-18 and 2024-25, there exists a digital divide among rural families and disadvantaged groups (Koley, 2025).

Parallely, Fintech innovation outside of payments including machine learning driven lending models and blockchain based welfare delivery is transforming credit distribution, transparency and trust in (Tantri, 2020; Singh et al., 2025). However, the increased rate of growth also poses new threats to instability, cybersecurity and uneven adoption among socio-economic segments (*Cevik, 2020*). This tension highlights the need to develop a multifaceted perspective on how financial technologies promote inclusion but also introduce new policy and operational challenges.

Against this background, this study examines the statistical link between Fintech-enabled digital banking adoption and financial inclusion in India, particularly for UPI, IMPS and PMJDY. Through the analysis of transaction values and account ownership patterns in rural and urban areas, the study aims to determine if the increase in digital banking results in greater financial inclusion. In the process, it adds to the global body of literature on digital

finance as well as to the country-specific literature on India's progress towards an inclusive and tech-enabled financial landscape.

Literature Review

Digital Finance and the Revolution of Inclusion in India

The past decade has witnessed a historic transformation in India's financial sector, spurred by government policies and Fintech platforms. Research points out that Pradhan Mantri Jan Dhan Yojana (PMJDY) has been the driving force of inclusion, with more than 31 crore accounts being opened in its first few years, mostly in rural India, thus alleviating poverty and bringing households into the formal financial system ((Nimbrayan et al., 2018)). Securing this, Aadhaar-based services and Direct Benefit Transfers (DBT) have entrenched access among newly banked individuals. Research emphasizes that while account ownership has expanded, challenges remain in terms of digital literacy, rural access and gender disparities (Koley, 2025)(Reserve Bank of India, 2019; *The Global Findex Database 2025*).

The expansion of digital payments has strengthened this transformation. The RBI's Digital Payment Index shows a 15 fold increase in transaction volumes between 2017-18 and 2024-25, largely driven by UPI and policy support (Koley, 2025). Research has established that the simplicity of UPI usage, interoperability and costless design have contributed to it being the most popular digital payment instrument, lowering consumption of cash and promoting a cashless economy (Sahoo et al., 2024). However, studies also point out ongoing challenges like the digital divide, poor rural infrastructure and insufficient digital confidence levels among some segments, which impede universal access to digital finance.

Fintech Innovations and Systemic Challenges

In addition to access, recent literature highlights how Fintech innovations are influencing credit, entrepreneurship and financial behaviour for everyday consumers. Lending models in India based on machine learning have showed the capability to increase loan approvals and lower default risk without intensifying discrimination, as long as fairness guarantees are used (Tantri, 2020). Comparative research indicates that adoption varies greatly between rural and urban consumers, with young people and educated segments indicating quicker uptake for mobile wallets and apps, while rural families are hindered by factors associated with literacy and infrastructure ((Bakhtiyorovna, 2023; Setiawan et al., 2025). In parallel, African mobile

money platforms and Chinese digital ecosystems provide data that Fintech can drive entrepreneurship and mobility, although local contexts heavily influence results (Chen, 2025; Oppong & Mathibe, 2025). New and emerging technologies are also discussed in the literature. Blockchain technology, for example, is considered as a means of building trust and efficiency in welfare delivery, especially in urban slums in India, although evidence on scalability and corruption reduction is still limited (Singh et al., 2025). Macro-level studies, however, note that the accelerated growth of Fintech can also create systemic risks like volatility, liquidity stress and cybersecurity threats and that effective regulatory supervision is therefore crucial ((Cevik, 2025; Ioannou et al., 2024)

Research Gap

The available literature has so far analysed the development of digital finance in India, most of it either concentrates on policy interventions such as PMJDY or on the growth of digital payment systems such as UPI separately. The correlation of financial inclusion schemes (PMJDY) with Fintech adoption (UPI/IMPS) establish how policy-driven account penetration is transmitted into greater digital transaction activity is missing in most studies. Additionally, most existing research highlights descriptive growth patterns but fails to empirically verify the relationship between account holding and online transaction volumes and neither indicates the rural-urban split of inclusion advantages using evidence from data.

Objectives of the Study

1. To examine trends in digital transactions (UPI and IMPS) in India.
2. To analyse the relationship between Fintech adoption and financial inclusion indicator (PMJDY account penetration)
3. To highlight the impact of financial inclusion scheme, PMJDY on urban and rural areas.

Research Methodology

The research uses a descriptive and analytical research design to explore the connection between adoption of digital payments and financial inclusion in India, specifically the contribution of the Unified Payment Interface (UPI). The study highlights rural-urban differences in adoption trends and their implications for inclusive financial expansion.

Data Collection

The study is grounded in secondary data, sourced from credible websites like published papers in research journals, government publications, NPCI data and PMJDY database.

Data Analysis

The research utilizes correlation analysis to analyse the connection between the number of PMJDY accounts/beneficiaries and the volume of UPI transactions. Trend analysis and descriptive statistics have further been utilized to determine the expansion of PMJDY accounts between rural and urban regions. Graphical depiction have been utilized to exhibit patterns and enhance interpretation.

Limitations

The research is based on the use of secondary data, which might limit a broader understanding. The analysis is also limited to rural-urban differences without addressing other socio-economic factors like gender or income group. In spite of these, the application of correlation analysis and the use of multiple secondary sources guarantee a coherent and evidence-backed awareness of the role played by digital payment in financial inclusion.

Findings and Interpretation

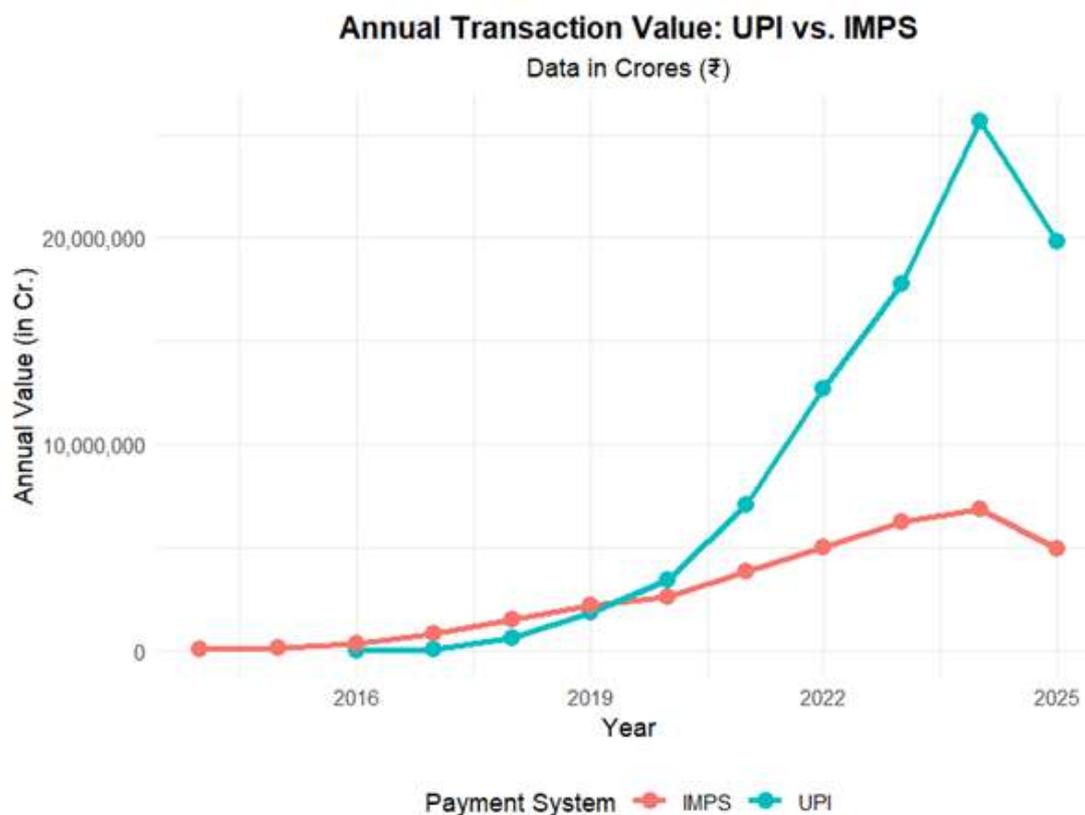


Figure 1: Growth of UPI and IMPS transaction values in India (2014-2025)

Source: Visualization generated by author via R-programming

The line graph plotting UPI and IMPS transaction amounts reveals a clear divergence in growth trends. IMPS, first introduced as an interbank payment system, showed gradual and modest growth year on year. UPI transactions, meanwhile, started at small levels in 2016 but have observed exponential growth from 2018-19 onwards. UPI transaction amounts caught up with those of IMPS by 2019, but the difference increased strongly in the following years.

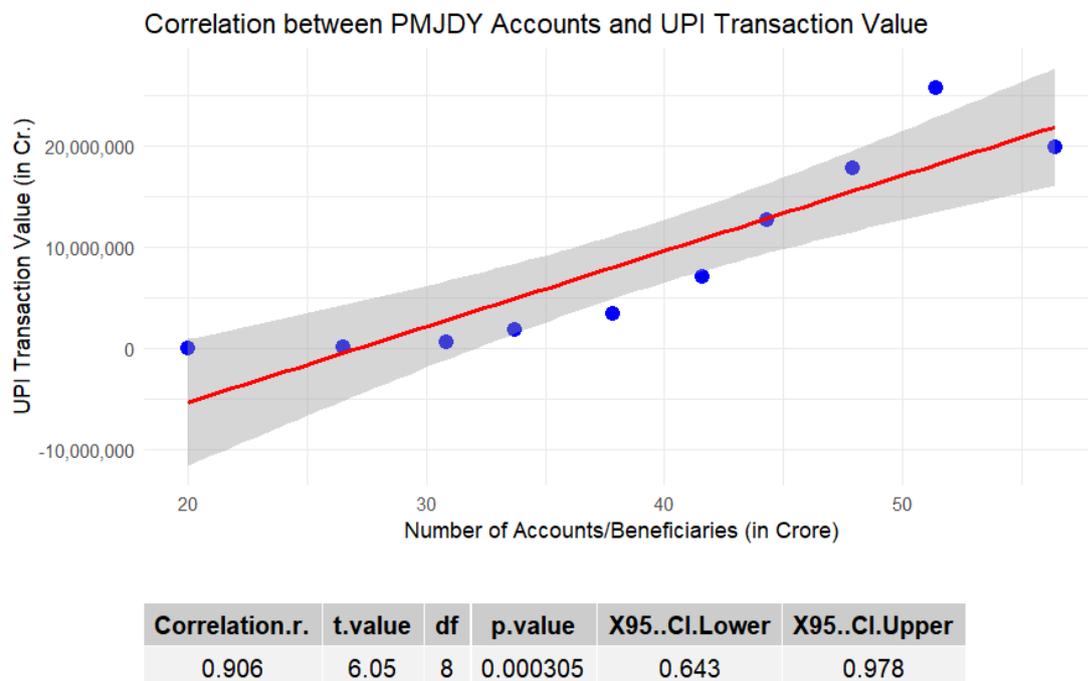
The results clearly indicate UPI's rapid adoption as the preferred digital payment mechanism. While IMPS continues to grow, its trajectory remains relatively stable, whereas UPI reflects sharp acceleration, with transaction values multiplying several times within a short span. This trend highlights UPI's success as a scalable and user-friendly Fintech platform.

Interpretation

The report highlights the revolutionary impact of UPI in transforming India's digital payment landscape. The rapid growth of UPI has been driven by the factors of interoperability of banks, absence of cost to customers for transactions, smartphone penetration and robust

policy initiatives. The IMPS, although secure, falls short of similar ease and flexibility for everyday low value transactions.

The supremacy of UPI over IMPS also shows a wider behavioural change: consumers increasingly prefer mobile-first, instant and low-cost payments. This lends confidence to the point that Fintech innovations are not merely supplementing but also phasing out conventional digital banking routes. Yet, the graph also shows the concentration of growth in some years, like during the COVID-19 outbreak, indicating that outside shocks can speed up technology adoption. From the financial inclusion point of view, the expansion of UPI indicates increasing access to digital financial services.



Figure

2: Relationship between PMJDY accounts and UPI transaction values

Source: Visualization generated by author via R-programming

The scatter plot with regression line shows the relationship between the number of Pradhan Mantri Jan Dhan Yojana (PMJDY) accounts/beneficiaries and the value of Unified Payments Interface (UPI) transaction. The blue data points indicate that as the number of accounts rises, UPI transaction values also increase substantially. This relationship is captured by the upward-sloping red regression line, with the surrounding grey band representing the 95% confidence interval. The fitted regression line suggests a strong positive relationship. With

every increase in the number of PMJDY accounts, the value of UPI transactions also increases uniformly.

The correlation coefficient, $r = 0.906$, indicates a highly positive correlation. The corresponding t-value (6.05) on $df = 8$ is statistically significant at $p < 0.001$, indicating the strength and reliability of the relationship. The 95% confidence interval for the correlation is between 0.643 and 0.978, which further indicates that the true correlation is highly positive and not likely by chance.

Interpretation

The findings confirm that the growth of PMJDY accounts, a flagship Indian financial inclusion program, is closely connected to the increase in UPI transaction values. This suggests that the increased base of banked individuals has been contributing directly to increased digital payment use. As formal banking services become available to more people through PMJDY, they increasingly engage in UPI enabled transactions, which indicates that financial inclusion policy complements Fintech development.

The strength of the correlation highlights UPI's role as a key driver of digital financial activity in newly banked populations. It suggests that the availability of basic bank accounts not only enables savings and transfers but also fosters participation in more advanced digital financial ecosystems. This aligns with India's policy goal of moving from mere financial access to meaningful financial inclusion, where technology is leveraged to deepen usage.

From a wider context, the discovery leans towards the policy-technology cooperative effect: whereas PMJDY widened account penetration, UPI offered an inexpensive, free and easy-to-use transaction mechanism. Together, they facilitated the move towards the cashless economy.

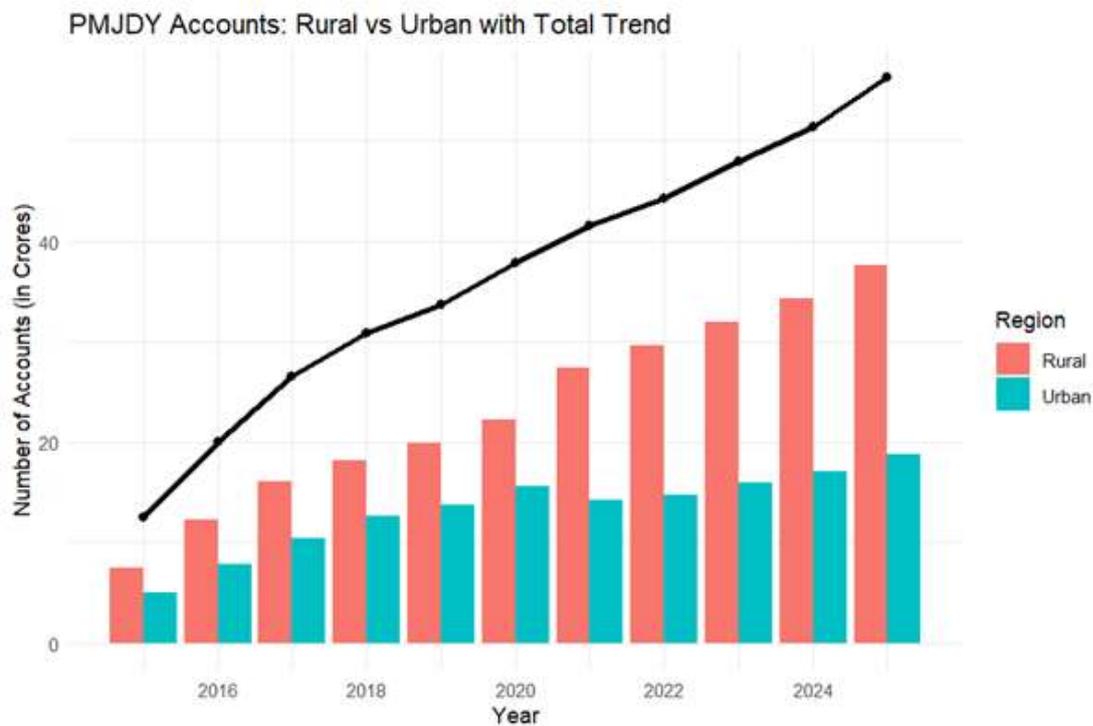


Figure 3: Rural and urban distribution of PMJDY accounts (2015–2025)

Source: Visualization generated via R-programming

The bar graph illustrates the comparison between the rural and urban distribution of PMJDY accounts during the period from 2015 to 2025 and also the general growth trend line. The number of accounts indicates a steady climb, increasing from roughly 12 crore in 2015 to almost 57 crore in 2025.

Broken down region-wise, rural accounts hold a greater proportion of PMJDY accounts over the period. The rural portion increased steadily from approximately 6 crore in 2015 to nearly 38 crore in 2025, whereas urban accounts jumped from approximately 5 crore to 19 crore over the same span. Even with the growth in both regions overall, rural contribution has held much more substantial proportions, indicating the scheme's deeper penetration in rural India.

Interpretation

The findings point towards the success of PMJDY in reaching out to excluded segments through formal banking services, especially in rural areas. The statistics reflect that financial inclusion initiatives under the program have been more effective in rural areas, where traditional banking penetration was historically weak. The persistently higher rural account

growth proves the effectiveness of the policy in mitigating regional imbalances in access to the financial system.

The rural-urban divide also yields significant information on behavioural and policy-oriented elements of financial inclusion. In rural settings, specific outreach programs, easy account opening procedures and direct benefit transfers (DBT) have served as powerful reasons of account generation. By contrast, urban expansion has been relatively slow, perhaps because a majority of urban households were already connected to formal banking mechanisms prior to PMJDY.

The overall upward trend line also confirms that the scheme is growing consistently, testifying to its long-term viability and popularity among the people. Especially, the increased proportion of rural accounts shows financial inclusion is no longer limited to urban-based growth but has actually penetrated grassroots levels. This rural majority also lays a strong groundwork for the development of digital payment platforms such as UPI, as evidenced in the previous figure, indicating account penetration and digital transactions development's interaction.

Conclusion

The paper confirms significant correlation between financial inclusion policies, especially the Pradhan Mantri Jan Dhan Yojana (PMJDY) and Fintech uptake growth through Unified Payments Interface (UPI). The strong positive correlation proves that with an increase in access to formal banking facilities, digital payments also increase, showing the complementarity between policy-initiated inclusion and technology-provided financial services.

The findings point to the fact that while urban cities are still gaining from Fintech, rural India has experienced higher account penetration, which reflects the success of inclusive policies in narrowing enduring regional disparities. The explosive growth of UPI demonstrates how uncomplicated, low-cost and interoperable platforms can change consumer behaviour and speed up the shift to a digital economy.

Overall, the intersection of government-sponsored financial inclusion initiatives and Fintech innovations has been instrumental in transforming India's financial sector. With supportive policy interventions, consumer literacy and inclusive design of technology, Fintech can be a

growth driver and also helpful in furthering financial inclusion for all socio-economic groups of the nation.

Policy Recommendations

➤ **Digital and Financial Literacy**

Roll out focused awareness drives, particularly among women and elderly segments, to enhance usage confidence in UPI and other Fintech services.

➤ **Cybersecurity and Consumer Protection**

Enhance protections against digital platform abuse and fraud to generate confidence among new consumers.

➤ **Public–Private Partnerships**

Promote cooperation between policymakers, banks and Fintech players to create inclusive models that move beyond payments to credit, insurance, and savings.

Future Scope

Subsequent studies can examine gender-based usage patterns, income-group differences and savings and credit conduct in the long run affected by Fintech. Utilizing primary data surveys integrated with secondary datasets will give a broader perspective on how digital banking promotes sustainable financial inclusion.

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