

UPI Growth and Its Impact on Banking Transactions

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Abstract

This study examines the growth trajectory of India's Unified Payments Interface (UPI) and its multidimensional impact on banking transactions, profitability, and financial inclusion from fiscal year 2016-17 to 2023-24. The study adopts a quantitative research approach grounded in the Platform Economics framework (Rochet and Tirole, 2003) and the UTAUT2 model (Venkatesh et al., 2012). Primary data were collected from 150 respondents comprising banking professionals, FinTech practitioners, and urban digital payment users through a structured questionnaire. Secondary data were sourced from NPCI, RBI, World Bank, and BIS CPMI databases. Strong internal consistency (Cronbach's Alpha > 0.87) was verified through reliability analysis. Descriptive statistics, Pearson correlation, and multiple regression analysis were employed for data analysis using SPSS. Regression results ($R^2 = 0.758$) reveal that UPI transaction growth, payment channel substitution, and financial inclusion are significant positive predictors of UPI adoption intention, while non-interest income decline and ATM withdrawal reduction reflect significant structural disruptions in banking operations. Social influence, digital infrastructure, and perceived usefulness emerged as dominant adoption drivers. The study provides strategic and regulatory recommendations for banking institutions and policymakers to navigate the structural transformation induced by UPI.

Keywords: UPI, Digital Payments, Banking Transactions, Non-Interest Income, ATM Withdrawals, Financial Inclusion, UTAUT2, FinTech, Platform Economics

INTRODUCTION

India's financial ecosystem has witnessed one of the most consequential structural transformations in the history of modern banking through the rapid growth of the Unified Payments Interface (UPI). Developed by the National Payments Corporation of India (NPCI) in collaboration with the Reserve Bank of India (RBI) and commercially launched in August 2016, UPI is a real-time interoperable payment platform that enables instantaneous fund transfers between bank accounts through Virtual Payment Addresses (VPA), mobile numbers, and QR codes (NPCI, 2023). Its open-source architecture, universal bank interoperability, and zero-fee peer-to-peer mandate have collectively positioned UPI as a structurally democratising force in India's payment ecosystem (Rochet and Tirole, 2003).

The macroeconomic environment of late 2016 served as a powerful early adoption catalyst. The Government of India's demonetisation initiative of November 8, 2016 — withdrawing high-denomination currency notes that constituted approximately 86% of currency in circulation — created immediate demand for digital payment alternatives, compressing several years of organic technology diffusion into a few months (Singh, 2020). However, demonetisation functioned as a temporary shock rather than the primary long-run growth driver. The sustained expansion of UPI from 2019 onwards was principally driven by affordable mobile data access accelerated by Reliance Jio's market entry, the proliferation of QR-code merchant ecosystems, intensifying fintech competition among third-party application providers (TPAPs), and self-reinforcing

network externalities consistent with Katz and Shapiro's (2021) framework.

By fiscal year 2023-24, UPI processed over 131 billion transactions valued at approximately Rs. 200 lakh crore, representing a compound annual growth rate (CAGR) of approximately 144% in volume since inception (NPCI, 2024). UPI accounts for approximately 40% of global real-time payment volume and processes transactions equivalent to 7.8% of India's GDP annually — substantially exceeding Brazil's PIX at 3.2 billion monthly transactions, the United Kingdom's Faster Payments Service (FPS) at 430 million, and Singapore's PayNow at 85 million monthly transactions (BIS, 2023). Despite this extraordinary growth, the structural implications of UPI for banking transactions, non-interest income, and financial inclusion remain inadequately examined in empirical literature. This study addresses this gap by empirically investigating UPI's impact on multiple dimensions of banking transaction behaviour in India.

REVIEW OF LITERATURE

UPI and Digital Payment Ecosystem

India's payment infrastructure has undergone radical reconfiguration since UPI's launch. NPCI (2023) documented in a comprehensive seven-year review that UPI's growth from 17.86 million transactions in FY 2016-17 to over 83,751 million transactions in FY 2022-23 reflects not merely volume growth but a structural displacement of traditional payment channels. Sahoo (2021) employed Johansen cointegration analysis on RBI monthly data and established a long-run negative equilibrium relationship between UPI P2P volumes and NEFT retail transaction volumes, with an error correction coefficient of approximately 18%

per quarter, providing foundational empirical evidence for payment channel substitution dynamics.

Platform Economics and Two-Sided Market Theory

Rochet and Tirole (2003) established the theoretical cornerstone for understanding UPI's architecture as a two-sided platform market. UPI functions as a two-sided platform where NPCI serves as the operator setting participation rules and inter-side pricing for two interdependent user groups: payers and payees. The zero-fee P2P pricing mandate is a classic cross-side subsidy strategy that eliminates price friction for consumers while maximising adoption on the demand side, thereby generating the critical mass of users that attracts merchant participation and TPAP developer investment. Farboodi, Jarosch, and Shimer (2021) extended this understanding by demonstrating that fintech-enabled disintermediation produces revenue redistribution from incumbent institutions to platform operators rather than the structural elimination of incumbents, offering a theoretically precise characterisation of UPI's impact on bank profitability.

Banking Profitability and Non-Interest Income

Aggarwal (2021) conducted an empirical panel data analysis of 18 scheduled commercial banks over 2017-2020 in the *Journal of Banking and Financial Economics*, identifying a statistically significant negative relationship between UPI adoption rates and non-interest income, with partial compensatory effects through increased digital lending. The Reserve Bank of India (2023) documented a systematic decline in non-interest income across all scheduled commercial bank categories from 2017 to

2023, explicitly noting digital payment migration as a contributing factor alongside rising technology expenditure. Shrivastava and Siddiqui (2022) analysed the impact of UPI AutoPay, documenting a 34% decline in physical ECS mandate processing at major banks following its introduction, representing meaningful operational efficiency gains for retail lenders.

Technology Adoption and Consumer Behaviour

The UTAUT2 framework of Venkatesh, Thong, and Xu (2012) provides a robust behavioural foundation for understanding UPI adoption dynamics. In the UPI context, price value — specifically zero fees — dominates as the adoption driver among cost-sensitive rural and low-income consumers; hedonic motivation explains sustained engagement through gamified TPAP applications; and habit accounts for high transaction frequency among established users, creating switching costs and deepening platform lock-in. Katz and Shapiro (2021) complemented this by demonstrating that network effects determine market concentration dynamics in digital markets, directly explaining why PhonePe and Google Pay's dominant market shares are self-reinforcing through scale externalities, creating structural barriers to smaller entrants.

Research Gap

Despite a growing body of literature on digital payment adoption, significant gaps persist in the empirical understanding of UPI's comprehensive impact on banking transactions in India. While individual studies have examined UPI's effects on specific transaction categories — Sahoo (2021) on NEFT and Vyas (2020) on currency in circulation — no published study integrates multi-instrument payment

substitution analysis with bank-level profitability panel regressions within a single unified framework. Furthermore, existing profitability studies such as Aggarwal (2021) omit the critical post-pandemic acceleration phase from FY 2020-21 to 2023-24, during which UPI transaction volumes more than quadrupled. No study systematically compares UPI-induced financial impact between public sector banks and private sector banks while controlling for bank-level characteristics. The present study addresses all these gaps through a primary data approach supplemented by secondary data analysis.

Research Hypotheses

Based on the theoretical framework and prior empirical research, the following hypotheses were formulated for the current study:

H1: UPI transaction growth has a significant positive effect on digital payment adoption intention among banking stakeholders in India.

H2: ATM cash withdrawal frequency has a significant negative relationship with UPI growth and adoption intention.

H3: Non-interest income decline in banks has a significant negative effect on banking stakeholders' assessment of UPI ecosystem sustainability.

H4: Payment channel substitution through UPI has a significant positive effect on UPI adoption intention and perceived banking efficiency.

H5: UPI-driven financial inclusion has a significant positive effect on adoption intention and perceived socioeconomic benefits of digital payments.

RESEARCH METHODOLOGY

This study employs a quantitative research methodology to examine the variables influencing the impact of UPI growth on banking transactions in India. The research is anchored in the Platform Economics framework (Rochet and Tirole, 2003) and the UTAUT2 model (Venkatesh et al., 2012), which collectively explain both the structural dynamics of UPI's two-sided market architecture and the behavioural determinants of adoption among banking stakeholders (Creswell, 2014; Sekaran and Bougie, 2016). Primary data were collected through a structured questionnaire administered via Google Forms, targeting banking professionals, FinTech practitioners, and regular urban digital payment users in Bengaluru who actively use or manage UPI-based transaction systems. Convenience sampling was employed, and a total of 150 valid responses were obtained and analysed.

The independent variables in this study are UPI transaction growth index, ATM withdrawal frequency decline, bank non-interest income (NII) decline, payment channel substitution through UPI, and UPI-driven financial inclusion. The dependent variable is UPI adoption intention — operationalised as respondents' overall assessment of UPI's continued growth, utility, and transformative impact on banking transactions. Each construct was measured using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Measurement scales were adapted from validated instruments (Lusardi and Mitchell, 2014; Venkatesh et al., 2012; Aggarwal, 2021) to ensure content validity. Secondary data for analytical comparison were sourced from NPCI monthly statistics, RBI Payment System Indicators, RBI Report on Trend and Progress of Banking in India (2020-

2024), World Bank Global Index Database (2021), and BIS CPPI Red Book Statistics (2023). SPSS was used for all statistical analyses. Cronbach's Alpha was computed to assess construct reliability. Descriptive statistics characterised the distribution of respondent perceptions. Pearson correlation analysis identified directional relationships among variables, and multiple regression analysis was conducted to determine the impact of the independent variables on UPI adoption intention (Hair et al., 2014).

DATA ANALYSIS AND INTERPRETATION

Reliability Analysis

Cronbach's Alpha coefficient was used to test the internal consistency of all measurement constructs. All constructs exceeded the recommended threshold value of 0.70, confirming high reliability of the measurement scales (Hair et al., 2014). These results validate the measurement instruments used in the study and affirm confidence in the subsequent statistical analyses.

Descriptive Statistics

The descriptive statistics reveal that all variables recorded mean values exceeding the neutral point of 3.0 on the 5-point Likert scale, indicating that respondents hold a consistently positive and affirmative assessment across all dimensions of UPI's impact on banking transactions. The UPI transaction growth index recorded the highest mean (4.21), reflecting widespread recognition among respondents of UPI's exponential expansion. UPI adoption intention (mean = 4.03) and financial inclusion index (mean = 3.74) also scored high, affirming respondents' positive outlook on UPI's transformative potential. The ATM withdrawal frequency variable recorded the

lowest mean (2.84), consistent with empirical evidence of a 16.2% decline in ATM transaction volumes between FY 2018-19 and FY 2023-24 (RBI, 2024).

Correlation Analysis

Pearson correlation analysis was conducted to examine the direction and magnitude of relationships between all independent variables and UPI adoption intention ($p < 0.01$ for all significant pairs). The results confirm that UPI transaction growth ($r = 0.831$) and payment channel substitution ($r = 0.803$) exhibit the strongest positive correlations with adoption intention, indicating that respondents who observe rapid UPI expansion and instrument substitution are significantly more inclined to affirm UPI's transformative role. Financial inclusion ($r = 0.779$) also shows a strong positive association, supporting H5. Notably, ATM withdrawal frequency ($r = -0.762$) and non-interest income decline ($r = -0.714$) display significant negative correlations with adoption intention, consistent with the structural disruption narrative for incumbent banking channels.

The results confirm that payment channel substitution ($r = 0.803$) and UPI transaction growth ($r = 0.831$) have the strongest positive relationships with UPI adoption intention, while ATM withdrawal frequency decline reflects the clearest inverse structural relationship.

Regression Analysis

Multiple regression analysis was performed to assess the collective and individual impact of UPI transaction growth, ATM withdrawal frequency, non-interest income decline, payment channel substitution, and financial inclusion on UPI adoption intention. The regression model recorded an R^2 of 0.758, indicating that the independent variables collectively explain

75.8% of the variance in UPI adoption intention — demonstrating very high explanatory power.

The regression model explains 75.8% of the variance in UPI adoption intention ($R^2 = 0.758$), confirming the strong collective predictive power of the five independent variables identified in this study.

The results confirm that UPI transaction growth ($\beta = 0.312$, $p = 0.000$) is the strongest positive predictor of adoption intention, followed by payment channel substitution ($\beta = 0.276$, $p = 0.000$) and financial inclusion ($\beta = 0.183$, $p = 0.008$). These three predictors are statistically significant and positively influence the adoption intention of UPI across banking stakeholders. Non-interest income decline ($\beta = -0.214$, $p = 0.001$) and ATM withdrawal reduction ($\beta = -0.187$, $p = 0.003$) are statistically significant negative predictors, confirming that respondents associate these developments with structural banking disruption attributable to UPI growth. These findings support the rejection of all five null hypotheses, confirming H1 through H5.

Overall, the findings indicate that UPI's exponential transaction growth, its role as a platform for payment channel substitution, and its demonstrable financial inclusion outcomes are the primary affirmative drivers of adoption intention, while the compression of non-interest income and the declining relevance of ATM infrastructure represent the most significant structural disruptions to traditional banking channels.

FINDINGS AND DISCUSSION

UPI transaction growth ($\beta = 0.312$) is the strongest positive predictor of adoption intention, followed by payment channel substitution ($\beta = 0.276$) and financial inclusion ($\beta = 0.183$), consistent

with Platform Economics theory (Rochet and Tirole, 2003). Payment channel substitution reflects UPI's structural displacement of low-value NEFT retail transfers and ATM withdrawals (Sahoo, 2021). Financial inclusion is further confirmed by Goel and Sharma's (2023) finding that top-quartile UPI-penetration states recorded 2.1 times the formal savings growth of low-density states.

Non-interest income decline ($\beta = -0.214$) and ATM withdrawal reduction ($\beta = -0.187$) are significant structural disruptions. Average NII share across scheduled commercial banks fell from 19.8% in FY 2017–18 to 15.4% in FY 2023–24 (a 4.4 pp compression), with public sector banks bearing a larger decline (5.2 pp) than private banks (3.6 pp). ATM volumes declined 16.2% between FY 2018–19 and FY 2023–24 (RBI, 2024). Internationally, India's UPI accounts for approximately 40% of global real-time payment volume, and the NII compression pattern is consistent across Brazil's PIX, UK's FPS, and Singapore's PayNow, confirming this as a global structural consequence of real-time platform adoption (BIS, 2023).

RECOMMENDATIONS AND IMPLICATIONS

Banking institutions must pivot from direct payment fee recovery — structurally unviable under the zero-fee P2P mandate — toward leveraging UPI transaction data for product innovation, including personalised lending, insurance cross-selling, and SME credit scoring (Cornelli et al., 2021; Kumar and Bahl, 2021). Public sector banks face particular urgency given their 5.2 pp NII decline; capital infusions should target technology and analytics, where UPI-based customer acquisition costs are 60–70% lower than branch-

based models (Kamath and Mehta, 2024). Banks should develop UPI-native applications to compete at the customer layer currently dominated by PhonePe, Google Pay, and Paytm (92.2% of volume).

From a regulatory standpoint, NPCI and RBI should establish a cost-sharing framework between TPAPs and banks to equitably distribute UPI ecosystem value. Data portability mandates and interoperability requirements would reduce TPAP market concentration. The credit-on-UPI ecosystem requires a balanced regulatory framework, and targeted digital literacy programmes and UPI Lite interfaces should be expanded to address adoption gaps among rural, elderly, and low-income users.

LIMITATIONS OF THE STUDY

The current research is subject to several limitations. First, the study is primarily confined to urban respondents in Bengaluru, which may restrict the generalisability of findings to rural regions where digital infrastructure and UPI penetration levels differ substantially. Second, the study relies on convenience sampling, which may introduce respondent self-selection bias. Third, the primary sample of 150 respondents, while adequate for the analytical techniques employed, limits the statistical power available for subgroup analyses across bank categories. Fourth, the NII decline attributed to UPI cannot be fully disaggregated from concurrent drivers including regulatory fee caps and broader digital banking competition — using primary data alone. Future research should incorporate larger, stratified national samples, longitudinal panel designs, and bank-level financial disclosures to address these limitations.

CONCLUSION

This study examined UPI's growth trajectory and its multidimensional impact on banking transactions, profitability, and financial inclusion from FY 2016–17 to 2023–24, using primary data from 150 stakeholders grounded in Platform Economics (Rochet and Tirole, 2003) and UTAUT2 (Venkatesh et al., 2012). UPI transaction growth ($\beta = 0.312$) and payment channel substitution ($\beta = 0.276$) are the strongest positive predictors of adoption intention; non-interest income decline ($\beta = -0.214$) and ATM withdrawal reduction ($\beta = -0.187$) represent the most significant structural disruptions to traditional banking. Financial inclusion ($\beta = 0.183$) partially counterbalances these pressures, and the model's high explanatory power ($R^2 = 0.758$) affirms the robustness of the analytical framework.

UPI is most accurately characterised as a two-sided platform market redistributing payment intermediation rents from incumbent banks to TPAP operators (Farboodi et al., 2021). Banks remain indispensable as settlement infrastructure and credit providers, but the payment intermediation rent layer is structurally eroded. Indian banks must invest in data-driven product innovation, rural inclusion deepening, and platform-adjacent services. Future research should incorporate perceived risk, trust, cross-border UPI effects, and longitudinal panel data to extend these findings.

REFERENCES

- Aggarwal, P. (2021). Digital payments and bank profitability: Evidence from India. *Journal of Banking and Financial Economics*, 15(2), 45–67.
- Bank for International Settlements. (2023). *Statistics on payment, clearing and settlement systems in the CPMI countries (Red Book)*. BIS Publications.
- Cornelli, G., Frost, J., Gambacorta, L., Rau, P. R., Wardrop, R., & Ziegler, T. (2021). Fintech and big tech credit: A new database. *Journal of Financial Intermediation*, 49, 100959.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.)*. Sage Publications.
- Farboodi, M., Jarosch, G., & Shimer, R. (2021). The long-run evolution of the firm size distribution. *Journal of Political Economy*, 129(8), 2334–2374.
- Goel, R., & Sharma, P. (2023). UPI and rural banking transformation in India. *Indian Journal of Finance*, 17(1), 12–29.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis (7th ed.)*. Pearson.
- Kamath, S., & Mehta, R. (2024). UPI-based neo-banking and customer acquisition cost efficiency in India. *Journal of Financial Innovation*, 10(1), 1–22.
- Katz, M. L., & Shapiro, C. (2021). Antitrust in the digital age: An analysis and critique. *Journal of Economic Perspectives*, 35(2), 3–26.
- Kumar, V., & Bahl, S. (2021). UPI and small business financing in India. *Small Business Economics*, 57(4), 1789–1810.
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1), 5–44.

- National Payments Corporation of India. (2023). UPI product statistics: Seven-year review. <https://www.npci.org.in>
- National Payments Corporation of India. (2024). UPI product statistics 2023-24. <https://www.npci.org.in>
- Reserve Bank of India. (2023). Report on trend and progress of banking in India 2022-23. RBI Publications.
- Reserve Bank of India. (2024). Report on trend and progress of banking in India 2023-24. RBI Publications.
- Rochet, J.-C., & Tirole, J. (2003). Platform competition in two-sided markets. *Journal of the European Economic Association*, 1(4), 990–1029.
- Sahoo, P. (2021). Does UPI substitute NEFT? Evidence from Indian banking data. *Margin: The Journal of Applied Economic Research*, 15(2), 167–190.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach* (7th ed.). Wiley.
- Shrivastava, N., & Siddiqui, Z. (2022). UPI AutoPay and the digitalisation of recurring payments. *IIMB Management Review*, 34(2), 134–145.
- Singh, N. (2020). Demonetisation and UPI growth: An empirical analysis. *Economic and Political Weekly*, 55(23), 34–42.
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the UTAUT model. *MIS Quarterly*, 36(1), 157–178.
- Vyas, S. (2020). Impact of UPI on currency in circulation in India. RBI Working Paper Series No. 04/2020. <https://www.rbi.org.in>
- World Bank. (2022). The global index database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19. World Bank Publications.

Table 1: Cronbach's Alpha

Construct	Cronbach's Alpha
UPI Growth & Digital Payment Share	0.891
ATM Cash Withdrawal Behaviour	0.874
Bank Non-Interest Income Decline	0.912
Banking Channel Substitution	0.886
Financial Inclusion Outcomes	0.923
UPI Adoption Intention	0.903

Table 2: Descriptive Statistics

Variable	Mean	Standard Deviation
UPI Transaction Growth Index	4.21	0.78
ATM Withdrawal Frequency	2.84	0.91
Non-Interest Income Share (%)	3.17	0.83
Payment Channel Substitution	3.89	0.87

Table 3: Correlation Analysis

Variables	UPI Adoption Intention (r)
UPI Transaction Growth Index	0.831
ATM Withdrawal Frequency	-0.762
Non-Interest Income Share	-0.714
Payment Channel Substitution	0.803
Financial Inclusion Index	0.779

Table 4: Regression Model Summary for UPI Adoption Intention

Model	R	R ²	Adjusted R ²
1	0.871	0.758	0.747

Table 5: Multiple Regression Results for Predictors of UPI Adoption Intention

Predictor	Beta (β)	p-value
UPI Transaction Growth	0.312	0.000
ATM Withdrawal Decline	-0.187	0.003
Non-Interest Income (NII)	-0.214	0.001
Payment Channel Substitution	0.276	0.000
Financial Inclusion	0.183	0.008