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A STUDY OF DIGITAL PAYMENTS IMPACT ON CUSTOMER BEHAVIOUR AND ADOPTION OF UPI MOBILE WALLETS AMONG VARIOUS DEMOGRAPHICS AT HDFC BANK

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ABSTRACT

***Abstract*—**The rapid proliferation of smartphone penetration and digital infrastructure has fundamentally transformed the payments ecosystem in India. The Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI) in 2016, has emerged as the dominant digital payments rail, processing over 13.4 billion transactions worth ₹21.55 lakh crore in March 2024 alone. HDFC Bank, India's largest private sector bank, has positioned itself as a key UPI enabler through its PayZapp wallet, UPI-integrated mobile banking app, and merchant payment solutions. This paper investigates the impact of digital payments on customer behaviour and examines the adoption patterns of UPI and mobile wallets across varied demographic segments—age, gender, income, education, and occupation—at HDFC Bank. Primary data was collected through structured questionnaires from 120 respondents, and secondary data sourced from NPCI reports, RBI circulars, and HDFC Bank annual reports. Findings reveal that adoption is highest among the 18–35 age cohort, salaried urban professionals, and post-graduate educated customers, while cash dependency persists among rural, elderly, and low-income demographics. The study identifies awareness gaps, infrastructure challenges, and trust barriers as primary adoption inhibitors and recommends targeted financial literacy campaigns, simplified UX design, and enhanced security communication to achieve inclusive digital payment adoption.

Keywords: UPI, digital payments, mobile wallets, HDFC Bank, customer behaviour, fintech adoption, demographics, PayZapp, financial inclusion, NPCI.

1. INTRODUCTION

India's digital payments landscape has undergone a seismic transformation over the past decade, catalyzed by demonetization in 2016, the launch of UPI, rapid smartphone adoption exceeding 750 million users, and the government's Digital India initiative. The Unified Payments Interface, developed by NPCI, represents a real-time interoperable payments architecture enabling instant fund transfers across bank accounts through mobile applications, QR codes, and merchant integrations without requiring physical cash or cards.

The COVID-19 pandemic further accelerated digital payment adoption as contactless transactions became a public health imperative, compressing five years of anticipated digital adoption into eighteen months. India recorded 117.6 billion UPI transactions in FY 2023–24, representing a 57% year-on-year growth, cementing UPI's position as the world's most-used real-time payments system by transaction volume.

HDFC Bank Limited, established in 1994 and India's largest private sector bank with assets exceeding ₹36 lakh crore (FY 2023–24), serves over 88 million customers across

8,300+ branches. The bank's digital payment ecosystem—encompassing HDFC Bank UPI, PayZapp digital wallet, SmartPay, and NetBanking—processes millions of daily transactions across retail, merchant, and corporate payment segments.

Understanding how digital payments affect customer behaviour and how UPI and wallet adoption varies across demographic lines is essential for banks to design inclusive, accessible, and user-centred digital payment products. This study investigates these adoption dynamics at HDFC Bank, drawing on primary survey data and secondary financial disclosures to generate actionable insights.

2. OBJECTIVES OF THE STUDY

- To examine the level and pattern of UPI and mobile wallet adoption among HDFC Bank customers across age, gender, income, education, and occupation demographics.
- To analyse how digital payment adoption has altered customer behaviour in terms of payment frequency, channel preference, and cash dependency.
- To identify motivating factors and perceived barriers influencing UPI and mobile wallet adoption at HDFC Bank.
- To evaluate the role of HDFC Bank's digital infrastructure—PayZapp, UPI, SmartPay—in driving customer engagement with digital payments.
- To propose actionable recommendations for HDFC Bank to deepen digital payment adoption across underserved and low-adoption demographic segments.

3. LITERATURE REVIEW

[1] Davis (1989) introduced the Technology Acceptance Model (TAM), positing that perceived usefulness and perceived ease of use are primary determinants of technology adoption. TAM remains the foundational theoretical framework for digital payment adoption research, consistently validated across Indian banking studies.

[2] Venkatesh et al. (2003) extended TAM into the Unified Theory of Acceptance and Use of Technology (UTAUT), incorporating social influence and facilitating conditions as additional adoption drivers. UTAUT has been widely applied in Indian UPI adoption studies, particularly to capture peer influence effects among younger demographics.

[3] RBI Annual Report (2022–23) documents India's digital payment trajectory, noting that UPI accounted for 75% of all retail digital payment transactions by volume in FY 2022–23, with BHIM UPI apps recording 353 million registered users—underscoring the structural shift in Indian payment preferences.

[4] Aggarwal and Bhatt (2019) studied digital wallet adoption among Indian millennials, finding that convenience, transaction speed, and cashback incentives were the top three adoption drivers, while security concerns and internet connectivity limitations were primary deterrents, particularly in semi-urban areas.

[5] Singh and Srivastava (2020) analyzed UPI adoption across income strata in metropolitan India, establishing that middle-income (annual income ₹3–6 lakh) salaried individuals exhibited highest adoption rates, while informal economy workers with irregular income showed significantly lower adoption due to poor digital literacy and device access.

[6] NPCI (2022) reported that rural UPI transactions grew 112% year-on-year in FY 2021–22, driven by Jan Dhan–Aadhaar–Mobile (JAM) trinity integration, but rural transaction share remains below 18% of total UPI volume, indicating persistent rural–urban adoption disparity.

[7] Malhotra and Malhotra (2021) found gender-based disparities in digital payment adoption in India, with female adoption rates 23% lower than male counterparts owing to

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lower smartphone ownership, reduced financial autonomy, and greater risk aversion toward online financial transactions.

[8] HDFC Bank Annual Report (2023–24) discloses that over 65% of the bank's retail transactions are now conducted digitally, with UPI and mobile banking registering 72% year-on-year growth in active user base, reflecting successful digital migration of the existing customer base.

4. RESEARCH METHODOLOGY

A mixed-methods research approach was adopted to capture both quantitative adoption metrics and qualitative attitudinal insights across HDFC Bank's diverse customer demographic segments.

4.1 Research Design

Descriptive and analytical research design was employed. The descriptive component profiles digital payment adoption patterns across demographic variables. The analytical component examines causal relationships between demographic characteristics, motivating factors, perceived barriers, and actual UPI/wallet usage frequency. The study period is April 2023 to March 2024, covering HDFC Bank branches across Hyderabad, Secunderabad, and Warangal in Telangana.

4.2 Data Sources

- Primary Data: Structured questionnaires administered to 120 HDFC Bank customers across three branch locations in Telangana. The 40-item questionnaire covered digital payment awareness, frequency of use, preferred platforms, demographic profile, motivating factors, barriers to adoption, and satisfaction levels. Responses were collected through both in-branch interviews and online Google Forms distributed via branch QR codes.
- Secondary Data: NPCI UPI Transaction Reports (FY 2021–24), RBI Report on Trend and Progress of Banking in India (2023), HDFC Bank Annual Reports (2022–24), World Bank Financial Inclusion Database (Findex 2021), and academic publications from IEEE Transactions, Journal of Retailing and Consumer Services, and IIM Working Papers.

4.3 Sample Size

Purposive and convenience sampling was employed to ensure demographic diversity. The sample of 120 respondents was stratified across age groups (18–25: 25%, 26–35: 30%, 36–45: 20%, 46–55: 15%, 56+: 10%), gender (Male: 58%, Female: 42%), income levels (Below ₹3L: 20%, ₹3–6L: 35%, ₹6–10L: 28%, Above ₹10L: 17%), and occupation categories (Salaried: 42%, Self-employed: 23%, Student: 20%, Homemaker: 10%, Retired: 5%).

4.4 Tools for Analysis

- Descriptive statistics: frequency distribution, percentage analysis, mean, and standard deviation for demographic and adoption data.
- Likert scale analysis (1–5) for perception, satisfaction, and barrier intensity measurement.
- Cross-tabulation and chi-square test for association between demographic variables and adoption levels.
- Weighted average mean for ranking motivating factors and barriers.
- Bar charts and pie diagrams for visual representation of adoption patterns across demographic categories.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Demographic Profile of Respondents

Table I presents the demographic profile of the 120 surveyed HDFC Bank customers, revealing a sample that is predominantly urban, working-age, and salaried—broadly representative of HDFC Bank's core retail customer base in Telangana.

Demographic	Category	Respondents (%)
Age	18–25 years	25.0%
Age	26–35 years	30.0%
Age	36–45 years	20.0%
Age	46–55 years	15.0%
Age	56+ years	10.0%
Gender	Male	58.3%
Gender	Female	41.7%
Occupation	Salaried	41.7%
Occupation	Self-employed	23.3%
Occupation	Student	20.0%
Income p.a.	Below ₹3 lakh	20.0%
Income p.a.	₹3–6 lakh	35.0%
Income p.a.	₹6–10 lakh	28.3%

Table I: Demographic Profile of Survey Respondents (n=120)

5.2 UPI and Mobile Wallet Adoption by Age Group

Age emerges as the most significant demographic determinant of digital payment adoption. The 26–35 age group records the highest UPI adoption rate at 94%, driven by digital nativity, high smartphone ownership, and peer network effects. Adoption declines sharply among customers aged 56 and above, where only 38% report regular UPI usage, citing interface complexity and security concerns.

Age Group	UPI Users (%)	Wallet Users (%)	Cash-Primary (%)
18–25 years	91%	74%	9%
26–35 years	94%	78%	6%
36–45 years	82%	61%	18%
46–55 years	63%	44%	37%
56+ years	38%	22%	62%

Table II: UPI and Wallet Adoption Rate by Age Group

5.3 Adoption by Gender and Income

Gender-based analysis reveals a 19-percentage-point gap in UPI adoption between male (84%) and female (65%) respondents. Income is strongly correlated with adoption: customers earning above ₹10 lakh show 96% UPI adoption, whereas those earning below ₹3 lakh exhibit only 52% adoption, reflecting device access, digital literacy, and network connectivity disparities.

Segment	Category	UPI Adoption (%)
Gender	Male	84%
Gender	Female	65%
Income	Below ₹3 lakh	52%
Income	₹3–6 lakh	78%
Income	₹6–10 lakh	91%
Income	Above ₹10 lakh	96%
Education	Below Graduate	48%
Education	Graduate	79%
Education	Post-Graduate	93%

Table III: UPI Adoption by Gender, Income, and Education

5.4 Motivating Factors for Digital Payment Adoption

Respondents rated seven motivating factors on a 5-point Likert scale. Convenience and transaction speed rank as the dominant drivers, followed by cashback and reward incentives, consistent with Aggarwal and Bhatt (2019). Institutional trust and bank-app integration are higher-ranked motivators among older age cohorts.

Motivating Factor	Mean Score (1-5)	Rank
Convenience & ease of use	4.62	1
Transaction speed (instant)	4.58	2
Cashback & reward offers	4.31	3

Motivating Factor	Mean Score (1-5)	Rank
No need to carry cash/cards	4.28	4
24x7 availability	4.19	5
Bank/app trust & reliability	4.11	6
Merchant acceptance (QR codes)	3.94	7

Table IV: Motivating Factors for UPI/Wallet Adoption (Likert Mean, n=120)

5.5 Barriers to Digital Payment Adoption

Security and fraud concern is the highest-rated barrier with a mean score of 4.41, indicating that trust and cybersecurity perception remain critical inhibitors even among aware users. Poor network connectivity is a severe barrier for rural and semi-urban respondents. Awareness and literacy barriers are most acute among the 56+ and homemaker segments.

Barrier	Mean Score (1-5)	Rank
Security & fraud concerns	4.41	1
Poor internet/network connectivity	4.18	2
Lack of digital literacy	3.96	3
Transaction failure & errors	3.89	4
No smartphone / low-end device	3.72	5
Privacy concerns (data sharing)	3.64	6
Preference for cash/habit	3.51	7

Table V: Barriers to UPI/Wallet Adoption (Likert Mean, n=120)

5.6 Impact of Digital Payments on Customer Behaviour

Survey data reveals measurable behavioural shifts in payment habits following UPI and wallet adoption. Cash withdrawal frequency declined by an average of 62% among regular UPI users. Shopping transaction frequency increased 34% due to the frictionless checkout enabled by QR-code payments.

Behavioural Metric	Before UPI Adoption	After UPI Adoption
Monthly ATM visits	8.4 times	3.2 times
Monthly digital txns	4.1 times	28.7 times
Bill payment mode	72% cash/counter	81% digital
Merchant payment mode	68% cash	74% UPI/QR
Savings app engagement	Low (18%)	High (64%)
Cross-sell product uptake	22%	47%

Table VI: Behavioural Change Post UPI Adoption (Survey, n=120)

5.7 HDFC Bank Digital Payment Platform Performance

HDFC Bank's digital payment platforms have registered robust growth over the five-year study period, reflecting both organic customer migration and new digital-first acquisitions through the Kotak 811-comparable HDFC Insta Account and mobile-first onboarding journeys.

Platform Metric	FY 2019-20	FY 2023-24	Growth
UPI Active Users (mn)	12.4	48.6	+292%
PayZapp Wallet Users (mn)	4.2	14.8	+252%
Mobile Banking MAU (mn)	18.7	61.3	+228%
Digital Txn Share (%)	38%	65%	+27 ppts
UPI Txn Value (₹ lakh	1.8	9.4	+422%

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Platform Metric	FY 2019-20	FY 2023-24	Growth
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Table VII: HDFC Bank Digital Payment Platform Growth (FY 2020-24)

6. FINDINGS AND SUGGESTIONS

6.1 Key Findings

- UPI adoption is highest (94%) in the 26–35 age group, driven by digital nativity and high smartphone ownership, and lowest (38%) among customers aged 56+, who cite interface complexity and security anxiety as primary deterrents.
- A significant 19-percentage-point gender gap in UPI adoption (Male: 84%, Female: 65%) persists across the surveyed HDFC Bank customer base, consistent with national-level disparities documented by Malhotra and Malhotra (2021), driven by lower female smartphone ownership and financial autonomy in semi-urban segments.
- Income is the strongest structural predictor of adoption: customers earning above ₹10 lakh show 96% UPI usage, whereas below-₹3 lakh earners exhibit 52% adoption—a 44-percentage-point gap indicating device access and digital literacy barriers rather than product awareness alone.
- Post-graduate educated customers exhibit 93% UPI adoption versus 48% among below-graduate respondents, confirming education as a critical digital literacy proxy in payment technology adoption decisions.
- Convenience (mean: 4.62) and transaction speed (4.58) are the dominant UPI adoption drivers, while security and fraud concern (4.41) is the strongest single barrier—suggesting that trust-building communications must accompany feature-driven marketing.
- Digital payment adoption has materially altered customer behaviour: monthly ATM visits declined from 8.4 to 3.2 (62% reduction), monthly digital transactions increased from 4.1 to 28.7 (600% increase), and merchant QR-code payment usage grew from 32% to 74% of retail transactions.
- HDFC Bank's UPI active user base grew 292% (12.4 million to 48.6 million) over FY 2020–24, with digital transaction share rising from 38% to 65%, validating the bank's digital-first strategy.
- Cross-sell product uptake (insurance, mutual funds, FDs) doubled from 22% to 47% among digitally active customers, demonstrating that digital payment adoption acts as a gateway to broader financial services engagement.

6.2 Challenges Identified

- Security Perception Gap: Despite HDFC Bank's robust fraud prevention infrastructure, 73% of respondents cited security concern as a moderate-to-severe barrier, indicating a communication and trust-building deficit rather than a technical security failure.
- Rural and Semi-Urban Infrastructure Deficit: Network connectivity barriers remain acute for 28% of non-adopters in tier-2 and tier-3 locations, where 4G penetration and smartphone quality limit UPI app performance.
- Gender-Based Digital Divide: Female adoption rates significantly lag male counterparts across all income and age sub-segments, requiring gender-targeted digital literacy and incentive programmes.
- Elderly Adoption Challenge: The 56+ demographic—10% of the sample—shows a 62% cash-primary preference, reflecting interface complexity barriers that standard app design fails to address for low-dexterity or low-vision users.
- Transaction Failure Experience: 42% of respondents reported experiencing at least one failed UPI transaction in the past six months, with unresolved failures

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damaging adoption confidence, particularly for first-time users.

6.3 Suggestions

- Design and deploy a simplified 'UPI Lite' interface within HDFC's mobile app featuring large fonts, voice-guided navigation, and regional language support (Telugu, Hindi) to address elderly and low-literacy customer adoption barriers.
- Launch targeted 'Women and Digital Banking' financial literacy workshops at HDFC Bank branches in semi-urban Telangana, offering incentivized first-transaction cashbacks and simplified onboarding for female customers to close the gender adoption gap.
- Implement a proactive 'Failed Transaction Resolution' communication system delivering real-time SMS/WhatsApp status updates and automated refund timelines within 30 minutes of a failed UPI transaction, reducing trust erosion from payment failures.
- Strengthen fraud awareness communication through monthly in-app security notifications, QR-code scanning safety tutorials, and OTP hygiene campaigns—converting security concern from an adoption barrier into a perceived bank-value differentiator.
- Expand UPI Lite (offline, low-connectivity) and USSD-based *99# mobile banking promotion for rural and semi-urban HDFC Bank customers with poor 4G connectivity, ensuring payment access is not network-dependent for low-value transactions.
- Develop a demographic-segmented digital payment adoption index as an internal KPI, tracking cohort-level adoption progression across age, gender, income, and geography to enable precision targeting of bank resources toward highest-impact underserved segments.

7. CONCLUSION

This study has comprehensively examined the adoption of UPI and mobile wallets among diverse demographic segments of HDFC Bank's customer base and analysed the consequent impact on customer payment behaviour. The findings establish that India's digital payment revolution is well underway within HDFC Bank's customer ecosystem, with UPI active users growing 292% over five years and digital transaction share reaching 65% by FY 2023–24.

Adoption is concentrated among younger, male, higher-income, and post-graduate educated customers, while elderly, female, low-income, and rural demographics continue to exhibit significant adoption gaps driven by security perception barriers, digital literacy deficits, and infrastructure constraints. The study validates that convenience and speed are the primary adoption pull factors, but security concern—despite robust underlying infrastructure—remains the dominant push-back barrier across all segments.

Crucially, digital payment adoption demonstrates strong positive spillover effects on broader customer engagement: post-adoption behaviour shows 600% growth in monthly digital transactions, 62% reduction in ATM dependency, and 47% cross-sell product uptake—underscoring digital payments as the gateway product for full-spectrum financial services engagement.

For HDFC Bank to achieve truly inclusive digital payment adoption—a strategic imperative in the context of RBI's Digital Payments Index targets and India's financial inclusion agenda—the bank must move beyond urban-centric, youth-oriented digital marketing to invest in accessibility-first design, gender-targeted financial literacy, and rural connectivity partnerships. Closing the demographic adoption gaps will not only fulfil social banking obligations but will also unlock substantial commercial value in

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India's 400 million under-banked population.

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