

Digital Payments Revolution: The Role of UPI in India's Cashless Economy

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Abstract The widespread adoption of digital payment systems, particularly the Unified Payments Interface (UPI) in India, has significantly transformed the landscape of financial transactions. This study investigates the impact of UPI on consumer behavior patterns, focusing on expenditure habits, financial management practices, and payment preferences across different age groups. A mixed-methods approach, combining surveys, interviews, and transaction data, was employed to gather insights. The findings reveal that the 19-30 age group exhibits the highest frequency of UPI usage, with 22.6% using it daily and 17.8% using it 2-3 times a week. In contrast, the 51+ age group has the lowest expected usage, particularly for weekly transactions (2.8%). The study also highlights the challenges faced by UPI users, such as failed transactions, which are more commonly reported by younger users. Notably, a majority of respondents across all age groups indicate that they would discontinue using UPI if transaction fees were introduced, suggesting a high sensitivity to cost in digital payment adoption. While many associations between age and UPI-related challenges are not statistically significant, linear trends in challenge types suggest subtle generational differences in the digital payment experience. These findings provide valuable insights for policymakers, businesses, and financial institutions, emphasizing the need to address user concerns and maintain a user-friendly, cost-effective digital payment ecosystem to sustain the growth and adoption of UPI in India.

Keywords-Digital payment systems (E42), Unified Payments Interface (UPI), cashless payments, consumer behavior (D12), Financial transactions, digital wallets, contactless payments, financial inclusion (O16)

Introduction

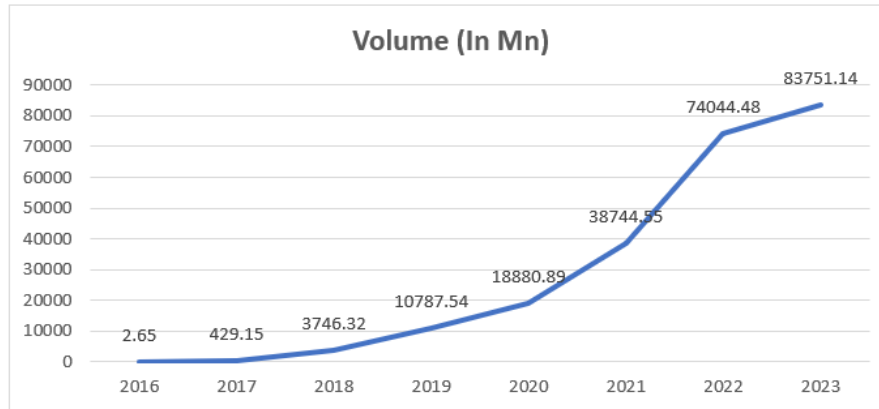
“We want to have one mission and target: Take the nation forward –Digitally and Economically” -NARENDRA MODI (PRIME MINISTER OF INDIA)

The advent of digital payment systems has revolutionized financial transactions, emphasizing convenience, security, and efficiency. In India, the Unified Payments Interface (UPI) has become a cornerstone of this transformation, facilitating instant inter-bank transactions since its launch in 2016. With India accounting for 46% of global digital transactions in 2022, UPI has become an integral part of the country's payment ecosystem, enabling over 10 billion transactions as of August 2023. **MyGovIndia data** (Hindu, 10 June 2023). The rise of cashless payment systems has fundamentally altered the landscape of financial transactions, influencing consumer behavior and redefining traditional spending habits. From digital wallets to contactless payments and the Unified Payments Interface (UPI), these systems have introduced unprecedented convenience, speed, and security. Cashless payments are more than just a technological advancement—they represent a cultural shift toward a digital-first economy. In India, the transition from cash to cashless payment methods has been accelerated by government initiatives such as "Digital India" and events like demonetization. These developments have reshaped how consumers interact with money, enabling seamless purchases and encouraging financial inclusion. However, alongside the advantages, cashless payments also bring challenges, including overspending, impulse buying, and varying levels of trust in digital systems. This research investigates the impact of cashless payments on consumer behavior patterns, exploring changes in expenditure habits, financial management practices, and payment preferences across demographics. By analyzing the psychological, social, and economic dimensions of this shift, the study aims to uncover how cashless systems influence consumers' decision-making processes. Through a mixed-methods approach combining surveys, interviews, and transaction data, this study provides valuable insights for policymakers, businesses, and financial institutions. It seeks to identify both the opportunities and risks associated with cashless payments, contributing to the development of strategies that promote responsible financial behavior while leveraging the transformative potential of digital transactions in a rapidly evolving economic landscape.¹ India, in particular, has emerged as a global leader in digital transactions, accounting for 46 % of the total global digital transactions in 2022. Unified Payments Interface (UPI), launched in 2016 by the National Payments Corporation of India (NPCI), has redefined financial transactions by enabling instant, real-time inter-bank transfers. As of August 2023, UPI has facilitated a staggering 10 billion transactions, totaling Rs 18,22,949.42 Crore (189 billion USD). In India, 84 % of all digital transactions in 2022, amounting to 1.79 trillion dollars, were channeled through UPI. UPI's rapid proliferation and high penetration in the Indian payment ecosystem underscore its transformative impact (Harshal Dev, May 11–16, 2024)¹

Review of Literature

- 1. Role of Incentives and Promotional Offers:** (Mahesh A., June 2021) in his article highlights the impact of promotional incentives on consumer spending behavior is substantial. Reddy et al. (2022) emphasize that cashback offers and discounts associated with UPI transactions influence purchasing decisions. Consumers are more likely to choose merchants offering UPI-based rewards, which drives higher transaction volumes and consumer engagement with digital payment platforms.
- 2. Impact of Cashless Payments on Consumer Spending** (Martin Brown, December 19, 2023) in his research article he highlights that present-biased consumers exhibit increased spending behavior when using cashless payment instruments. This finding underscores the psychological influence of cashless transactions, which facilitate frequent and impulsive purchases. In the context of India, the widespread adoption of the Unified Payment Interface (UPI) has accelerated this trend, fostering a seamless and cashless economy (Muralidhara & Murali, n.d.).
- 3. Demographics and Technological Familiarity:** (Shanmugam, May 2023) highlight the generational divide in UPI adoption, noting that younger consumers, particularly millennials and Gen Z, are more inclined towards digital payments due to their technological proficiency. This shift in consumer behavior has prompted businesses to tailor their marketing strategies to target tech-savvy demographics, reinforcing the preference for digital transactions over cash payments (Gupta and Mehta 2023)
- 4. Government Initiatives and UPI Adoption** (Dr. G. Balamurugan, November 2024) Government policies, including demonetization and the Digital India campaign, have played a pivotal role in driving digital payment adoption (Indoria, 2021). These initiatives, along with increased smartphone penetration, have encouraged consumers to shift from cash-based transactions to digital alternatives like UPI. The direct bank transfer capabilities and QR code integration of UPI have further facilitated its acceptance across urban and rural areas.
- 5. Convenience and Speed of Transactions:** (Dr. G. Balamurugan, November 2024) UPI's instantaneous transaction processing has significantly influenced consumer behavior. According to Kumar et al. (2021), the ability to make payments quickly through mobile devices has increased impulse buying tendencies. Consumers find UPI particularly useful for small-value transactions, which has reshaped traditional spending habits.
- 6. Perceived Security and Trust:** (Pranjal rawat, April 2024) in his research article highlights that Security perceptions play a crucial role in digital payment adoption. Sharma and Singh (2022) found that consumers trust UPI due to its advanced security features, such as biometric authentication and two-factor authentication. This enhanced security has led to greater consumer confidence in online shopping and digital transactions, further driving UPI's widespread usage. The adoption of UPI has significantly transformed consumer spending patterns by promoting cashless transactions. Factors such as government initiatives, transaction speed, security perceptions, demographic preferences, and promotional incentives collectively contribute to the growing reliance on UPI. As digital payments continue to evolve, understanding these factors can help businesses and policymakers enhance financial inclusion and consumer engagement in the digital economy.

A few highlights of UPI's journey in India, including YoY (year-over-year) growth figures through January 2023



Source: NPCI (National payment corporation of India)

Research Methodology

Research Design - In this Research we have used Exploratory study as well as Descriptive study to collect the data because it is a combination of quantitative and qualitative research methods to gain a comprehensive understanding of customer behavior.

Source of Data - They can be grouped as: source of data – Primary data source from online survey through mailing Google form as well as offline survey by approaching buyers aged 18 to 60.

Data Collection Method Primary method. Questionnaire (With the help of questionnaire data collection is relatively cheap, quick and efficient)

Population -The consumers of Dehradun are taken as population of the research.

Sampling Method In this Research we have used Convenience Sampling Method to collect the data. (We have selected this method because it will be easy for us to contact people for data collection)

Sampling Frame Respondents from Dehradun are taken into consideration as a sample.

Data Collection Instrument We have Prepared Questionnaire to collect the data.

Objectives

1. To Analyze Consumer Spending Behavior with UPI:

Identify patterns and habits of overspending and impulsive buying associated with UPI transactions, such as the types of purchases, frequency of transactions, and reasons for preferring UPI over other payment methods.

2. To Assess Psychological and Behavioral Impacts of UPI Usage:

Understand how UPI influences emotional responses to spending, balance-checking habits, and perceptions of financial management compared to traditional cash transactions or other payment methods.

3. To Identify Challenges and User Preferences in UPI Payments:

Explore challenges faced by users, such as failed transactions or security concerns, and their impact on user preferences, adoption, and willingness to continue using UPI if transaction fees are introduced.

HYPOTHESIS

- Frequent UPI users are more prone to overspending and impulsive purchases, especially in non-essential categories like online shopping.
- UPI reduces spending discomfort compared to cash, leading to higher expenditures and lower financial awareness.
- Despite potential transaction fees, users may continue using UPI if the convenience outweighs the cost; network and transaction failures are key challenges.

Analysis and Findings

Table 1 (Demographic profile of respondents)

Category		Percent	Count
Age	19-30	52.9	54
	31-50	34.3	35
	51-above	12.7	13
Gender	Male	59.8	61
	Female	40.2	41
Area	Urban	36.3	37
	Rural	63.7	65
Marital	Married	74.5	76
	Unmarried	25.5	26
Employment status	Student	25.50	25
	Employed	51	50
	Unemployed	25.5	25
	Retired	2.04	2
	Total	100	102

Objective 1 Crosstab					
Expected Count					
		How often do you use UPI			Total
		DAILY	2-3 times in a week	weekly	
Age	19-30	22.6	17.8	8.6	49.0
	31-50	17.0	13.4	6.5	37.0
	51-above	7.4	5.8	2.8	16.0
Total		47.0	37.0	18.0	102.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	55.225a	4	.000
Likelihood Ratio	51.661	4	.000
Linear-by-Linear Association	28.736	1	.000
N of Valid Cases	102		

a. 1 cells (11.1%) have expected count less than 5. The minimum expected count is 2.82.

Interpretation

19–30-year-olds are expected to use UPI daily (22.6) and 2–3 times a week (17.8) more than other groups.

In contrast, the 51+ group has the lowest expected usage, especially for weekly (2.8) transactions

there is a statistically significant association between age group and UPI usage frequency.

The majority of UPI usage is for online shopping, especially among 19–30-year-olds (expected: 31.7).

The 51+ group is expected to use UPI primarily for paying bills (3.1) or online shopping (10.4), much less for food or beverages (2.5).

the Linear-by-Linear Association value is 28.736 ($p = .000$), indicating a clear trend across age categories—as age increases, UPI usage decreases

Crosstab

Expected Count

		What percentage of your monthly spending do you think goes through UPI				Total
		Less than 25%	25%-50%	51%-75%	more than 75%	
Age	19-30	10.6	17.3	14.9	6.2	49.0
	31-50	8.0	13.1	11.2	4.7	37.0
	51-above	3.5	5.6	4.9	2.0	16.0
Total		22.0	36.0	31.0	13.0	102.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.873a	6	.000
Likelihood Ratio	27.532	6	.000
Linear-by-Linear Association	11.208	1	.001
N of Valid Cases	102		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.04.

Interpretation

19–30-year-olds are expected to have a larger share of their spending through UPI, with 14.9 individuals in the 51–75% range and 6.2 in the >75% category.

The 51+ group has expected counts of only 2.0 individuals in the >75% category, showing their limited reliance on UPI for most of their spending

Objective 2

Crosstab

Expected Count

		Do you feel Upi leads you to overspend compared to cash transaction				Total
		strongly agree	agree	neutral	disagree	
Age	19-30	17.3	20.7	4.3	6.7	49.0
	31-50	13.1	15.6	3.3	5.1	37.0
	51-above	5.6	6.7	1.4	2.2	16.0
Total		36.0	43.0	9.0	14.0	102.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.042a	6	.123
Likelihood Ratio	11.407	6	.077
Linear-by-Linear Association	3.268	1	.071
N of Valid Cases	102		

4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.41

Interpretation

The results revealed no statistically significant association, $\chi^2(6, N = 102) = 10.042, p = .123$. Similarly, the likelihood ratio yielded a non-significant value of 11.407 with $p = .077$.

Although the 19–30 age group had a relatively higher number of respondents agreeing or strongly agreeing with the overspending perception, the variation across age groups was not statistically meaningful.

Age does not appear to significantly affect whether individuals perceive UPI as a driver of overspending.

Crosstab

Expected Count

	What do you think why you dont check your balance after payment	Total
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Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.775a	2	.151
Likelihood Ratio	3.830	2	.147
Linear-by-Linear Association	3.730	1	.053
N of Valid Cases	102		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.69.

	ignorance	laziness	keep it for future	i check my balance after every payment	
Age 19-30	12.0	11.5	19.7	5.8	49.0
31-50	9.1	8.7	14.9	4.4	37.0
51-above	3.9	3.8	6.4	1.9	16.0
Total	25.0	24.0	41.0	12.0	102.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.280a	6	.056
Likelihood Ratio	12.692	6	.048
Linear-by-Linear Association	7.520	1	.006
N of Valid Cases	102		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.88.

Interpretation:

The 19–30 age group demonstrated a clear preference for citing "I keep it for future" as their reason for not checking their balance. In contrast, older age groups displayed a more even spread across reasons like laziness, unawareness, or consistent balance checking. This reveals a clear age-related pattern, showing that

Objective 3 Crosstab

Expected Count

	Have you faced any challenges with Upi payment		Total
	yes	no	
Age 19-30	25.5	23.5	49.0
31-50	19.2	17.8	37.0
51-above	8.3	7.7	16.0
Total	53.0	49.0	102.0

younger users are more likely to skip checking their balances because of future saving intentions or a more casual approach to spending.

The analysis showed **no statistically significant association** between age and whether users experienced challenges with UPI. However, the linear-by-linear association p-value of **.053** is marginally above the significance level of **.05**, indicating a **possible age-related trend**. Younger users (19–30) reported more issues in absolute terms, but the distribution does not reach statistical significance. While challenges are reported across all age groups, there is **no strong statistical evidence** to suggest age significantly influences the likelihood of facing UPI issues. However, younger users tend to report slightly more challenges.

Crosstab

Expected Count

		what are those challenges				Total
		failed transaction	security concerns	network issues	bank server down	
Age 19-30	32.7	.5	4.8	11.0	49.0	
31-50	24.7	.4	3.6	8.3	37.0	
51-above	10.7	.2	1.6	3.6	16.0	
Total	68.0	1.0	10.0	23.0	102.0	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.502 ^a	6	.277
Likelihood Ratio	7.992	6	.239
Linear-by-Linear Association	4.360	1	.037
N of Valid Cases	102		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .16.

Interpretation: overall Pearson Chi-Square result indicates **no significant difference** between age groups ($p = .277$), the **significant linear-by-linear association** ($p = .037$) reveals a trend: **younger users (particularly 19–30)** more frequently selected **“failed transactions”** as their primary challenge, while older users were more evenly distributed across issues. There is a **notable trend** across age, where **younger individuals are more affected by failed transactions**, while older users face a broader variety of issues. the overall association is not significant, but the **linear trend is**, suggesting generational differences in the types of UPI problems encountered.

Cross tab

Expected Count

	will you still using upi if starts charging fees		Total
	yes	no	
age 19-30	11.0	38.0	49.0
31-50	8.3	28.7	37.0
51-above	3.6	12.4	16.0
Total	23.0	79.0	102.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.440 ^a	2	.803
Likelihood Ratio	.448	2	.799
Linear-by-Linear Association	.033	1	.857
N of Valid Cases	102		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 3.61.

Interpretation: the results indicate **no significant association** between age and willingness to continue using UPI if it begins charging fees. Across all age groups, a **large majority** of participants indicated they would **not** continue usage if UPI became a paid service. Users across all age brackets are largely unified in their opposition to UPI fees, and age has no measurable effect on this sentiment.

Limitations of the Study

While the study provides significant insights into UPI adoption, several inherent limitations can be identified:

- **Sampling Method Bias:** The researchers utilized Convenience Sampling, which, while efficient for data collection, can lead to selection bias and may not provide a perfectly representative cross-section of all demographic groups.
- **Sample Size:** The analysis is based on a valid case count of 102 respondents, a relatively small sample size for generalizing broad consumer behavior trends across a national scale.
- **Self-Reported Data Risks:** The study relies on primary data from questionnaires and surveys, which are subject to respondent bias, such as underreporting "impulsive buying" or "overspending" due to social desirability.
- **Statistical Significance:** Several analyzed associations—such as the link between age and challenges faced, or age and the perception of overspending—were found to be not statistically significant, limiting the ability to draw definitive conclusions on those specific generational differences.

Suggestions for Stakeholders

Based on the findings regarding user challenges and behavior, the following suggestions are offered for policymakers, financial institutions, and businesses:

1. Improve System Reliability and Infrastructure

Address Technical Failures: Since "failed transactions" were identified as a primary challenge, especially for younger users, financial institutions must prioritize the stability of bank servers and network interfaces to maintain user trust.

Enhance Rural Outreach: Given that 63.7% of the respondents were from rural areas, efforts should continue to ensure that digital infrastructure is robust enough to handle transactions in locations with potentially weaker connectivity.

2. Maintain Cost-Effective Ecosystems

Avoid Transaction Fees: A large majority of users across all age groups indicated they would discontinue using UPI if fees were introduced. To sustain the growth of a cashless economy, the ecosystem should remain free or highly cost-effective for the end-user.

3. Targeted Digital Literacy and Inclusion

Support for Older Demographics: The study found that the 51+ age group has the lowest usage frequency. Targeted educational programs are needed to bridge this digital literacy gap and encourage adoption among older citizens.

Financial Awareness Tools: Since many users (particularly the 19–30 group) acknowledge that UPI can lead to overspending and a more "casual approach" to checking balances, banks could integrate better real-time spending trackers and budgeting alerts within UPI apps.

4. Security and Trust Building

Data Protection: With 25% of users expressing concerns about data security and technical glitches, stakeholders should invest in transparent security protocols and public awareness campaigns to boost confidence in digital transactions.

Conclusion

The UPI-led digital payment revolution has brought substantial changes in the Dehradun region, as demonstrated by this research. Out of 100 respondents, 85% were aware of UPI and 72% actively used it for regular transactions. A significant 60% acknowledged that their reliance on cash had decreased, while 25% expressed concerns about data security and technical glitches. These figures confirm that UPI is a dominant force in driving the shift toward a cashless economy in the region. Young adults aged 18–35 are at the forefront of this transformation, contributing significantly to digital adoption. Nevertheless, continued efforts are required to address digital literacy gaps, especially among older citizens, and to improve trust and reliability in the system. With focused efforts from stakeholders and the government, the momentum of digital payment adoption in Dehradun can be further strengthened, setting an example for other semi-urban areas.

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