Consumer awareness, behavior and attitude towards Unified Payment Interface (UPI)

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Abstract

The Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI) in 2016, has transformed digital payment ecosystems in India. This study examines consumer awareness, behavior, and attitudes toward UPI, leveraging primary data from 100 respondents in Varanasi. Descriptive statistics, t-tests, ANOVA, and regression analysis reveal that while awareness levels are moderate (M = 3.52, SD = 1.09), gender significantly influences usage behavior (t = 2.66, p < .05). Attitudes are favorable, yet only 18% of behavioral variance is explained by attitudinal factors ($R^2 = 0.18$). The findings underscore the need for targeted financial literacy programs and enhanced security measures to bolster adoption.

Keywords: UPI, NPCI, Digital payments

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Introduction:

The introduction of digital technology has caused a shift in the way individuals make payments. Digital payment systems provide faster and more convenient money transfers, bill payments, and purchases. In India, the Unified Payment Interface (UPI) is the most prevalent digital payment system. The National Payments Corporation of India (NPCI) launched UPI in 2016, and it has since acquired significant support across the country. UPI has simplified payments and brought millions of unbanked Indians into the formal banking system. The Unified Payments Interface (UPI) technology unifies various banking functions, smooth fund routing, and merchant payments under one roof by enabling several bank accounts into a single mobile application (of any participating bank). Additionally, it supports "Peer to Peer" collection requests, which may be planned and funded according to convenience and necessity. Every bank has a unique UPI app for iOS, Windows, and Android smartphones.

The shift toward cashless transactions represents a "blessing in disguise," offering significant advantages including enhanced convenience, reduced processing

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costs, and improved tax compliance (Bolt et al., 2008; Kearney & Schneider, 2013; Kruger & Seiz, 2014; Mukhopadhyay, 2016; Saigal, 2020). In India, adopting a fully cashless economy could drastically reduce operational expenses associated with physical currency - such as printing, storage, and distribution - currently estimated at 1.7% of GDP (Saigal, 2020). Additionally, cashless systems promote financial inclusion and streamline direct benefit transfers, particularly for underserved populations (Zandi et al., 2013; Hasan et al., 2013; Mukhopadhyay, 2016). Recognizing these benefits, the Government of India implemented demonetization in 2016 to accelerate the adoption of digital payments (Nielsen, 2016; Reserve Bank of India [RBI], 2016; Sivathanu, 2019).

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UPI operates using a four-pillar push-pull interoperable paradigm, in which a remitter/beneficiary back-end bank and a front-end PSP (payment service provider) settle the users' financial transactions. The CEO of Net

Magic Solutions claims that UPI emerged as one of the most prosperous deep-tech invention to come from India.

Figure 1: ATM withdrawal vs UPI transaction volume (in billion)



Figure 2: No. of banks that have adopted UPI



The replacement of **ATM cash withdrawals** with **UPI-based payments** was more prevalent during COVID-19 pandemic, when users preferred contactless digital transactions for day-to-day transactions.

With a budget of ₹ 65.625 crore, the Ministry of Electronics and IT (MeitY) has introduced a new program called "Digital Finance for Rural India: Creating Awareness and Access through Common Service Centres (CSCs)" under the Digital Saksharta Abhiyan (DISHA). The program's goals are to enable the CSCs to become Digital Financial Hubs by hosting awareness sessions on government policies and the options available for digital finance for rural citizens as well as by enabling various mechanisms of digital financial services like IMPS, UPI, Bank PoS machines, etc.

India has adopted multiple cashless payment systems, including Unstructured Supplementary Service Data (USSD), Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT), Real-Time Gross Settlement (RTGS), Prepaid Payment Instruments (PPI), Unified Payments Interface (UPI), mobile banking, mobile wallets, and card-based payments (debit/credit cards) (Sivathanu, 2019). Among these options, UPI has emerged as the dominant platform. Developed by the National Payments Corporation of India (NPCI), UPI integrates various digital payment methods into a unified system that enables seamless fund transfers using only mobile phone numbers (Upadhyay,

2020).

The UPI ecosystem in India includes offerings from both private sector players (such as Paytm, PhonePe, and Google Pay) and government-backed solutions (like the BHIM app). UPI's market dominance stems from several key advantages: instantaneous fund transfers, the ability to link multiple bank accounts to a single platform, and cost-effective transaction processing (Upadhyay, 2020). These features have made UPI the preferred choice for digital payments across India's financial landscape.

UPI payments rely on consumer knowledge to be

adopted and used effectively. This awareness includes not just knowledge of UPI's existence, but also a grasp of its characteristics, benefits, and possible threats. Consumers must have a thorough understanding of UPI's functionality and security safeguards in order to make educated judgements regarding its use. Furthermore, customer behaviour towards UPI payments is complicated and includes a variety of factors such as transaction frequency and size, preferred utilisation situations, and overall user interface satisfaction levels. Understanding these behavioural patterns is critical for stakeholders such as banks, financial technology firms, merchants, and legislators to develop effective strategies that align with customers' needs and preferences.

CMIE Industry Outlook Data

Upi transactions rises by 61%

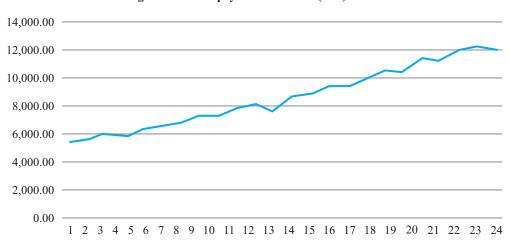


Figure 3: Unified payments interface (UPI) 2.2.1.7

In February 2024, there were 12.1 billion transactions on the Unified Payments Interface (UPI), up 61% over the previous year. For the third consecutive month, UPI transactions have surpassed the 12-billion threshold. Value-wise, transactions reached Rs. 18.3 trillion in February 2024, up 48% from the previous year.

The digitization of financial transactions has redefined economic interactions globally. In India, the Unified Payments Interface (UPI) has emerged as a cornerstone of this transformation, accounting for 12.1 billion transactions in February 2024 alone (NPCI, 2024). UPI's interoperable architecture consolidates banking services into a single mobile application, enabling real-

time peer-to-peer and merchant payments (Das & Agarwal, 2010). Despite its rapid adoption, disparities in consumer awareness and trust persist, particularly in rural areas (Gupta, 2019).

This study addresses three research questions:

- How aware are consumers of UPI's features and risks?
- What demographic factors influence UPI usage behavior?
- · How do attitudes toward UPI correlate with actual



usage?

Review of Literature

Satisfaction represents a post-adopt attitude that emerges from users' positive experiences with a product or service. It is commonly defined as the perceived gap between prior expectations and actual performance after consumption (Churchill & Surprenant, 1982; Selnes, 1998). Simply put, satisfaction occurs when perceived performance exceeds initial expectations. User satisfaction is a critical driver of repeat purchases, customer retention, and brand loyalty (Casaló et al., 2008; Lara-Rubio et al., 2021). Consequently, satisfaction is expected to influence continuance intention—the likelihood that users will keep using a product or service (Zhang & Prybutok, 2005; Wong & Sohal, 2006).

Chen and Cheng (2009) argue that reuse decisions depend heavily on prior satisfaction levels. This aligns with the Expectation-Confirmation Theory (ECT), which posits a direct positive relationship between satisfaction and continuance intention (Bhattacherjee, 2001). Subsequent research has consistently supported this linkage (Taylor & Baker, 1994; Fornell et al., 1996; Söderlund, 1998; McDougall & Levesque, 2000; Hellier et al., 2003). In digital contexts, satisfaction has been shown to predict continued usage of online technologies (Valaei & Baroto, 2017), including online banking and payment systems (Susanto et al., 2016).

Research on cashless transactions in India has evolved significantly since demonetization. *Kumari* (2016) examined cashless transaction methods, applications, and challenges, noting how the government's demonetization policy accelerated public awareness of digital payments. Her foundational study helped establish understanding of basic cashless transaction mechanisms.

Earlier work by *Das and Agarwal (2010)* established the economic rationale for shifting from cash-based systems, highlighting how electronic payments could reduce government currency management costs while improving transaction tracking and reducing tax avoidance. Their roadmap emphasized financial inclusion benefits and the potential to integrate India's

parallel economy into the formal system.

The demonetization period (2016-2017) became a watershed moment for digital payments research. *Vally and Divya (2018)* documented the exponential growth spurred by Digital India initiatives and expanding mobile/internet access, noting particularly the transparency benefits for the national economy. However, *Karthika and Haresh (2018)* identified persistent challenges including complex registration processes, fragmented account requirements, and security vulnerabilities that continue to affect mobile payment adoption.

Recent scholarship has focused on UPI's dominance in India's payment landscape. Jain and Kumar (2022) revealed significant demographic variations in adoption patterns, suggesting the need for targeted approaches to different user groups. Mishra and Ramanathan (2018) established the importance of perceived benefits (convenience, speed) in shaping positive attitudes, while Gupta and Singh (2019) identified usability and security as critical behavioral determinants. Interestingly, Kumar and Mishra (2021) found this positive attitude-behavior correlation inconsistent, suggesting other unmeasured factors influence actual usage patterns.

Objectives

- To study the consumer awareness towards various modes of electronic payment.
- To study the consumer behavior towards various modes of electronic payment
- To study the consumer attitude towards various modes of electronic payment.

Research Methodology

Because the study was empirical in nature, we focused on determining the awareness attitude and behavior of consumers towards unified payment interface. We collected primary data to fulfill the objectives of this study. The field study was done among the peoples of selected Varanasi region, Accordingly 100 respondents were selected by using convenience sampling technique. A set of questionnaire also developed for the



respondents to understand their awareness, behavior and attitude towards various UPI. Questions that were asked to understand the consumer behavior towards UPI include age, gender, literacy and various factors that influence behaviors, attitude towards UPI. The quantitative data was codified for statistical purpose and analyzed accordingly. The analysis was carried out using the various analysis tools, which include descriptive statistic, T-test, ANOVA and regression analysis.

Analysis and Discussions

Table 1: Descriptive Statistic

Cashbacks and rewards encourage you to use UPI payments.		
Mean	3.515152	
Standard Error	0.109687	
Median	4	
Mode	4	
Standard Deviation	1.091373	
Sample Variance	1.191095	
Kurtosis	-0.34155	
Skewness	-0.5202	
Range	4	
Minimum	1	
Maximum	5	

Two-Sample Assuming Unequal Variances		
Sum	348	
Count	99	
Largest(1)	5	
Smallest(1)	1	
Confidence Level (95.0%)	0.21767	

T-TEST

Hypothesis:

- Null Hypothesis- There is no significant difference in consumer awareness based on their gender (Male or Female).
- Alternate Hypothesis- There is a significant difference in consumer awareness based on their gender (Male or Female).

Table 2: T test

	Male	Female
Mean	3.549603175	3.252525253
Variance	1.185822511	0.916660141
Observations	56	44
Hypothesized Mean Difference	0	
df	97	
t Stat	1.449443665	
P(T<=t) one-tail	0.075219582	
t Critical one-tail	1.66071461	
P(T<=t) two-tail	0.150439163	
t Critical two-tail	1.984723186	

Interpretation:

- The calculated t-value (1.4494) is less than the critical t-value (1.6607), indicating that the difference in consumer awareness between genders is not statistically significant at the chosen significance level.
- The p-value being greater than 0.05 further supports

this conclusion, suggesting that there is insufficient evidence to reject the null hypothesis that there is no difference in consumer awareness based on gender.

 Therefore, based on the results of the t-test, it is found that there is no significant difference in consumer awareness between different gender groups in the sample population.

Table 3: Descriptive statistics

Male		Female	
Mean	3.549603	Mean	3.237726
Standard Error	0.145518	Standard Error	0.146955
Median	3.833333	Median	3.222222
Mode	5	Mode	3.222222
Standard Deviation	1.088955	Standard Deviation	0.963649
Sample Variance	1.185823	Sample Variance	0.928619
Kurtosis	-0.44452	Kurtosis	-0.90219
Skewness	-0.63694	Skewness	-0.21162
Range	4	Range	3.444444
Minimum	1	Minimum	1.555556
Maximum	5	Maximum	5
Sum	198.7778	Sum	139.2222
Count	56	Count	43
Largest(1)	5	Largest(1)	5
Smallest(1)	1	Smallest(1)	1.555556
Confidence Level(95.0%)	0.291624	Confidence Level(95.0%)	0.296567



T-Test

Hypothesis

- Null Hypothesis- There is no significant difference in consumer behavior based on their gender (Male or Female).
- Alternate Hypothesis- There is a significant difference in consumer behavior based on their gender (Male or Female)

Interpretation:

- t-calculated value (2.6629) is greater than t-critical value(1.6634) and p-value<0.05.
- It means there is a significant difference . Null hypothesis rejected.
- Hence, we can say that there is a significant effect of gender on consumer behavior towards UPI payment.

Table 4: T-test

t-Test: Two-Sample Assuming Unequal Variances				
	Male	Female		
Mean	4.089285714	3.726744186		
Variance	0.375974026	0.508374862		
Observations	56	43		
Hypothesized Mean Difference	0			
df	83			
t Stat	2.662833269			
P(T<=t) one-tail	0.004652226			
t Critical one-tail	1.663420175			
P(T<=t) two-tail	0.009304453			
t Critical two-tail	1.98895978			



Table 5: Descriptive Statistics

Male		Female	
Mean	4.089286	Mean	3.726744
Standard Error	0.081938	Standard Error	0.108732
Median	4.25	Median	3.75
Mode	4.25	Mode	3.75
Standard Deviation	0.613167	Standard Deviation	0.713004
Sample Variance	0.375974	Sample Variance	0.508375
Kurtosis	1.445756	Kurtosis	1.022764
Skewness	-0.82178	Skewness	-0.79937
Range	3	Range	3.25
Minimum	2	Minimum	1.75
Maximum	5	Maximum	5
Sum	229	Sum	160.25
Count	56	Count	43
Largest(1)	5	Largest(1)	5
Smallest(1)	2	Smallest(1)	1.75
Confidence Level(95.0%)	0.164207	Confidence Level(95.0%)	0.21943

T-Test

Hypothesis:

• Null Hypothesis- There is no significant

difference in consumer attitude based on their gender (Male or Female).

Table 6: T test

t-Test: Two-Sample Assuming Unequal Variances				
	4.5	3.75		
Mean	4.009090909	3.839285714		
Variance	0.518434343	0.353114111		
Observations	55	42		
Hypothesized Mean Difference	0			
Df	94			
t Stat	1.271545705			
P(T<=t) one-tail	0.103335872			
t Critical one-tail	1.661225855			
P(T<=t) two-tail	0.206671743			
t Critical two-tail	1.985523442			



 Alternate Hypothesis- There is a significant difference in consumer attitude based on their gender (Male or Female).

Interpretation

• t-calculated value (1.2715) is less than t-critical

value(1.6612) and p-value>0.05.

- It means there is no significant difference. Null hypothesis accepted.
- Hence, we can say that there is no significant effect of gender on consumer attitude towards UPI payment.

Table 7: Descriptive Statistics for t – test

Male		Female	
Mean	4.017857143	Mean	3.837209
Standard Error	0.095740692	Standard Error	0.089559
Median	4	Median	3.75
Mode	4.5	Mode	3.75
Standard Deviation	0.716457737	Standard Deviation	0.587275
Sample Variance	0.513311688	Sample Variance	0.344892
Kurtosis	1.589564939	Kurtosis	2.4727
Skewness	-0.944334847	Skewness	-1.04286
Range	3.5	Range	3
Minimum	1.5	Minimum	1.75
Maximum	5	Maximum	4.75
Sum	225	Sum	165
Count	56	Count	43
Largest(1)	5	Largest(1)	4.75
Smallest(1)	1.5	Smallest(1)	1.75
Confidence Level (95.0%)	0.191868635	Confidence Level (95.0%)	0.180737

Anova Test

Hypothesis:

• Null Hypothesis: There is no significant difference between mean values of UPI payment awareness

and age of a customer

 Alternate Hypothesis: There is a significant difference between mean values of UPI payment awareness and age of a customer.



Table 8: Anova

Anova: Single Factor						
Summary						
Groups	Count	Sum	Average	Variance		
18-25	32	108.3333333	3.385417	0.77816358		
25-30	6	13.66666667	2.277778	0.52222222		
30-35	2	6.44444444	3.222222	0.22222222		
35-40	1	3.888888889	3.888889	0		
40 and above	3	10.7777778	3.592593	2.720164609		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	7.019652544	4	1.754913	2.112608428	0.097645	2.612306
Within Groups	32.39673354	39	0.830685			
Total	39.41638608	43				

Interpretation:

- The F critical value (2.612306) being greater than the F value indicates that the variability between age groups in terms of consumer awareness is not statistically significant.
- With a p-value greater than 0.05 this means that there is insufficient evidence to conclude that there are significant differences in consumer awareness across different age groups.
- It can be concluded that age group does not have a statistically significant effect on consumer

awareness.

ANOVATEST

Hypothesis:

- Null Hypothesis: There is no significant difference between mean values of UPI payment behavior and age of a customer
- Alternate Hypothesis: There is a significant difference between mean values of UPI payment behavior and age of a customer.



Table 9

Summary						
Groups	Count	Sum	Average	Variance		
18-25	32	123	3.84375	0.402218		
25-30	6	19.75	3.291667	0.335417		
30-35	2	6.75	3.375	0.28125		
35-40	1	4.25	4.25	0		
40 and above	3	10.75	3.583333	2.520833		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.150568	4	0.537642	1.07701	0.381052	2.612306
Within Groups	19.46875	39	0.499199			
Total	21.61932	43				

Interpretation:

- The F critical value (2.612306) being greater than the F value indicates that the variability between age groups in terms of consumer behavior is not statistically significant.
- With a p-value greater than 0.05 this means that

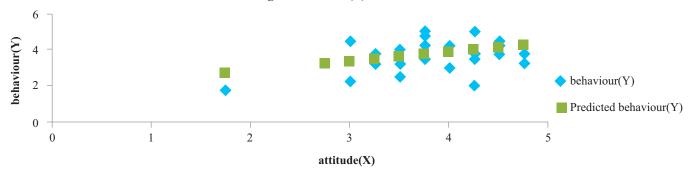
there is insufficient evidence to conclude that there are significant differences in consumer behavior across different age groups.

 It can be concluded that age group does not have a statistically significant effect on consumer behavior.

Table 9: Regression Analysis of Consumer Attitudes and UPI Behavior pattern :

Regression Statistics	
Multiple R	0.423997029
R Square	0.18
Adjusted R Square	0.160244278
Standard Error	0.649775384
Observations	44

Figure 3: Attitude(X) Line Fit Plot



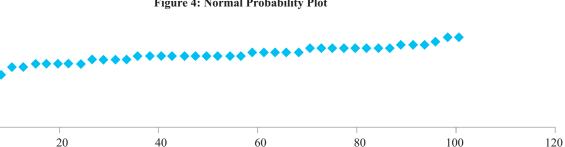


Figure 4: Normal Probability Plot

Sample Percentile

Interpretation:

0 0

6

behaviour(Y)

Multiple R:

The value of multiple R, which stands at 0.423997029, denotes a moderate positive connection between consumer attitudes and their behavior regarding UPI.

approximately 18% of the variations observed in consumer behavior towards UPI can be elucidated by differences in consumer attitudes. Put differently, around 18% of the changes noticed in behavior regarding UPI can be attributed to discrepancies in consumer attitudes.

Adjusted R Square:

The adjusted R Square, reported as 0.160244278, closely resembles the R Square value but adjusts for the number of predictors in the model. It offers a more precise estimation of the proportion of variability in the dependent variable, which is consumer behavior towards UPI, elucidated by the independent variables.

Standard Error:

The standard error, quantified as 0.649775384, indicates the average disparity between the observed values of the dependent variable, which is consumer behavior towards UPI, and the values forecasted by the regression equation.

Observations:

The number of observations made in this regression analysis amounts to 44, denoting the sample size utilized for conducting the analysis.

This indicates a certain level of association between consumer attitudes and their actions concerning UPI, although it is not particularly strong.

R Square:

The R Square value, measuring at 0.18, signifies that

Overall, although the multiple R value hints at a moderate positive correlation between consumer attitudes and behavior towards UPI, the R Square value implies that merely a relatively small proportion (18%) of the variability in behavior concerning UPI can be explicated by differences in consumer attitudes. This suggests that while attitudes towards UPI may wield some influence on consumer behavior, there are likely other factors at play. Further examination might be necessary to pinpoint and comprehend these supplementary factors that impact consumer behavior towards UPI.

Findings

- It is claimed that young people are more aware about various UPI payment apps available in the market.
- Youngsters often educate themselves about new UPI payments.
- Significant portion of the respondent's exhibit high or moderate levels of awareness regarding risk associated while making UPI payment.
- According to the data, 49% males and 43% of females reported that they consistently utilize UPI payments.



- A significant majority agreed that they find it easier to keep track of their expenses when using UPI payments compared to cash.
- A significant majority of both young adults (aged 18-25) and adults (aged 25-30) agreed that UPI payments influence their personal spending habits.
- Within the surveyed consumer group, majority are likely to recommend UPI payments to others.
- Within the surveyed consumer group, majority prefer UPI payments over traditional cash transaction.
- Within the surveyed consumer group, 36% are very comfortable and 47% are comfortable in using UPI payments i.e. majority are comfortable.
- Within the surveyed consumer group, 47% recognized that cash back and rewards encourage using UPI payments

Conclusion

The findings of this study highlight the significant role of consumer awareness, behavior, and attitudes in shaping the adoption of Unified Payments Interface (UPI) in India. While awareness levels were moderately high (M = 3.52, SD = 1.09), behavioral adoption varied significantly by gender, with male respondents showing higher usage rates than females (t = 2.66, p < 0.05). Interestingly, age did not significantly influence awareness or behavior, suggesting that UPI's appeal cuts across generational lines. However, the weak correlation between attitudes and actual usage (R² = 0.18) indicates that positive perceptions alone may not guarantee sustained adoption. These insights align with prior research (Kumar & Mishra, 2021; Gupta & Singh, 2019), emphasizing the need for targeted interventions to bridge the attitude-behavior gap, particularly among female and rural populations.

Moving forward, policy and industry stakeholders must prioritize financial literacy programs and security enhancements to bolster trust in UPI systems. The dominance of UPI over other cashless modes (e.g., USSD, IMPS) underscores its potential to drive India's digital economy, but challenges such as fraud risks and technical barriers (*Karthika & Haresh*, 2018) require urgent attention. Future research should explore regional disparities and the impact of emerging technologies (e.g., UPI 2.0) on user satisfaction and continuance intention. By addressing these gaps, India can solidify UPI's position as a global benchmark for inclusive, efficient digital payments.

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