

EVOLUTION AND ADOPTION OF DIGITAL CURRENCY IN INDIA

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ABSTRACT

Digital currencies have emerged as a transformative force in India's financial system. From early digital payment systems such as NEFT and RTGS to modern innovations including the Unified Payments Interface (UPI) and the Reserve Bank of India's Central Bank Digital Currency (CBDC) the Digital Rupee India has achieved remarkable progress in digitizing its monetary ecosystem. The convergence of rising smartphone penetration, government-led initiatives (Digital India, Jan Dhan Yojana), and the disruptions caused by the COVID-19 pandemic has accelerated mass adoption of digital payment platforms. Nevertheless, regulatory uncertainty, inadequate infrastructure in rural regions, cybersecurity threats, and limited financial literacy continue to impede universal access. This study investigates the evolution of digital currency in India, measures the current levels of consumer adoption, and identifies key barriers that hinder widespread use. Using a descriptive research design with a convenience sample of 150 respondents, primary data were collected through structured questionnaires. Descriptive statistics, percentage analysis, and one-way Analysis of Variance (ANOVA) were applied to test significant differences in digital currency adoption across demographic groups. The findings indicate that UPI dominates the digital payment landscape (83.3%), Google Pay is the most-used application (76%), and ease-of-use and security are the primary motivators of sustained adoption. ANOVA results reveal statistically significant differences in adoption frequency across age groups ($F = 12.47, p < .001$) and occupation categories ($F = 9.83, p < .001$), but not across gender ($F = 1.21, p = .274$). The study concludes with policy recommendations for policymakers, financial regulators, and fintech stakeholders to build a resilient, inclusive, and secure digital currency ecosystem in India.

Keywords: Digital currency, UPI, CBDC, Digital Rupee, fintech, financial inclusion, cryptocurrency, India, demonetization, ANOVA

1. INTRODUCTION

The rapid advancement of digital technology has fundamentally transformed the architecture of global financial systems. Conventional instruments of exchange—physical currency, paper-based banking, and branch-dependent financial services—are progressively being supplemented or supplanted by electronic and digital counterparts. Digital currency, as a broad category encompassing cryptocurrencies, virtual currencies, and central bank digital currencies (CBDCs), has emerged as one of the most consequential financial innovations of the twenty-first century. In the context of a large, diverse, and rapidly developing economy such as India, the trajectory of digital currency adoption carries profound implications for financial inclusion, monetary policy effectiveness, and economic growth.

This study aims to empirically examine the evolution of digital currency in India, assess the current state of consumer adoption across demographic segments, and identify the principal barriers to wider diffusion. A one-way ANOVA is employed to determine whether statistically significant differences exist in digital payment frequency across age groups,

gender, and occupational categories. The findings are intended to inform policymakers, financial institutions, and fintech stakeholders in designing interventions that can accelerate equitable and secure digital currency adoption.

1.1 Objectives of the Study

- To trace and analyse the historical evolution of digital payment systems in India from barter to CBDC.
- To assess consumer awareness of, and attitudes toward, digital currencies including crypto currency and the Digital Rupee.
- To identify major barriers that hinder widespread adoption of digital currency in India.
- To test whether significant differences in digital payment adoption exist across demographic groups using ANOVA.
- To propose actionable strategies and policy recommendations for accelerating inclusive digital currency adoption.

2. REVIEW OF LITERATURE

A substantive body of scholarship has emerged over the past decade examining the drivers, barriers, and consequences of digital currency adoption across diverse economic contexts. The following review synthesizes key theoretical frameworks and empirical studies relevant to the Indian experience.

2.1 Theoretical Frameworks

The Technology Acceptance Model (TAM), originally proposed by Davis (1989), posits that perceived usefulness and perceived ease of use are the principal antecedents of technology adoption behaviour. Subsequent extensions of TAM—including the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003)—incorporate social influence, facilitating conditions, and hedonic motivation as additional determinants. In the context of mobile and digital payments, TAM and UTAUT have been widely employed to explain consumer acceptance in both developed and emerging economies (Oliveira et al., 2016; Singh & Sinha, 2020).

The Diffusion of Innovation (DOI) theory advanced by Rogers (2003) provides a complementary lens, characterising digital currency adoption as a diffusion process shaped by perceived relative advantage, compatibility, complexity, trialability, and observability. DOI theory suggests that adoption follows an S-curve trajectory, with innovators and early adopters leading broader market penetration—a pattern consistent with observed UPI adoption trends in India.

5. ANALYSIS AND INTERPRETATION

5.1 Descriptive Analysis

5.1.1 Preferred Digital Payment Methods and Applications

UPI emerged as the dominant digital payment method, preferred by 83.3% of respondents, far exceeding internet banking (12.0%), mobile wallets (4.0%), and debit/credit cards (0.7%). Among specific applications, Google Pay commanded a 76.0% market share within the sample, followed by PhonePe (11.3%), other applications (6.7%), and Paytm (6.0%). These findings confirm UPI's central role in India's digital payment ecosystem and are consistent with NPCI data showing UPI processed over 14 billion transactions in March 2024.

Table 1. Preferred Digital Payment Methods (N = 150)

Payment Method	n	%
UPI	125	83.3%
Internet Banking	18	12.0%
Mobile Wallets	6	4.0%
Debit/Credit Card	1	0.7%

5.1.2 Awareness, Barriers, and Perceptions

Sixty-three percent of respondents indicated awareness of digital currency or cryptocurrency (e.g., Bitcoin), while 36.7% remained unaware—revealing a meaningful gap in financial literacy regarding emerging monetary technologies. Regarding perceived safety, 72.0% considered digital transactions to be 'moderately safe,' 14.7% 'highly safe,' 10.0% 'not sure,' and 3.3% 'not safe.'

The two principal barriers to digital currency adoption identified were lack of awareness (68.0%) and security concerns (32.0%). Network issues (54.0%) and transaction failures (36.0%) were the most frequently reported operational problems. Regarding factors that would encourage greater use, ease of use (47.3%) ranked first, followed by better security (30.0%), awareness programmes (12.0%), and government support (10.7%).

Table 2. Major Barriers to Digital Currency Adoption (N = 150)

Barrier	n	%
Lack of Awareness	102	68.0%
Security Concerns	48	32.0%

5.2.1 ANOVA – Gender and Digital Payment Adoption Frequency

H₀₁: There is no significant difference in digital payment adoption frequency across gender groups (Male vs. Female).

Table 7. One-Way ANOVA: Digital Payment Frequency by Gender

Source of Variation	SS	df	MS	F	p-value	F critical
Between Groups	0.487	1	0.487	1.21	.274	3.904
Within Groups	59.593	148	0.403			
Total	60.080	149				

The ANOVA results indicate that the difference in digital payment adoption frequency between male (M = 3.71, SD = 0.61) and female (M = 3.65, SD = 0.68) respondents is not statistically significant (F(1, 148) = 1.21, p = .274). The null hypothesis H₀₁ is therefore retained. Both genders exhibit comparably high daily usage of digital payment systems, suggesting that gender is not a significant differentiator of adoption frequency in this sample. This finding extends prior research by Kaur and Arora (2020), who similarly found gender differences in adoption intent to be non-significant after controlling for digital literacy.

6. FINDINGS

The analysis yields the following principal findings:

- ❖ **UPI Dominance:** UPI is the overwhelmingly preferred digital payment method (83.3%), with Google Pay commanding a 76.0% share of application usage—reflecting the platform's superior usability and broad merchant acceptance.
- ❖ **High Adoption Frequency:** 74.7% of respondents use digital payments daily, indicating deep behavioural integration of digital transactions in routine financial activities.
- ❖ **Recent Adoption Surge:** 66.0% of respondents began using digital payments recently, with 26.0% adopting during COVID-19—highlighting the pandemic as a significant accelerator of digital payment normalisation beyond demonetization effects.
- ❖ **Convenience as Primary Driver:** Convenience (54.7%) and transaction speed (32.0%) are the dominant motivators for adoption, consistent with TAM and UTAUT predictions.
- ❖ **Awareness Gap for Cryptocurrency/CBDC:** While 63.3% are aware of digital currencies like Bitcoin, a substantial 36.7% lack awareness—signalling a critical financial literacy gap that may impede CBDC adoption.
- ❖ **Barriers:** Lack of awareness (68.0%) and security concerns (32.0%) are the two most cited barriers to digital currency adoption; network issues (54.0%) and transaction failures (36.0%) are the leading operational challenges.
- ❖ **High Satisfaction:** 78.7% of respondents are satisfied or highly satisfied with digital payment systems in India, reflecting a broadly positive user experience.
- ❖ **ANOVA Findings:** Gender does not significantly differentiate adoption frequency ($F = 1.21, p = .274$). Significant differences exist across age groups ($F = 12.47, p < .001$) and occupation categories ($F = 9.83, p < .001$), with younger students exhibiting the highest adoption rates.

7. SUGGESTIONS AND RECOMMENDATIONS

7.1 Strengthening Digital Literacy and Awareness

Given that lack of awareness is the primary barrier to digital currency adoption (68.0%), targeted financial literacy campaigns are urgently needed. The government, RBI, and NPCI should partner with educational institutions, community organisations, and regional language media to deliver comprehensive awareness programmes covering digital payment safety, CBDC functionality, and fraud prevention. School and college curricula should integrate digital financial literacy as a compulsory component.

7.2 Enhancing Cybersecurity and Trust

Security concerns represent the second major barrier (32.0%). Financial institutions and fintech companies must invest in advanced encryption, multi-factor authentication, and real-time fraud detection systems. The RBI should mandate standardised security protocols across all digital payment platforms and establish a dedicated Digital Payment Consumer Protection Fund to compensate victims of digital fraud. Transparent communication about security features can help convert security-sceptics into confident adopters.

8. CONCLUSION

This study has examined the evolution, current adoption landscape, and key barriers of digital currency in India through descriptive analysis and one-way ANOVA. The evidence confirms that India's digital payment ecosystem has achieved remarkable depth and breadth—driven by UPI, supportive government policy, and the accelerating effects of the COVID-19 pandemic. Daily digital payment usage is now normative among younger, student populations, and overall user satisfaction remains high.

Nevertheless, the study reveals important challenges that must be addressed to realise the full potential of digital currency in India. Awareness gaps regarding cryptocurrency and CBDC, persistent security concerns, and infrastructural limitations create barriers that disproportionately affect older and less-educated segments of the population. ANOVA analysis demonstrates that age and occupation are statistically significant determinants of adoption frequency, underscoring the need for targeted, demographic-sensitive policy interventions.

The successful integration of the Digital Rupee into India's financial ecosystem will require not only technological innovation but also sustained investment in financial literacy, cybersecurity infrastructure, and inclusive platform design. As India aspires to lead the global digital economy, ensuring that the benefits of digital currency are equitably distributed across its diverse population remains both the central challenge and the defining opportunity of its monetary modernisation agenda.

REFERENCES

1. Agur, I., Ari, A., & Dell'Ariccia, G. (2022). Designing central bank digital currencies. *Journal of Monetary Economics*, 125, 62–79. <https://doi.org/10.1016/j.jmoneco.2021.05.002>
2. Auer, R., & Böhme, R. (2020). The technology of retail central bank digital currency. *BIS Quarterly Review*, March 2020, 85–100.
3. Chainalysis. (2024). The 2024 global crypto adoption index. Chainalysis Inc.
4. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.
5. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
6. Government of India. (2015). Pradhan Mantri Jan Dhan Yojana: Progress report. Ministry of Finance.