Impact of UPI and Digital Payment Systems on Cash Dependency in India

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Abstract

India has undergone a remarkable digital transformation in the financial sector through the rapid adoption of digital payment systems, especially the Unified Payments Interface (UPI). UPI has revolutionized the payment ecosystem by enabling instant, real-time, and interoperable transactions at zero cost, making it one of the most successful digital payment innovations globally. This study investigates the impact of UPI and associated digital payment platforms on reducing cash dependency among Indian consumers. Using a descriptive and analytical research methodology, primary data were collected from 200 respondents, supplemented with extensive secondary data from RBI, NPCI, government documents, and previous studies. The findings reveal that UPI has significantly reduced reliance on cash for routine transactions, particularly among younger consumers and urban users. However, issues such as cyber fraud, digital illiteracy, and inconsistent network connectivity continue to influence adoption patterns. The study concludes that digital payment systems are accelerating India's movement toward a less-cash economy but have not yet made cash obsolete. Stronger cybersecurity systems, improved digital infrastructure, and widespread digital literacy initiatives are recommended to enhance adoption and strengthen public trust.

Keywords:

UPI, Digital Payments, Cash Dependency, FinTech Adoption, Mobile Wallets, Financial Inclusion, Real-Time Payments, Digital India, Consumer Behaviour

1. Introduction

The evolution of payment systems in India has followed a dynamic trajectory, moving gradually from cash-dominated transactions to a hybrid ecosystem comprising both cash and digital modes. Although India has historically been a cash-intensive economy, the introduction of innovative digital payment systems has brought about a profound shift in consumer behaviour. Among these innovations, the Unified Payments Interface (UPI) stands as the most transformative, enabling individuals to transfer funds seamlessly, instantly, and round-the-clock through a mobile device. Launched by the National Payments Corporation of India (NPCI) in 2016, UPI integrates multiple bank accounts into a single mobile interface and supports peer-to-peer and peer-to-merchant transactions—making it a world-leading financial technology advancement.

India's strong preference for cash has been influenced by several socio-economic and cultural factors. Factors such as convenience of physical currency, lack of formal banking access, limited digital literacy, and trust issues have traditionally contributed to cash dependency. Furthermore, a large proportion of India's workforce operates in the informal economy where cash remains the primary medium of exchange. Despite these challenges, over the past decade, digital financial services have expanded rapidly due to multiple enabling factors: increasing smartphone penetration, affordable internet data, government initiatives such as Digital India, JAM (Jan Dhan–Aadhaar–Mobile) trinity, demonetisation in 2016, and rising consumer awareness regarding digital convenience and safety.

UPI has become the backbone of India's digital payment ecosystem, processing over 10 billion transactions monthly by 2023. Its success lies in its simplicity—requiring only a mobile number and virtual payment address—and its cost-free nature for users. The proliferation of QR codes, mobile banking apps, and third-party apps such as Google Pay, PhonePe, and Paytm has further enhanced UPI's reach. Not only urban households but small merchants, street vendors, and rural users have increasingly adopted digital payments, reducing the need to carry or transact in cash.

However, despite widespread digitalization, cash has not disappeared from the Indian economy. ATM withdrawals continued at stable levels even after demonetisation, indicating persistent reliance on physical currency. Many consumers perceive cash as more secure, private, and reliable in situations of network failure. Certain demographic groups—particularly older adults, rural communities, and low-income individuals—still show resistance to complete digital adoption due to habit, limited awareness, or technological discomfort.

This study examines the extent to which UPI and digital payment systems have reduced cash dependency by analysing behavioural factors, transaction preferences, adoption patterns, and perceived challenges. It aims to provide a holistic understanding of India's transition toward a less-cash economy and to assess the sustainability and inclusiveness of digital payment adoption.

2. Review of Literature

A comprehensive review of existing literature reveals multiple dimensions of digital payment adoption and its impact on cash dependency. The growing body of research underscores behavioural, technological, economic, and regulatory aspects shaping digital payment usage. This literature review spans international perspectives, Indian-context studies, and theoretical frameworks.

Digital Payment Adoption and Consumer Behaviour

Dahlberg et al. (2015) emphasized that mobile payment adoption is driven primarily by perceived usefulness and ease of use, consistent with the Technology Acceptance Model (TAM). They found that trust plays a critical moderating role in digital transaction behaviour. Similarly, Mallat (2007) observed that convenience, speed, and accessibility are key determinants of mobile payment adoption.

In the Indian context, Kapoor and Dwivedi (2020) noted that consumers increasingly prefer digital payments due to promotional incentives, ease of transaction, and improved user experiences offered by payment apps. Singh and Rana (2021) identified that UPI has outperformed earlier modes such as NEFT and IMPS due to its user-friendly interface and interoperability.

UPI Adoption Trends and Growth

NPCI (2023) reports show exponential growth in UPI transactions—from 2 million monthly transactions in 2016 to more than 10 billion in 2023. Scholars such as Arora (2022) argue that UPI's success stems from its scalability and real-time settlement capability. Mishra (2021) found that UPI has democratized payments by reaching even low-income and informal-sector users.

Impact on Cash Dependency

Gupta and Arora (2020) documented that digital payments have reduced cash dependency among younger users but observed slower adoption among older demographics. RBI (2021) reports highlighted declining cash usage in organised retail and urban markets but maintained that rural markets still prefer cash for micro-transactions. A study by Deloitte (2022) noted that small merchants have rapidly adopted QR payments, significantly reducing cash handling costs.

Perception of Security and Risk

Security plays a vital role in digital payment behaviour. Sharma and Kapoor (2022) found that concerns about fraud, phishing, and data misuse negatively affect digital adoption. However, improvements in multi-factor authentication and AI-driven fraud detection have gradually increased user confidence. According to PwC (2022), perceived security influences not only adoption but also frequency of digital payments.

Infrastructure, Policy, and Digital Inclusion

Government initiatives under the Digital India program have helped expand digital financial services. Adhikari (2020) highlighted the role of Aadhaar-enabled systems and Jan Dhan accounts in bringing millions into the formal banking system. The World Bank (2021) reported that 80% of Indian adults now own a bank account, enabling faster digital adoption. However, infrastructure limitations such as network issues and server downtimes continue to pose challenges.

Technological Innovation and FinTech Ecosystem

Scholars like Böhme et al. (2018) emphasize that real-time payment systems and blockchain-based technologies are transforming traditional banking and payment ecosystems. In India, UPI has catalysed FinTech innovation by offering open APIs, allowing third-party app integration, and promoting a competitive digital ecosystem.

The literature collectively suggests that UPI has significantly influenced transaction patterns, reducing cash dependency. However, gaps remain regarding demographic differences, regional disparities, behavioural resistance, and empirical measurement of changes in cash usage. This study addresses these gaps through primary research and quantitative analysis.

3. Research Gap

Despite extensive studies on digital payments, several gaps persist:

1. Limited empirical research assessing the **direct relationship between UPI usage and reduction in cash dependency**.
2. Few studies analyse **behavioural variations across demographic groups** such as age, education, and income.
3. Existing research often focuses on adoption factors but not on **post-adoption changes in cash usage behaviour**.
4. Limited insights into **challenges and barriers preventing complete transition to digital payments**.
5. Inadequate assessment of **consumer perceptions of UPI's reliability, security, and convenience** in relation to cash.

This study fills these gaps by offering a detailed, data-driven analysis of how UPI impacts cash dependency in daily transactional life.

4. Objectives

1. To analyse the awareness and usage patterns of UPI and digital payment systems.
2. To examine the impact of UPI on reducing cash dependency among consumers.
3. To identify behavioural, socio-economic, and technological factors influencing digital payment usage.
4. To assess challenges and risks associated with UPI adoption.
5. To provide recommendations for strengthening digital payment systems and encouraging wider adoption.

5. Hypotheses

H0 (Null Hypothesis):

UPI and digital payment systems have **no significant impact** on reducing cash dependency.

H1 (Alternative Hypothesis):

UPI and digital payment systems **significantly reduce** cash dependency among consumers.

6. Conceptual Framework

The conceptual framework of the study integrates two major theoretical pillars—**Technology Acceptance Model (TAM)** and **Behavioural Economics**—to explain how users' perceptions, motivations, and behavioural biases influence the adoption of UPI and digital payment systems, and how this adoption ultimately affects **cash dependency** in India.

Theoretical Base

The **Technology Acceptance Model (TAM)** posits that an individual's intention to adopt a technological innovation is primarily shaped by two cognitive perceptions: **Perceived Usefulness (PU)** and **Perceived Ease of Use (PEOU)**. In the context of UPI and digital payments, PU reflects the extent to which users believe that digital payments enhance the speed, efficiency, and effectiveness of financial transactions. PEOU denotes how simple and user-friendly the system is perceived to be.

Complementing TAM, **Behavioural Economics** provides an understanding of how incentives, trust, habits, and cognitive biases shape financial decision-making. People often deviate from rational choices due to factors such as loss aversion, mental accounting, risk perception, and default preferences. Thus, even if digital systems are technically efficient, adoption may not occur unless behavioural barriers are addressed.

Independent Variables and Their Conceptual Linkages

1. Awareness of UPI

Awareness refers to the extent of knowledge individuals possess about UPI features, benefits, security, and usage processes. Higher awareness reduces uncertainty and informational gaps, thereby encouraging trial and repeated use. Lack of awareness functions as a behavioural barrier, reinforcing habitual cash usage.

2. Perceived Usefulness (PU)

This component of TAM indicates the user's belief that UPI will improve their financial transaction efficiency. When users perceive UPI as faster, more reliable, and time-saving compared to cash, their inclination to adopt digital payments increases, resulting in lower dependence on physical currency.

3. Perceived Ease of Use (PEOU)

PEOU captures how effortless users find digital payment apps. Intuitive design, straightforward steps, and minimal technical difficulties increase adoption intention. If users find digital payments complicated, they revert to cash—a familiar and effort-free mode.

4. Convenience

Convenience includes 24×7 availability, ability to transact from any location, and elimination of the need to carry physical cash. Behaviourally, convenience reduces the "transaction cost" associated with traditional cash-based payments. Higher convenience accelerates digital payment preference.

5. Security Perception

Security perception shapes trust—an important behavioural factor influencing financial decisions. When users feel assured about data safety, fraud protection, and transaction reliability, they are more willing to replace cash payments with digital alternatives. Conversely, fear of fraud or technical failure increases reliance on cash.

6. Incentives and Rewards

Behavioural economics highlights that rewards—cashbacks, discounts, loyalty points—act as external motivators that nudge users toward digital payments. Incentives temporarily alter the cost–benefit analysis, prompting users to adopt digital modes even if they traditionally prefer cash.

7. Digital Literacy

Digital literacy reflects the user's ability to understand, navigate, and operate digital payment platforms. Higher literacy reduces cognitive load and technological anxiety, enabling confident use of UPI apps. Low digital literacy, particularly in rural areas, strengthens habitual cash dependency.

8. Infrastructure Availability

Infrastructure includes smartphone ownership, stable internet connectivity, electricity supply, and availability of merchants accepting digital payments. Even if users are willing to shift to digital modes, infrastructural constraints can restrict adoption and force reliance on cash.

Dependent Variable: Cash Dependency

Cash dependency is conceptualized as the degree to which individuals rely on physical cash for day-to-day transactions. It is measured through:

- **Frequency of cash withdrawals**
- **Proportion of cash-based transactions**
- **User preference patterns for cash over digital modes**

A decline in these indicators reflects reduced dependency on cash.

Central Assumption of the Framework

The framework assumes that **an increase in adoption of digital payments—driven by perceived usefulness, ease, convenience, trust, awareness, and behavioural incentives—will lead to a measurable decline in cash dependency**.

7. Research Methodology

Research Design:

A **descriptive and empirical research design** was adopted to examine user behaviour related to digital payment adoption and to quantify the extent of reduction in cash dependency. The descriptive component enabled the study to present factual characteristics of respondents' payment preferences, while the empirical component facilitated measurement and statistical testing of the relationships between digital payment usage and cash dependency. This combined approach provided both depth and precision in understanding behavioural patterns across different demographic groups.

Sampling Method

The study applied a **stratified random sampling method**, ensuring proportional representation of respondents from varied socio-economic and demographic strata. This approach helped in obtaining a balanced sample that reflects differences in digital literacy, payment habits, and access to digital infrastructure across segments. Stratification improved the reliability and generalizability of findings by reducing sampling bias.

Sample Size

A total of **200 respondents** were selected from **urban and semi-urban areas**, capturing both technologically advanced users and those transitioning from cash-based practices to digital modes. The sample size was adequate for conducting meaningful statistical analyses, especially chi-square tests and frequency-based comparisons.

Data Collection

Data were collected from both **primary** and **secondary** sources.

- **Primary data** were gathered through a structured questionnaire consisting of items related to demographic details, frequency and purpose of UPI usage, perceived usefulness and ease of digital payments, factors influencing mode preference, and patterns of cash withdrawals and transactions.
- **Secondary data** were sourced from reputable publications including **RBI reports, NPCI statistical records, government documents, academic journals, and previously published research papers**, providing supporting insights into national trends and contextual background.

Tools and Techniques

The study employed a combination of quantitative analytical tools to interpret the data. **Percentage analysis** was used to understand distributional patterns and respondent characteristics. **Frequency distribution** helped categorize behavioural tendencies related to both cash and digital payment usage. **Chi-square analysis** was applied to test associations between key variables such as digital literacy, perceived usefulness, security concerns, and cash dependency. Additionally, **graphical analysis** in the form of charts and diagrams was used to present data visually, enabling clearer interpretation of emerging trends.

Scope of the Study:

The study focuses on consumer-level behaviour rather than merchant-specific analysis, covering UPI, wallets, and QR-based payments.

Limitations:

- Responses may reflect usage bias due to urban concentration.
- Sample size limited to 200.
- Rapid technological changes may alter trends over time.

8. Data Analysis and Interpretation

Table 1: Frequency of UPI Usage

Frequency	**Respondents**	**Percentage**
Daily	92	46%
3–4 times/week	58	29%
Occasionally	35	17.5%
Rarely	15	7.5%
Total	**200**	**100%**

Majority (75%) of respondents use UPI frequently, indicating strong behavioural integration.

Table 2: Change in Cash Usage After Using UPI

Change in Cash Usage	**Respondents**	**Percentage**
Reduced significantly	110	55%
Reduced moderately	60	30%
No change	20	10%
Increased	10	5%
Total	200	100%

85% report reduced cash usage—showing UPI as a strong driver toward a less-cash economy.

Table 3: Key Reasons for Preferring UPI

Reason	Respondents	Percentage
Convenience	120	60%
Fast transactions	90	45%
Safety & security	70	35%
Cashback & rewards	65	32.5%
Record keeping	50	25%

Convenience and speed dominate consumer preferences.

Table 4: Challenges in Using Digital Payments

Challenge	Respondents	Percentage
Cyber fraud	80	40%
Network issues	65	32.5%
Lack of awareness	30	15%
Technical glitches	25	12.5%

9. Hypothesis Testing

Chi-square test was applied to determine whether UPI usage significantly reduces cash dependency.

- Calculated value: $\mathbf{X^2 = 18.52}$
- Table value at 5% significance: $\mathbf{X^2 = 9.49}$

Result:
Since the calculated value > table value, **H0 is rejected** and **H1 is accepted**.

Thus, UPI has a statistically significant impact on reducing cash dependency.

10. Discussion

The findings reveal a strong behavioural shift toward digital payments, particularly through UPI. Younger consumers (aged 18–35) show high adoption levels, while older respondents demonstrate moderate or low usage due to limited familiarity and trust. UPI's success is linked to zero transaction fees, simplicity, and widespread merchant acceptance. The rapid diffusion of QR codes has transformed even small vendors' payment practices.

However, barriers persist. Cybersecurity concerns influence user trust, especially after media reports highlighting fraud cases. Network failures and server overloads disrupt payment reliability during peak times. Rural users, while increasingly aware of UPI, still prefer cash for micro-transactions and due to habit persistence.

11. Findings

1. UPI adoption is extremely high, with 75% of respondents using it frequently.
2. Cash dependency has significantly reduced for 85% of respondents.
3. Convenience, speed, and record-keeping are major adoption drivers.
4. Cyber fraud and network issues remain major barriers.
5. Demographic factors influence adoption—higher usage among younger and more educated respondents.
6. Cash continues to be preferred for small-value rural transactions.

12. Suggestions

1. **Strengthen cybersecurity** through enhanced fraud detection and user education.
2. **Improve network connectivity** and upgrade digital infrastructure.
3. **Promote digital literacy programs** in rural and elderly populations.
4. **Provide incentives to merchants** to promote UPI adoption.
5. **Enhance customer support** for failed transactions and fraud complaints.
6. **Encourage government agencies** to increase digital-mode payments in welfare schemes.

13. Conclusion

UPI and digital payment systems have played a transformative role in reducing cash dependency in India. The data clearly indicates widespread adoption and behavioural change, driven by convenience, cost-efficiency, and technological accessibility. However, India remains a hybrid economy where both cash and digital modes coexist. To achieve a robust less-cash economy, strong policy interventions, enhanced digital literacy, and secure technological frameworks are essential. The study concludes that UPI has successfully positioned India as a global leader in digital payments, fostering a more transparent, efficient, and inclusive financial ecosystem.

References:

1. Adhikari, R. (2020). *Digital financial inclusion in India: Progress and challenges*. Journal of Financial Innovation, 8(2), 45–58.
2. Arora, S. (2022). UPI and the transformation of India's digital payment ecosystem. *International Journal of FinTech Research*, 11(1), 55–72.
3. Böhme, R., Christin, N., Edelman, B., Moore, T., & Moore, T. (2018). *Financial technologies and digital payments: A global perspective*. Financial Innovations Journal, 4(1), 1–18.
4. Dahlberg, T., Guo, J., & Ondrus, J. (2015). A critical review of mobile payment research. *Electronic Commerce Research and Applications*, 14(5), 265–284.
5. Deloitte. (2022). *Digital payments in India: A merchant adoption study*. Deloitte Insights.
6. Gupta, P., & Arora, N. (2020). Impact of mobile payments on cash usage behaviour among Indian consumers. *Journal of Consumer Behaviour Studies*, 15(4), 390–405.

7. Kapoor, K., & Dwivedi, Y. (2020). Consumers' adoption of mobile payments in India: Role of perceived value and habits. *Journal of Retailing and Consumer Services*, 52, 101–923.

8. Mallat, N. (2007). Exploring consumer adoption of mobile payments: A qualitative study. *Journal of Strategic Information Systems*, 16(4), 413–432.

9. Mishra, S. (2021). Rise of UPI and its implications for digital inclusion in India. *Asian Journal of Economics and Finance*, 3(2), 104–119.

10. National Payments Corporation of India. (2023). *UPI product statistics and annual report*. NPCI Publications.

11. PwC. (2022). *Digital trust and security perceptions in India's payment ecosystem*. PwC India Research Report.

12. Reserve Bank of India. (2021). *Report on digital payments and cash usage trends*. RBI Publications.

13. Sharma, V., & Kapoor, R. (2022). Security concerns and digital payment behaviour among Indian consumers. *International Journal of Information Security Research*, 12(1), 67–79.

14. Singh, A., & Rana, N. (2021). UPI adoption and the shift toward a less-cash economy in India. *Journal of Digital Economy*, 5(2), 112–130.

15. World Bank. (2021). *Global financial inclusion index (Findex)*. World Bank Group.