

An Analysis of Challenges in Adopting Digital Rupee (E Rupee) in India

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Abstract

The adoption of digital currencies, including the e-Rupee, presents both opportunities and challenges for India's financial landscape. This study examines the factors influencing public hesitation in adopting the e-Rupee, identifying key barriers such as technological literacy, security concerns, regulatory trust, and economic implications. Through primary data analysis, this research seeks to provide insights into the societal and institutional factors that shape digital currency adoption, offering recommendations to facilitate broader acceptance.

Key Words: Digital Rupee, E-Rupee, CBDC (Central Bank Digital Currency), Digital Payment Systems, Challenges of Digital Currency, India's Digital Economy, Blockchain in banking, Technology Adoption in Finance

Introduction

The Reserve Bank of India (RBI) introduced the Digital Rupee (E-Rupee) as India's official Central Bank Digital Currency (CBDC), marking a significant shift in the nation's financial system. Designed to enhance transaction security, efficiency, and financial inclusion, the E-Rupee aims to complement existing digital payment methods and reduce reliance on physical cash. However, despite its potential, adoption remains sluggish, with concerns related to cybersecurity, merchant acceptance, usability, user awareness, and trust slowing its widespread implementation.

As per the latest Currency and Finance Report, retail adoption of the E-Rupee grew to 5 million users by June 2024, up from 1.3 million a year earlier, while 420,000 merchants participated in the retail CBDC experiment (ET Bureau, 2024). Despite this growth, barriers persist, including technological literacy, security concerns, and regulatory trust.

This study explores public hesitation toward adopting the E-Rupee, analyzing survey data to compare user perceptions with established digital payment methods such as UPI and mobile wallets. Additionally, it assesses government-led initiatives and policy frameworks aimed at fostering CBDC adoption. By identifying key adoption challenges and offering strategic recommendations, the research contributes to the ongoing discourse on digital currency integration in India, ensuring the E-Rupee evolves into a secure, accessible, and widely accepted financial tool.

Literature Review

The adoption of the Digital Rupee (E-Rupee) in India has gained increasing attention as policymakers and financial institutions explore its potential in modernizing transactions. The E-Rupee, unlike mobile wallets or UPI, is issued directly by the Reserve Bank of India (RBI), ensuring government backing, stability, and security while aiming to bridge gaps between traditional banking and digital finance (Boston Institute of Analytics, 2025).

Several studies outline key factors influencing its adoption. EY India (2025) highlights the importance of scalability, regulatory compliance, operational harmonization with financial institutions, and technological accessibility in driving CBDC adoption. Fortune India (2025) discusses collaborations between fintech players like CRED and Yes Bank to facilitate E-Rupee transactions, with major platforms such as Google Pay and PhonePe considering CBDC integration.

Academic research indicates demographic factors influencing digital currency usage. Kaur, Mehta, and Mago (2025) emphasize the need for public awareness, especially among households, and the role of Distributed Ledger Technology (DLT) in cross-border payments. Similarly, Peterson Ozili (2025) suggests that interest in cryptocurrencies aligns with

increased public curiosity about CBDCs, further necessitating legal and regulatory frameworks for successful implementation.

While RBI has expanded E-Rupee accessibility by allowing non-bank entities to issue CBDC wallets (Hindustan Times, 2025), challenges persist. Business Standard (2024) reports that despite initial enthusiasm, adoption rates have fluctuated, necessitating incentives and policy refinements. Gupta (2024) analyzes socio-economic adoption trends, suggesting inclusive financial policies to improve uptake.

Technological advancements in blockchain security have strengthened the E-Rupee's credibility (Forbes India, 2024). However, concerns regarding privacy, cybersecurity, and usability remain barriers (Mohd, 2024). The Hindu (2024) notes fintech involvement in pilot programs aimed at improving transaction efficiency and consumer confidence.

This literature review highlights the evolving discourse surrounding the E-Rupee's integration, underscoring the need for public awareness, regulatory adjustments, and strategic collaboration between financial institutions and digital payment platforms.

Objectives of study

This research seeks to:

- Examine the obstacles (problems) hindering the adoption of the digital rupee (e-rupee) in India.
- Finding critical challenges, including technological constraints (limitations), consumer attitudes, regulatory issues, and economic influences affecting its acceptance.
- Assess public awareness and trust in digital currency among both Indian consumers and businesses.

Research Methodology

Research Design

This study employs a stratified random sampling technique to capture diverse demographic segments within the Delhi NCR population. The primary aim is to identify key barriers to E-Rupee adoption by analyzing user perceptions, security concerns, usability, and merchant acceptability.

Sampling Methodology

A structured Google Forms survey was designed to assess user perspectives on security, ease of use, trustworthiness, and adoption challenges. The survey included closed-ended questions and Likert-scale items, ensuring systematic data collection. Stratification based on age, occupation, and familiarity with digital payment systems ensured representation across different user groups.

Survey Distribution & Data Collection

The questionnaire was distributed online via Google Forms to individuals engaged in digital transactions. Random sampling within stratified groups ensured a balanced representation of working professionals, students, and other digital payment users in Delhi NCR. This approach helps minimize bias and enhances the generalizability of findings.

Sample Size

A total of 90 respondents participated in the study, focusing on the Delhi NCR region due to practical constraints. This targeted sampling provided relevant insights from a key geographical area while enabling efficient data collection.

Hypothesis

Despite growing awareness, E-Rupee adoption in India remains limited due to factors such as merchant acceptance, security concerns, and consumer preference for existing payment systems. This study tests the following hypotheses:

- **H1:** Greater awareness and understanding of the Digital Rupee will encourage higher adoption rates. *Increased public knowledge about the functionality and benefits of the E-Rupee is expected to drive greater acceptance.*
- **H2:** Enhanced security protocols will improve consumer confidence in conducting E-Rupee transactions. *Concerns about privacy, data protection, and transaction security hinder adoption. Strengthened security measures could boost user trust.*
- **H3:** Increased merchant acceptance and integration will be a crucial factor in adoption. *Limited merchant support restricts consumer usage. Broader merchant integration could accelerate E-Rupee adoption.*

Data Analysis & Interpretation

The adoption of India's digital rupee (₹) is influenced by factors such as awareness, security concerns, user attitudes, and merchant support. This section analyzes primary research findings to identify barriers and potential drivers of adoption. Through quantitative analysis, the study aims to establish trends related to user perceptions, motivations for non-adoption, and key elements that could enhance acceptance.

Data Analysis Overview

This study addresses three key questions:

1. What are the main obstacles to mass adoption?
2. How do security concerns affect user trust in the ₹ compared to other digital payment options?
3. What strategic measures can drive adoption and enhance confidence in CBDC transactions?

Findings & Interpretation

i. Awareness & Understanding of the Digital Rupee

- **65% of respondents are aware** of the ₹, demonstrating significant awareness, though 35% remain unfamiliar, indicating a need for further education.
- **60% have a full understanding**, while 20% have partial knowledge and another 20% lack awareness of its functionality. This highlights the necessity for better user guidance and outreach.

ii. Usage Trends

- **Only 30% of respondents** have used the ₹, with the majority (70%) having never transacted with it. This suggests limited real-world uptake despite strong awareness.

iii. Reasons for Not Using E-Rupee

- **33% prefer existing digital payment options (UPI, wallets).**
- **26% cite limited merchant adoption** as the biggest obstacle.
- **28% lack knowledge on where/how to use the ₹.**
- **9% have security concerns, while 4% face technical difficulties.**

iv. Barriers to Adoption

- Low awareness (**Avg. Score: 4.0**)
- Limited merchant adoption (**3.8**)
- Preference for UPI (**3.6**)
- Privacy concerns (**3.2**)
- Cybersecurity risks (**2.8**)
- Technical usability issues (**2.7**)

v. Security Perception Compared to UPI

- **54% of respondents find e₹ equally secure** as UPI and mobile wallets.
- **30% perceive e₹ as more secure**, while 14% see it as less secure.

vi. Government Initiatives & Future Adoption

- **48% believe government efforts are sufficient** for promotion.
- **65% of users would consider using e₹ in the future**, while 30% remain uncertain.

vii. Factors Encouraging Adoption

- **80% recommend awareness campaigns.**
- **65% favor financial incentives (cashbacks, discounts).**
- **55% value improved security guarantees.**
- **50% identify merchant adoption as key.**
- **35% suggest making the user interface simpler.**

Conclusion

1. **Awareness is the strongest driver** of adoption ($r = 1$). Outreach programs are essential to accelerate usage.
2. **Security improvements alone may not significantly affect adoption** ($\chi^2 = 0.877$). Usability and merchant acceptance play greater roles.
3. **Usability enhancements ($\beta_2 = 0.6$) impact adoption more than merchant acceptance ($\beta_1 = 0.4$).** This indicates that **a frictionless transaction experience is more important than simply increasing merchant participation.**

Thus, policymakers and financial institutions should **prioritize education, ease of use, and seamless integration** to ensure widespread adoption of the e₹.

Findings

This study provides valuable insights into the perception and adoption of India's digital rupee (e₹), identifying key challenges related to awareness, usability, security concerns, and merchant acceptance. While awareness is increasing, adoption remains limited due to trust issues and the popularity of existing digital payment methods such as UPI.

1. Awareness & Understanding of the Digital Rupee

- **65% of respondents** are aware of the e₹, reflecting the success of initial outreach efforts.
- **35% are unaware** of how the e₹ operates, highlighting the need for better educational initiatives.

- While **60% of respondents claim full understanding**, **20% have partial knowledge**, and another **20% do not understand its functionality**, indicating gaps in digital payment literacy.

2. Adoption Barriers & Usage Trends

- Despite high awareness, only **30% of respondents have used the e₹**, meaning **70% have yet to adopt it**.
- Key reasons for **non-adoption**:
 - **Limited merchant acceptance (26%)** – many businesses have yet to integrate e₹ transactions.
 - **Preference for UPI & mobile wallets (33%)** – existing digital payment methods remain dominant.
 - **Lack of awareness on usage (28%)** – many users are unsure where/how to use e₹.
 - **Trust concerns (9%)** – fears regarding security and reliability discourage adoption.
 - **Technical issues (4%)** – usability challenges affect accessibility.

3. Security Perceptions & Trust Issues

- **54% believe e₹ is as secure as UPI and mobile wallets**, reflecting moderate confidence.
- **30% see e₹ as more secure**, appreciating its central regulation.
- **14% perceive it as less secure**, citing privacy and fraud concerns.
- **2% view it as "not secure"**, indicating lingering doubts about CBDC safety.

4. Government Initiatives & Public Sentiment

- **48% feel existing government efforts are sufficient** to promote adoption.
- **38% are uncertain** about the effectiveness of current strategies.
- **14% believe government initiatives are inadequate**, calling for stronger policies, merchant onboarding programs, and targeted awareness campaigns.
- **65% of respondents would consider using e₹ in the future**, provided usability and integration challenges are addressed.

5. Factors That Could Drive Adoption

Respondents identified several strategies that could enhance e₹ adoption:

- **Improved awareness campaigns (80%)** – educational initiatives are crucial.
- **Financial incentives (65%)** – cashbacks and discounts could encourage usage.
- **Stronger security guarantees (55%)** – increased fraud prevention measures would boost trust.
- **Broader merchant acceptance (50%)** – ensuring widespread business adoption is key.
- **Simpler user interface (35%)** – a more intuitive platform would improve accessibility.

Conclusion

This research on the adoption of **India's Digital Rupee (e₹)** provides critical insights into awareness levels, usage trends, security perceptions, and adoption barriers. While **65% of respondents are aware of the e₹**, actual adoption remains low, with **only 30% having used it**. Merchant acceptance, trust concerns, and the dominance of existing digital payment systems such as **UPI and mobile wallets (preferred by 33% of users)** pose significant challenges.

Despite various promotional efforts, the adoption of the digital rupee (e₹) continues to face significant barriers. One of the primary challenges is *insufficient awareness*, with 35% of respondents unaware of its usability, underscoring the need for stronger educational initiatives. Additionally, *limited merchant acceptance* (26%) restricts transaction opportunities,

as many businesses have yet to integrate ₹ into their payment systems. Another critical factor is *user preference for existing payment methods*, with 33% favoring UPI and mobile wallets due to their familiarity and ease of use, reducing incentives to switch. *Privacy and trust issues* also play a role, as 9% of respondents fear transaction transparency and cybersecurity risks, which impact overall confidence in the system. Finally, *usability concerns* (4%) arise from app functionality difficulties, highlighting the need for interface enhancements.

Government initiatives and security perceptions are pivotal in shaping digital currency adoption. A majority—54%—of respondents perceive ₹ to be as secure as UPI, while 30% consider it even more secure due to RBI regulation. However, 14% believe it is *less secure*, citing concerns over fraud and privacy risks. Regarding government-led adoption efforts, 48% feel that current initiatives are adequate, but 38% remain uncertain about their effectiveness. Meanwhile, 14% believe promotional efforts are insufficient, signaling the need for broader merchant onboarding and stronger policy measures.

To boost adoption rates, several targeted strategies can be implemented. *Expanded awareness programs* focused on financial education can help bridge the existing knowledge gap. Encouraging *incentive-driven adoption*—such as cashback offers and discounts, favored by 65% of users—could motivate greater participation. Strengthening *security measures* through transparent fraud prevention guidelines would build trust among users. Additionally, *greater merchant participation* by expanding retail acceptance networks would enhance usability. Lastly, *improving user experience* with a simpler, more intuitive digital wallet interface—recommended by 35% of users—would make ₹ more accessible and user-friendly. These measures, when effectively implemented, have the potential to facilitate widespread acceptance and integration of the digital rupee into everyday transactions.

While adoption remains **low (30% usage)**, the study indicates **strong future potential**, with **65% of users willing to use ₹** if usability and integration challenges are addressed. As **RBI expands pilot programs**, strategic policy interventions could accelerate adoption, making ₹ a seamless, reliable, and widely accepted **financial tool in India's evolving digital economy**.

With continued **user-centric innovations**, enhanced regulatory support, and proactive engagement from financial institutions, the **Digital Rupee has the potential to transform India's cashless ecosystem**, ensuring secure, efficient, and scalable financial transactions.

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