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Consumer Perception Towards Central Bank Digital Currency (CBDC) Adoption in India: A Transition from UPI-Driven Payments to Digital Rupee

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Abstract: The rapid expansion of digital payment systems in India, particularly the Unified Payments Interface (UPI), has transformed the country's financial landscape and created a strong behavioral foundation for future digital currency adoption. The Reserve Bank of India's introduction of the Digital Rupee (e₹) as India's Central Bank Digital Currency (CBDC) represents a significant milestone in the modernization of the monetary system. This study examines consumer perception toward CBDC adoption in India with special focus on the transition from UPI-driven payment systems to the Digital Rupee framework. Based entirely on secondary data drawn from RBI reports, NPCI statistics, BIS publications, IMF working papers, and peer-reviewed literature, the study employs thematic, comparative, and trend analysis methods to identify the key factors shaping consumer readiness toward Digital Rupee adoption. The findings indicate that while India possesses strong technological and institutional infrastructure for CBDC implementation, consumer acceptance remains contingent upon trust, security, digital literacy, privacy protection, and sustained policy support. The study highlights both the opportunities and challenges associated with CBDC adoption and offers practical suggestions for policymakers and financial institutions to ensure a successful and inclusive transition toward the Digital Rupee economy.

Keywords: Central Bank Digital Currency (CBDC), Digital Rupee, UPI, Consumer Perception, Digital Payments, Financial Inclusion, Technology Adoption.

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I. INTRODUCTION

The global financial system is undergoing rapid transformation due to technological advancement, digital innovation, and the increasing adoption of electronic payment systems. Over the past decade, digital transactions have become an integral component of modern economies by enabling faster, safer, and more convenient financial exchanges. In this evolving financial environment, Central Bank Digital Currency (CBDC) has emerged as one of the most significant innovations in the contemporary monetary system. CBDC refers to a sovereign digital form of fiat currency issued and regulated by a nation's central bank. Unlike decentralized cryptocurrencies such as Bitcoin and Ethereum, CBDC is legally recognized, centrally governed, and backed by the monetary authority, thereby ensuring stability, trust, and regulatory control within the financial ecosystem (Bank for International Settlements [BIS], 2021). Globally, several countries including China, Sweden, Nigeria, the Bahamas, and members of the European Union have initiated CBDC pilot projects and development programs to modernize payment systems and strengthen digital financial infrastructure. The growing global interest in CBDC is largely influenced by the expansion of fintech innovation, declining use of physical cash, increasing digitalization of financial services, and the need for more secure and efficient payment mechanisms. Central banks across the world consider CBDC an important instrument for improving payment efficiency, strengthening financial inclusion, reducing transaction costs, and maintaining monetary sovereignty in the digital age (Kiff et al., 2020).

India has emerged as one of the world's leading digital payment economies due to the remarkable success of the Unified Payments Interface (UPI). Developed by the National Payments Corporation of India (NPCI), UPI has transformed the Indian payment ecosystem by enabling instant, real-time, interoperable, and low-cost digital transactions through smartphones and mobile banking applications. The widespread use of digital payment platforms such as Google

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Pay, PhonePe, Paytm, and BHIM reflects changing consumer behavior and increasing trust in digital financial technologies. According to the Reserve Bank of India (2024), UPI transaction volume and transaction value have witnessed exponential growth in recent years, highlighting India's rapid transition toward a less-cash and digitally integrated economy. The evolution of India's payment ecosystem reflects a gradual transformation from traditional cash-based transactions toward advanced digital financial systems. The increasing adoption of electronic payments, mobile banking, and UPI-based transactions has created a strong technological and behavioral foundation for the future adoption of Central Bank Digital Currency (CBDC). The proposed Digital Rupee framework represents the next stage in this digital transformation, where sovereign digital currency may become an integral component of India's future digital economy.

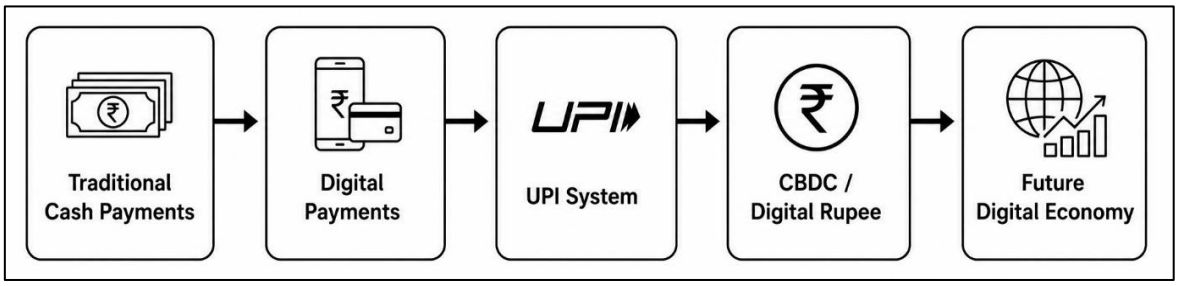

Fig 1 Evolution of Digital Payment Systems Toward CBDC and the Future Digital Economy

The framework presented in Figure 1 illustrates the progressive transformation of India's financial ecosystem from traditional cash payments to UPI-enabled digital transactions and ultimately toward CBDC-based digital currency systems. The figure highlights how increasing digital payment adoption and technological advancement have prepared consumers and institutions for the future integration of Digital Rupee transactions within the broader digital economy. Recognizing the global momentum toward sovereign digital currencies and the need to modernize the monetary system, the Reserve Bank of India introduced the Digital Rupee (e₹) as India's official Central Bank Digital Currency in 2022. The Digital Rupee represents a digital form of sovereign currency issued directly by the central bank and is expected to function as a secure, efficient, and regulated medium of exchange. Unlike UPI, which operates as a payment interface linked to commercial bank accounts, CBDC represents digital money itself issued by the Reserve Bank of India. The Digital Rupee is expected to improve payment efficiency, reduce transaction costs, strengthen financial inclusion, support transparent financial transactions, and enhance the overall efficiency of the monetary system (RBI, 2022). Despite India's remarkable success in digital payment adoption, consumer acceptance of CBDC remains an evolving and uncertain phenomenon. The transition from UPI-driven payment systems to Digital Rupee-based transactions involves not only technological transformation but also significant behavioral and institutional changes. Consumer willingness to adopt CBDC may depend upon multiple factors including trust in the central banking system, perceived usefulness, ease of use, cybersecurity protection, digital literacy, privacy concerns, and awareness regarding the functioning of Digital Rupee systems. While some consumers may perceive CBDC as a natural extension of existing digital payment practices, others may remain hesitant due to concerns regarding surveillance, data privacy, technological complexity, and cyber fraud risks (Allen et al., 2022).

Furthermore, the transition toward CBDC adoption represents an important structural shift in India's digital financial ecosystem. UPI primarily facilitates the transfer of money between bank accounts, whereas CBDC introduces a new framework where digital currency itself becomes a direct medium of exchange backed by the central bank. This transformation has the potential to influence consumer payment behavior, banking operations, fintech innovation, monetary policy transmission, and financial inclusion across different segments of society. Therefore, understanding consumer perception toward CBDC adoption is essential for policymakers, financial institutions, fintech companies, researchers, and regulatory authorities to ensure the successful implementation and widespread acceptance of the Digital Rupee in India. The present study aims to examine consumer perception toward CBDC adoption in India with special reference to the transition from UPI-driven payment systems to the Digital Rupee framework. The study seeks to identify the major factors influencing consumer readiness toward CBDC adoption and analyze the opportunities and challenges associated with the future development of India's digital currency ecosystem.

➢ *Objectives of the Study*

The present study is guided by the following specific objectives:

- To examine the growth and evolution of digital payment systems in India, with particular reference to the UPI framework.
- To analyze global developments in Central Bank Digital Currency (CBDC) and their relevance to India's Digital Rupee initiative.
- To identify the key factors influencing consumer perception toward CBDC adoption in India, including trust, security, ease of use, and awareness.
- To explore the opportunities and challenges associated with the transition from UPI-driven payment systems to the Digital Rupee framework.

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- To suggest policy recommendations for policymakers and financial institutions to facilitate successful and inclusive CBDC adoption in India.

II. REVIEW OF LITERATURE

The review of literature provides a conceptual and theoretical understanding of Central Bank Digital Currency (CBDC), digital payment systems, and consumer perception toward emerging financial technologies. Existing studies emphasize the growing role of digitalization in transforming global financial systems and highlight the increasing importance of secure, efficient, and technology-driven payment mechanisms. The literature also explains how consumer trust, technological advancement, and financial innovation influence the adoption of digital financial services and digital currencies in modern economies.

➢ *Global Development of Central Bank Digital Currency (CBDC)*

The concept of CBDC has gained global importance as central banks across the world attempt to modernize payment systems and reduce reliance on physical cash. Several countries, including China, Sweden, Nigeria, and the Bahamas, have introduced pilot projects and experimental digital currency systems to improve payment efficiency and financial transparency. CBDC is viewed as a secure digital alternative to traditional currency and privately issued cryptocurrencies. Studies indicate that CBDC can strengthen monetary control, enhance financial inclusion, and support the development of digital economies while improving the efficiency of retail and cross-border payment systems (Kiff et al., 2020; Bindseil, 2020).

Table 1 Global CBDC Development Status Across Select Countries (2024)

Country	CBDC Name	Launch Status	Key Features
China	Digital Yuan (e-CNY)	Pilot (since 2020)	200+ million wallets; retail & cross-border use; programmable payments
Bahamas	Sand Dollar	Launched (2020)	World's first fully deployed CBDC; digital wallet; financial inclusion focus
Nigeria	eNaira	Launched (Oct 2021)	Retail CBDC; unbanked population focus; mobile-based wallet system
Sweden	e-Krona	Pilot (since 2020)	Aimed at reducing cash reliance; interoperability with commercial bank systems tested
Jamaica	JAM-DEX	Launched (2022)	Legal tender status; digital wallet app; government incentives for adoption
India	Digital Rupee (e₹)	Pilot (since Dec 2022)	Retail & wholesale CBDC; RBI-issued; interoperability with UPI infrastructure planned
European Union	Digital Euro	Investigation phase	ECB-led investigation; privacy & offline payment capabilities being assessed

Source: Atlantic Council CBDC Tracker (2024); BIS (2021); RBI (2022); IMF Working Papers.

➢ *Growth of Digital Payment Systems in India*

India has experienced remarkable growth in digital payments due to technological advancement, increased smartphone usage, internet accessibility, and government initiatives promoting cashless transactions. The introduction of the Unified Payments Interface (UPI) significantly transformed India's digital payment ecosystem by enabling instant and low-cost money transfers through mobile applications. The rapid adoption of digital payment platforms has increased consumer participation in online financial transactions and strengthened India's digital economy. Studies suggest that convenience, accessibility, speed, and ease of use are major factors contributing to the success of UPI-based payment systems in India (Patil & Sharma, 2022).

Table 2 UPI Transaction Volume and Value in India (FY 2019–20 to FY 2023–24)

Financial Year	No. of Transactions (Billion)	Transaction Value (₹ Lakh Crore)	YoY Growth in Volume (%)
FY 2019–20	12.51	21.32	—
FY 2020–21	22.33	41.03	+78.5%
FY 2021–22	46.03	84.16	+106.1%
FY 2022–23	83.71	139.19	+81.8%
FY 2023–24	**131.03**	**199.89**	**+56.5%**

Source: National Payments Corporation of India (NPCI) – UPI Product Statistics (2024);
Reserve Bank of India Annual Report (2024).

➢ *Consumer Perception Toward Digital Financial Technologies*

Consumer perception plays a significant role in the adoption of digital financial technologies and electronic payment systems. Previous studies indicate that consumer behavior toward digital payments is influenced by factors such as trust, security, perceived usefulness, ease of use, and technological familiarity. Trust in digital platforms and confidence in transaction security are considered important determinants influencing the acceptance of digital financial services. Consumers are more likely to adopt digital payment technologies when they perceive them as secure, efficient,

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and beneficial for daily financial transactions (Gefen et al., 2003; Oliveira et al., 2016).

➢ *Theoretical Framework Related to Technology Adoption*

Several theoretical models have been used to explain consumer adoption behavior toward technological innovations and digital financial systems. The Technology Acceptance Model (TAM) suggests that perceived usefulness and perceived ease of use significantly influence technology acceptance. Similarly, the Unified Theory of Acceptance and Use of Technology (UTAUT) explains that behavioral intention, facilitating conditions, and social influence affect technology adoption behavior. The Diffusion of Innovation Theory also highlights that relative advantage, compatibility, and complexity influence the adoption of new technologies. These theoretical frameworks are useful in understanding consumer perception toward CBDC adoption and the transition from UPI-based transactions to Digital Rupee systems (Rogers, 2003).

➢ *Opportunities Associated with CBDC Adoption*

CBDC offers several opportunities for governments, consumers, and financial institutions by improving payment efficiency, reducing transaction costs, and strengthening financial inclusion. The introduction of Digital Rupee may help create a more secure and transparent payment ecosystem while reducing dependency on physical cash. CBDC can also support faster settlements, improve accessibility to financial services, and strengthen the efficiency of monetary systems. Furthermore, CBDC has the potential to enhance digital economic growth and facilitate more efficient domestic and cross-border financial transactions (Ozili, 2023).

➢ *Challenges and Risks of CBDC Adoption*

Despite its potential advantages, CBDC adoption also presents several challenges and risks. Cybersecurity concerns, privacy issues, digital illiteracy, and technological infrastructure limitations remain significant barriers to consumer acceptance of Digital Rupee systems. Consumers may hesitate to adopt CBDC if they perceive risks related to digital fraud, data surveillance, or lack of privacy protection. Additionally, inadequate awareness regarding the functioning and benefits of CBDC may negatively affect adoption intentions, particularly among less technologically literate populations (Allen et al., 2022).

➢ *Research Gap*

Existing literature mainly focuses on digital payment systems, fintech innovation, and the technical aspects of CBDC implementation. Limited research specifically examines consumer perception toward CBDC adoption in India and the transition from UPI-driven payments to Digital Rupee systems. Most previous studies separately analyze either UPI adoption or global CBDC developments, while comparative understanding of consumer readiness toward Digital Rupee adoption in the Indian context remains insufficient. Therefore, there is a need for a comprehensive study examining the opportunities, challenges, and factors influencing consumer perception toward CBDC adoption in India.

III. RESEARCH METHODOLOGY

The present study adopts a descriptive and exploratory research design to examine consumer perception toward Central Bank Digital Currency (CBDC) adoption in India and analyze the transition from UPI-driven payment systems to the Digital Rupee framework. The study is conceptual and analytical in nature and is entirely based on secondary data. Relevant information has been collected from authenticated and published sources such as reports of the Reserve Bank of India, National Payments Corporation of India statistics, government publications, BIS reports, IMF and World Bank publications, research journals, books, conference papers, fintech industry reports, and online databases related to digital payments and CBDC development. The collected data has been analyzed using thematic analysis, comparative analysis, and trend analysis methods to identify major factors influencing consumer perception toward Digital Rupee adoption. The study focuses on key dimensions such as trust, security, technological readiness, financial inclusion, privacy concerns, and ease of use associated with CBDC systems. Comparative analysis has also been used to understand the differences between UPI payment systems and CBDC-based digital transactions in terms of functionality, efficiency, and consumer acceptance. The scope of the study is limited to India's retail CBDC ecosystem and digital payment environment. Since the study relies entirely on secondary data, findings are dependent on the availability, reliability, and interpretation of existing literature, reports, and policy documents.

➢ *Conceptual Framework of the Study*

The conceptual framework of the study explains the major factors influencing consumer perception toward Central Bank Digital Currency (CBDC) adoption in India. The framework is developed to understand the transition from UPI-driven payment systems to Digital Rupee-based transactions and to identify the opportunities and challenges associated with this transformation. Consumer perception toward CBDC adoption is influenced by several supporting and hindering factors related to technology, trust, security, financial accessibility, and digital awareness. Supporting factors such as ease of use, transaction convenience, government support, technological advancement, financial inclusion, and trust in the central banking system positively influence consumer willingness to adopt Digital Rupee transactions. At the same time, factors such as cybersecurity risks, privacy concerns, lack of awareness, resistance to technological change, and infrastructure limitations may negatively affect CBDC adoption. The framework also highlights that the increasing success of UPI-based digital payment systems has created a technological and behavioral foundation that may facilitate the future acceptance of Digital Rupee in India. Therefore, consumer perception toward CBDC adoption can be understood as the result of the interaction between technological benefits, institutional trust, perceived risks, and digital payment experience.

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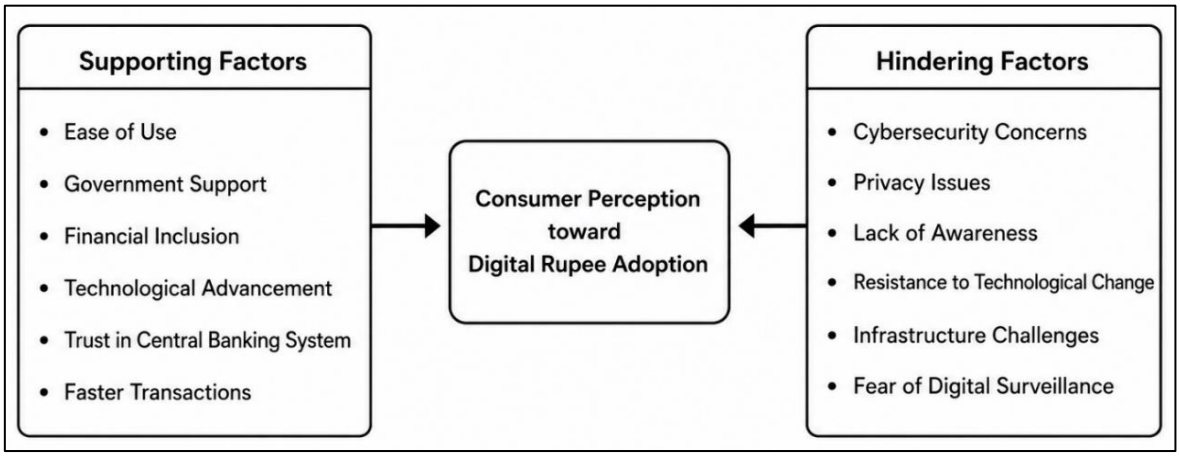

Fig 2 Factors Influencing CBDC Adoption

IV. ANALYSIS AND DISCUSSION

The analysis of existing literature, policy reports, and digital payment trends indicates that India has experienced substantial growth in digital financial transactions over the past decade. The increasing adoption of Unified Payments Interface (UPI), mobile banking applications, fintech services, and online payment platforms has significantly transformed consumer payment behavior in the country. The success of UPI-based transactions demonstrates that Indian consumers are becoming more comfortable with digital payment systems due to factors such as convenience, transaction speed, accessibility, and ease of use. The rapid expansion of smartphone usage and internet penetration has further accelerated the shift toward cashless transactions and digital financial inclusion. The rapid growth of UPI transactions and digital payment infrastructure reflects increasing consumer acceptance of technology-driven financial systems and provides a strong foundation for future CBDC adoption in India. Table 3 and Figure 3 present the growth trend of UPI transactions alongside the evolution of the Digital Rupee framework.

Table 3 Growth of UPI Transactions and CBDC Development in India

Financial Year	UPI Transactions (Billion)	UPI Transaction Value (₹ Lakh Crore)	CBDC Development Status
FY 2019–20	12.51	21.32	CBDC discussion stage
FY 2020–21	22.33	41.03	RBI exploring CBDC framework
FY 2021–22	46.03	84.16	RBI announced CBDC plans
FY 2022–23	83.71	139.19	Digital Rupee pilot launched
FY 2023–24	131.03	199.89	Retail and wholesale CBDC expansion

Source: NPCI UPI Statistics (2024); RBI Annual Report (2024); RBI Concept Note on CBDC (2022).

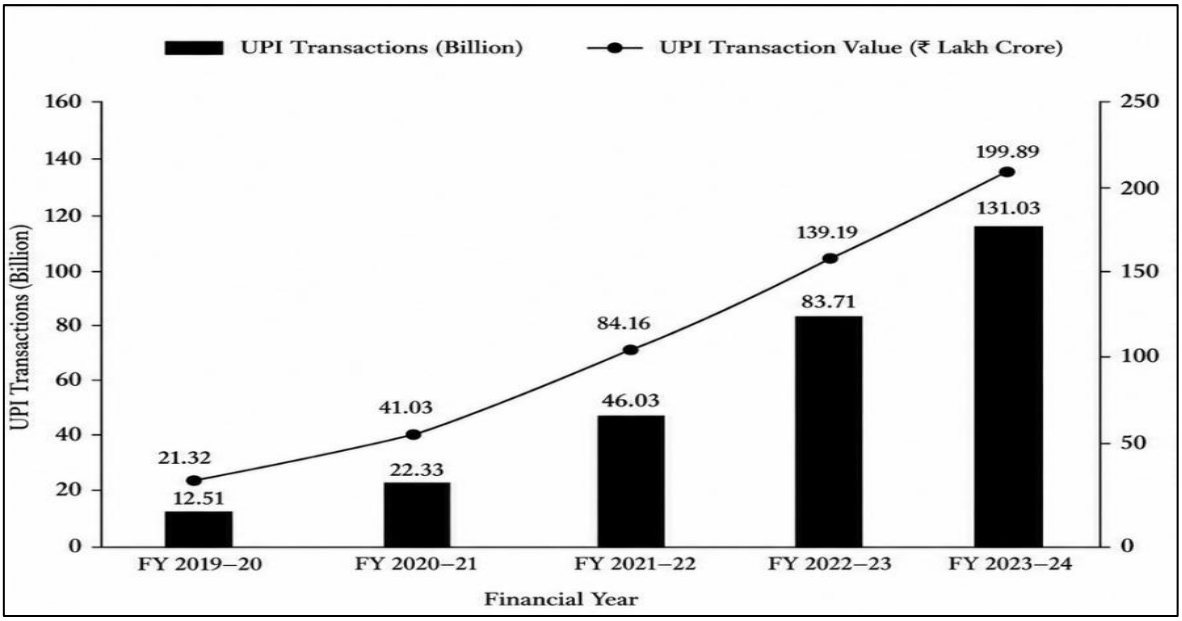

Fig 3 Growth of UPI Transactions and Evolution Toward CBDC Adoption in India

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The data presented in Table 3 and Figure 3 indicate exponential growth in UPI transaction volume and transaction value between FY 2019–20 and FY 2023–24. This growth demonstrates increasing consumer trust, digital payment familiarity, and technological readiness within India's financial ecosystem. Simultaneously, the gradual introduction of CBDC initiatives by the Reserve Bank of India reflects the country's transition from payment-interface-based digital transactions toward sovereign digital currency systems. The increasing digital payment culture developed through UPI adoption may significantly support future consumer acceptance of the Digital Rupee.

The introduction of the Digital Rupee by the Reserve Bank of India represents an important development in India's digital financial ecosystem. Existing studies and policy reports suggest that CBDC has the potential to improve payment efficiency, reduce transaction costs, strengthen monetary control, and enhance financial transparency. The Digital Rupee may also contribute to improving financial inclusion by providing secure and accessible digital payment solutions for individuals who have limited access to traditional banking infrastructure. The central bank-backed nature of CBDC may further increase consumer trust compared to privately operated digital payment systems and cryptocurrencies.

The literature also indicates that consumer familiarity with digital payment systems such as UPI may positively influence readiness toward CBDC adoption. Since Indian consumers are already accustomed to mobile-based transactions and real-time payment systems, the transition toward Digital Rupee usage may become relatively easier in the future. Consumers who regularly use UPI platforms may perceive CBDC as an extension of existing digital payment behavior rather than a completely new financial technology. However, several challenges associated with CBDC adoption have also been identified in the literature. Cybersecurity risks, privacy concerns, lack of digital literacy, and technological infrastructure limitations remain major barriers affecting consumer confidence toward Digital Rupee systems. Many consumers may be concerned about government surveillance, misuse of transaction data, or increased vulnerability to cyber fraud. Furthermore, limited awareness regarding the functioning and benefits of CBDC may reduce consumer willingness to adopt Digital Rupee-based transactions, particularly in rural and less technologically developed regions.

The analysis further suggests that trust plays a crucial role in influencing consumer perception toward CBDC adoption. Trust in the central banking system, regulatory framework, and digital transaction security significantly affects acceptance of digital financial technologies. The role of the Reserve Bank of India in regulating and issuing Digital Rupee may positively influence public confidence in CBDC systems. At the same time, the successful implementation of CBDC will require strong cybersecurity mechanisms, consumer awareness programs, digital infrastructure development, and transparent regulatory policies to address concerns related to privacy and technological risks. Overall, the analysis indicates that India possesses strong technological and institutional foundations for CBDC adoption due to the widespread success of UPI-driven digital payment systems. Nevertheless, the long-term acceptance and effectiveness of the Digital Rupee will depend upon consumer trust, awareness, technological readiness, policy support, and the ability of financial institutions to ensure secure and user-friendly digital currency systems.

V. CONCLUSION AND SUGGESTIONS

The present study examined consumer perception toward Central Bank Digital Currency (CBDC) adoption in India with special reference to the transition from UPI-driven payment systems to the Digital Rupee framework. The study highlights that the rapid growth of digital payment systems, fintech innovation, smartphone penetration, and government initiatives promoting cashless transactions have significantly transformed India's financial ecosystem. The success of UPI-based payment systems has created a strong technological and behavioral foundation that may support the future adoption of Digital Rupee transactions in India. The study found that CBDC has the potential to improve payment efficiency, financial inclusion, transaction transparency, and monetary system modernization. The Digital Rupee, introduced by the Reserve Bank of India, represents an important step toward developing a secure and sovereign digital financial infrastructure. Consumers may perceive CBDC positively due to factors such as transaction convenience, government support, faster settlements, and trust in the central banking system. The increasing familiarity of Indian consumers with digital payment technologies may further contribute to the acceptance of CBDC-based transactions.

However, the study also identifies several challenges associated with CBDC adoption in India. Cybersecurity concerns, privacy risks, digital illiteracy, infrastructure limitations, and lack of awareness remain important barriers affecting consumer confidence toward Digital Rupee systems. Many consumers may hesitate to adopt CBDC due to concerns regarding digital surveillance, misuse of personal financial information, and technological complexity. Therefore, consumer trust and awareness emerge as critical determinants influencing the successful implementation of CBDC in India. The study suggests that policymakers and financial institutions should focus on strengthening cybersecurity infrastructure, enhancing digital literacy, and conducting awareness programs regarding the functioning and benefits of the Digital Rupee. The government and banking authorities should also ensure transparent regulatory frameworks and privacy protection mechanisms to improve public confidence in CBDC systems. Furthermore, improving internet accessibility and digital infrastructure in rural and underserved regions may help increase financial inclusion and support wider CBDC adoption across different sections of society.

Overall, the transition from UPI-driven payments to Digital Rupee systems represents a significant transformation in India's digital economy. While India possesses strong technological readiness for CBDC adoption, the long-term

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success of the Digital Rupee will largely depend on consumer trust, awareness, policy support, and the ability of financial institutions to provide secure, accessible, and user-friendly digital currency systems.

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