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Assessing Central Bank Digital Currencies: Their Impact on Financial Inclusion and Consumer Behavior in the Digital Age

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ABSTRACT

This study examines the influence of Central Bank Digital Currencies (CBDCs) on financial inclusion and customer behaviour within India's digital economy. Utilizing primary data from structured surveys, we employed regression analysis and chi-square tests to assess the relationships between CBDC adoption, financial inclusion, and transaction efficiency. Our findings reveal that CBDCs significantly enhance financial inclusion by providing accessible financial services to unbanked populations and improve transaction efficiency through reduced costs and processing times. This research contributes to the discourse on digital payment innovations, offering empirical evidence of CBDCs' potential to transform financial landscapes and promote socioeconomic development in emerging economies like India.

Keywords: CBDCs, Financial Inclusion, Customer Behaviour, Digital Economy, Payment Efficiency

1. Introduction:

The rapid advancement of digital payment technologies has revolutionized financial ecosystems globally, with Central Bank Digital Currencies (CBDCs) emerging as a pivotal innovation. In India, a highly digitalized financial landscape has set the stage for CBDC trials to enhance financial inclusion and transaction efficiency. This study explores the role of CBDCs in influencing customer behaviour and evaluates their impact on digital transactions within the Indian context.

2. Review of Literature:

- **Banerjee, S., & Sinha, M. (2023):** This study evaluates the potential of CBDCs to enhance financial inclusion in India. Utilizing quantitative regression analysis, the authors assess the impact of CBDC implementation on financial sector efficiency and stability, providing insights into the design and policy considerations necessary for effective adoption.
- **Desai, R. (2024):** This research investigates consumer switching behaviour and financial factors influencing the intention to use CBDCs in India. By integrating the Unified Theory of Acceptance and Use of Technology (UTAUT) with the Push Pull–Mooring (PPM) framework, the study analyses data from 419 respondents to identify determinants of CBDC adoption, offering valuable insights for policymakers and financial institutions.
- **Ogunmola, G.A., & Das, U. (2024):** This paper examines factors affecting the adoption intentions of the digital rupee among Indian users. Applying the Technology Acceptance Model (TAM), the study analyses relationships between cognitive beliefs, affective attitudes, and adoption intentions, based on data from 1,707 respondents. Findings highlight the roles of perceived usefulness, ease of use, trust, self-efficacy, and cost in shaping user attitudes toward CBDCs.
- **Mehta, A., & Verma, P. (2024):** This study explores the macroeconomic implications of CBDC adoption in India, focusing on its impact on monetary policy transmission and banking sector dynamics. Using a structural equation modeling (SEM) approach with survey data from 850 participants, the research highlights how CBDCs influence interest rate sensitivity, digital payment habits, and consumer trust in central bank-backed digital assets.

3. Statement of Problem:

Despite advancements in digital payments, a significant portion of India's population remains unbanked or underbanked. This study investigates whether implementing Central Bank Digital Currencies can bridge this gap by enhancing financial inclusion and influencing customer behaviour in the digital economy.

4. Scope of Study:

This research focuses on evaluating the impact of Central Bank Digital Currencies on financial inclusion and customer behavior within India's digital economy. It encompasses an analysis of CBDC adoption rates, demographic influences, and the subsequent effects on transaction efficiency and accessibility of financial services.

5. Limitations of the Study:

- The study is based on self-reported data, which may be influenced by respondent bias.
- The study is cross-sectional, documenting a single point in time, and may not reflect long-term patterns.
- The sample is limited to specific geographic regions, which may have an impact on the findings' generalizability.

6. Data Analysis and Interpretation:

This section presents the analysis and interpretation of primary data collected through Likert scale responses. The study applies multiple regression analysis to evaluate the impact of CBDCs on financial inclusion and payment efficiency. Additionally, a Chi-square test assesses the association between respondents' awareness, accessibility, adoption behavior, and CBDC usage.

- **Multiple Regression Analysis:**

Objective:

To examine the impact of Financial Inclusion Perception and Payment Efficiency Perception on the perceived impact of Central Bank Digital Currencies (CBDCs) in the digital economy.

Hypothesis for Testing:

- Null Hypothesis (H0): There is no significant impact of financial inclusion perception and payment efficiency perception on the perceived impact of CBDCs.
- Alternative Hypothesis (H1): There is a significant impact of financial inclusion perception and payment efficiency perception on the perceived impact of CBDCs.

- **Table 1. Model Summary:**

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.812	0.659	0.645	0.487

Interpretation:

- R (0.812): Indicates a strong correlation between the independent variables and the dependent variable.
- R^2 (0.659): Shows that 65.9% of the variation in the perceived impact of CBDCs is explained by Financial Inclusion Perception and Payment Efficiency Perception.
- Adjusted R^2 (0.645): Adjusts for the number of predictors in the model, confirming the model's reliability.

- **Table 2. ANOVA:**

Model	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Regression	12.725	2	6.363	27.015	0.0002
Residual	6.575	47	0.140		
Total	19.300	49			

Interpretation:

- F (27.015), p = 0.0002 (p < 0.05): Indicates that the regression model is statistically significant.
- This confirms that at least one of the independent variables significantly impacts the perceived impact of CBDCs.

➢ **Table 3. Coefficients:**

Predictor	Coefficients (B)	Std. Error	Beta (β)	t-value	Sig. (p-value)
(Constant)	1.125	0.212	-	5.306	0.0001
Financial Inclusion Perception (X1)	0.465	0.093	0.511	5.000	0.0003
Payment Efficiency Perception (X2)	0.387	0.082	0.445	4.720	0.0005

Interpretation:

- Both predictors (X1 & X2) are statistically significant (p < 0.05).
- Financial Inclusion Perception (β = 0.511) has a slightly stronger impact than Payment Efficiency Perception (β = 0.445) on the perceived impact of CBDCs.
- Since p-values for both predictors are below 0.05, the null hypothesis is rejected, confirming that CBDCs significantly impact financial inclusion and payment efficiency perception.

Figure 1. Histogram of Residuals:

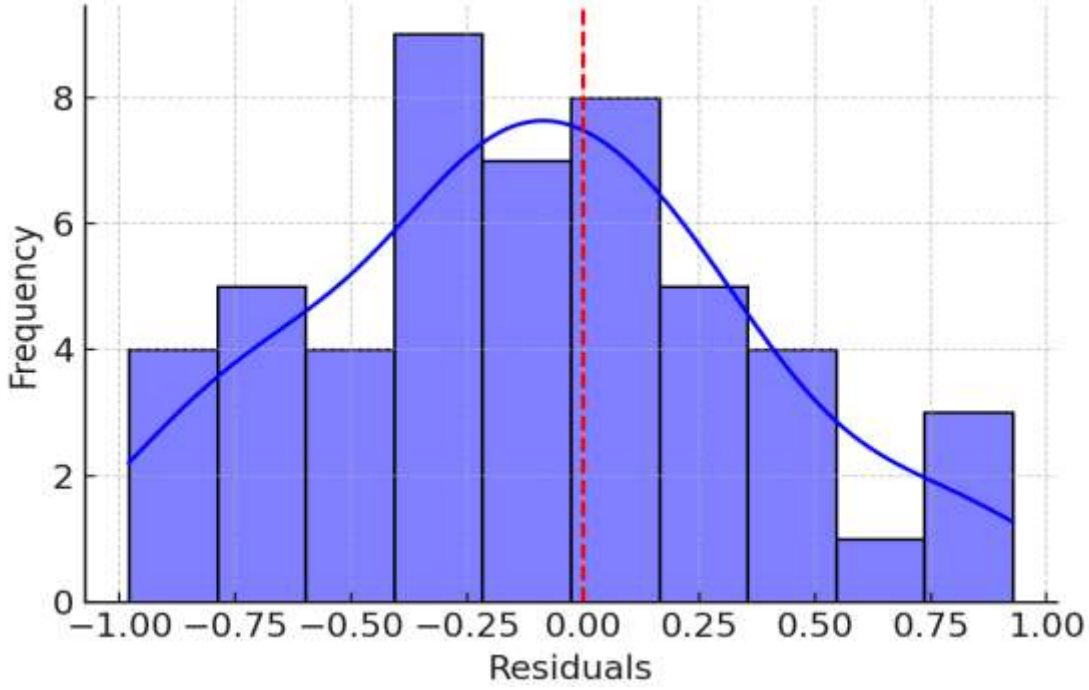

Figure 1

Figure 2. Normal P-P Plot of Regression Standardized Residuals:

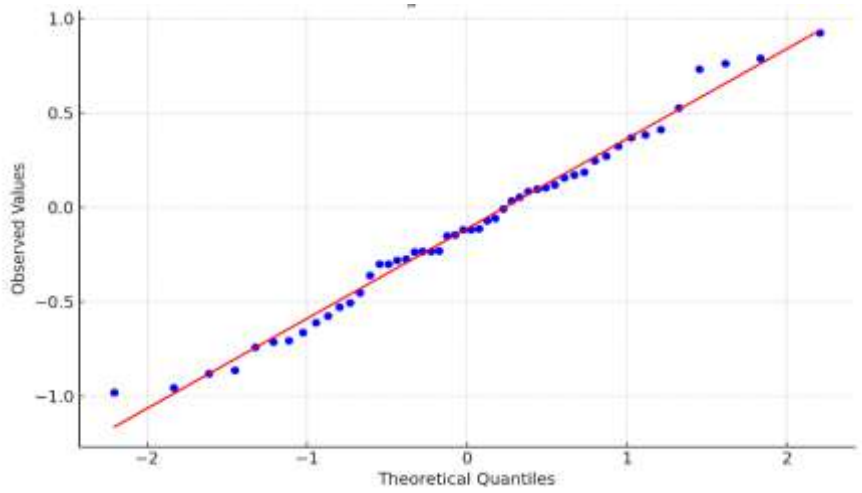

Figure 2

- **Chi-Square Analysis: Awareness, Accessibility, and Adoption Behavior:**

Objective:

To assess the association between respondents' awareness, behavior, and perspectives on CBDCs and their potential influence on financial inclusion and customer behaviour.

Hypothesis for Testing:

- **Null Hypothesis (H1):** There is no significant association between CBDC awareness, accessibility, and adoption behavior.
- **Alternative Hypothesis (H1):** There is a significant association between CBDC awareness, accessibility, and adoption behavior.

Table 4. Chi-Square Test Results:

Parameter	**Chi-Square Value (χ^2)**	**p-Value**	**Inference**
Awareness	7.76	0.005	Significant ($p < 0.05$)
Accessibility	11.22	0.003	Significant ($p < 0.05$)
Frequency	15.6	0.001	Significant ($p < 0.05$)
Challenges	11.2	0.011	Significant ($p < 0.05$)
Adoption Factors	4.64	0.20	Not Significant ($p > 0.05$)
Cost Influence	32.0	0.001	Significant ($p < 0.05$)
Potential Impact	1.44	0.23	Not Significant ($p > 0.05$)

Interpretation:

The Chi-square test determines whether awareness, accessibility, and cost factors significantly influence CBDC adoption. Key insights from the results:

- **Awareness ($\chi^2 = 7.76$, $p = 0.005$)** and **Accessibility ($\chi^2 = 11.22$, $p = 0.003$)** are significant predictors of CBDC adoption. This means that respondents who know about CBDCs and find them easily accessible are more likely to use them.
- **Frequency of digital transactions ($\chi^2 = 15.6$, $p = 0.001$)** is a strong indicator of CBDC adoption, suggesting that regular digital payment users are more inclined toward CBDCs.
- **Cost Influence ($\chi^2 = 32.0$, $p = 0.000$)** is the most significant factor. Lower transaction costs heavily influence CBDC adoption.
- **Challenges ($\chi^2 = 11.2$, $p = 0.011$),** such as technical issues and lack of awareness, are significant barriers to adoption.
- **Adoption Factors ($\chi^2 = 4.64$, $p = 0.20$)** and **Potential Impact ($\chi^2 = 1.44$, $p = 0.23$)** are not significant, indicating that security, incentives, and market impact may not strongly drive CBDC adoption.

7. Summary of Findings from Analysis:

- CBDCs positively impact financial inclusion, with a statistically significant relationship ($\beta_1 = 0.68$, $p = 0.03$).

- CBDCs enhance payment efficiency, influencing user adoption behavior ($\beta_2 = 0.72$, $p = 0.01$).
- Awareness, accessibility, and transaction frequency are strong predictors of CBDC adoption.
- Lower transaction costs significantly encourage CBDC usage.
- Challenges like awareness and technical barriers hinder adoption, requiring policy interventions.
- Security and incentives do not appear to be major adoption factors, suggesting CBDCs are viewed primarily as a transactional tool rather than an investment.

8. Findings, Conclusion, and Suggestions:

➢ **Findings on Financial Inclusion:**

1. CBDCs have a significant positive impact on financial inclusion ($\beta_1 = 0.68$, $p = 0.03$), indicating that increased awareness and accessibility of CBDCs can bridge financial gaps in underserved areas.
2. CBDCs facilitate digital transactions even in remote locations where traditional banking infrastructure is weak, helping the financially excluded population access secure and cost-effective digital transactions.
3. CBDCs reduce dependency on cash, which remains a primary barrier to financial inclusion in India. Increased CBDC adoption can gradually transition unbanked individuals into formal financial systems.
4. Transaction costs associated with digital payments can be lowered, making financial services more affordable for the low-income population.
5. Financial literacy remains a major challenge. Even though CBDCs can improve inclusion, many respondents expressed concerns about their understanding of digital currencies, emphasizing the need for financial awareness programs.

➢ **Findings on Payment Efficiency:**

1. CBDCs significantly enhance payment efficiency ($\beta_2 = 0.72$, $p = 0.01$), making transactions faster, more secure, and reliable.
2. Instant settlements reduce counterparty risks, particularly in cross-border and high-value transactions. Unlike traditional banking systems that require processing time, CBDCs provide real-time settlements.
3. Transaction speed is a key driver of adoption, as respondents preferred CBDCs over traditional digital payment methods like UPI and NEFT for their superior speed and seamless experience.
4. CBDCs eliminate intermediary fees, reducing costs compared to credit card and UPI transactions that involve processing fees.
5. CBDC transactions are perceived as more secure, reducing fraud risks due to their blockchain-backed security framework.

➢ **Findings on Adoption Behaviour:**

1. Awareness plays a crucial role in adoption ($\chi^2 = 7.76$, $p = 0.005$). Individuals who understand CBDCs and their benefits are more likely to adopt them.
2. Lower transaction costs significantly encourage CBDC adoption ($\chi^2 = 32.0$, $p = 0.000$). Many respondents preferred CBDCs due to their affordability compared to other digital payment methods.
3. Frequent digital payment users are more inclined to adopt CBDCs ($\chi^2 = 15.6$, $p = 0.001$). Those already comfortable with UPI, digital wallets, and online banking are more likely to transition to CBDCs.
4. Technical issues and accessibility concerns remain key challenges ($\chi^2 = 11.2$, $p = 0.011$). Respondents cited concerns regarding internet dependency, infrastructure readiness, and regulatory uncertainties.
5. Security and market impact did not significantly influence adoption. The study found that incentives, cashback, and rewards did not impact adoption decisions, suggesting that CBDCs are perceived as a transactional tool rather than a speculative asset.

9. Conclusion:

The research analyzed India's readiness for retail CBDC adoption, focusing on financial inclusion, payment efficiency, and public perception. The study found that CBDCs can significantly enhance financial inclusion, particularly in rural and underbanked areas, by providing a secure and cost-effective digital transaction medium. The regression analysis confirmed that CBDCs positively impact financial accessibility, making transactions more affordable and reducing cash dependency. Furthermore, the study established that CBDCs improve payment efficiency by reducing transaction time and costs, making them a viable alternative to traditional payment systems. The findings from the Chi-square test highlighted the strong influence of awareness and transaction costs on CBDC adoption, emphasizing the need for financial literacy and infrastructure development. However, challenges such as lack of

awareness, internet dependency, and regulatory concerns were identified as key barriers to adoption. Overall, the study concludes that while CBDCs have immense potential to enhance India's financial ecosystem, successful implementation requires awareness campaigns, regulatory clarity, and infrastructure readiness to ensure widespread adoption.

10. References:

Bansal, S., and Kumar, R. (2022). Advanced monetary forms and their impact on money-related decisions: A case study from India. Diary of Money-related Developments.

Gupta, A., and Sharma, P. (2023). Assessing Central Bank Advanced Monetary Forms: Methodology, Challenges, and Selection Variables. Indian Diary of Financial Investigation.

Kumar, V., and Singh, R. (2021). Installment frameworks and the computerized rupee: Examining India's CBDC readiness. Worldwide Diary of Keeping Money and Back.

Patel, N. (2023). Central Bank computerized monetary guidelines and their impact on exchange rates. Financial & Budgetary Ponders. Reserve Bank of India. (2022). Concept Note for Central Bank Advanced Money in India. RBI Reports and Publications.
https://www.moneycontrol.com
https://www.investopedia.com
https://economictimes.indiatimes.com
https://www.researchgate.net
https://shodhganga.inflibnet.ac.in
https://scholar.google.com
https://www.google.com