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The Slow but Steady Expedition of Central Bank Digital Currency in India- A Study with Special Reference to the People's Expectations on Central Bank Digital Currency

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Abstract
In the present context when the digital payment ecosystem is dominated by the Unified Payment Interface (UPI) system, RBI sets to introduce Central Bank Digital Currency (CBDC) or e-rupee. CBDC is the digital version of the rupee and is the liability of the Central Bank. CBDC is accepted as the legal tender, medium of payment and a safe store of value universally. The research article explores the key policy motivations for introduction of CBDC in the international scenario and in Indian context. The study identifies some key pertinent issues of CBDC like its probable conflict with the bank deposits, its ability to promote financial inclusion and prevent the illicit use of money, its presence as an acceptable alternative to the existing payment modes, its role to improve retail and cross-border transactions, to name a few. The article tries to showcase the people's expectations specifically regarding these issues and analyses them across demographical variables. The research article tries to identify some significant issues in the design features of the CBDC that needs the attention of the policymakers. The design features in the e-rupee should aim to maintain a proper balance between its attractiveness and also to fulfil its key objectives of existence.
Keywords: CBDC, e-rupee, Retail Digital Payment System, Cross-border Payment System, Financial Inclusion, Illicit use of money, Bank Deposits, Cryptocurrency
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I) Introduction

'It was the best of times, it was the worst of times,' the famous quote of the great novelist Charles Dickens in the novel 'A Tale of Two Cities.' The statement holds true in the context of pandemic across the globe. The pandemic has created many challenges but it has also created and unfolded many opportunities for humans across the globe.

One of them is the manifold increase in the digitalisation of the payment systems. The global digital payment market size has been growing and was valued at USD 81.03 billion in 2022 and is expected to further expand at a compound annual growth rate (CAGR) of 20.8% from 2023 to 2030. The global digital payments transactions were valued at over USD 8 trillion in 2022 **(Grand View Research. N.d.)**.

The digital landscape of India in the context of payment systems is undergoing a rapid transformation. Reserve Bank of India (RBI) has been making inroads in extending technology-based solutions in the banking system since mid-eighties. The introduction of Electronic Clearing Service (ECS) in 1990, then the development of the almost real time fund transfers through Real Time Gross Settlement (RTGS), National Electronic Fund Transfer (NEFT) in the years 2004 and 2005 respectively, paving the way for Immediate Payment Service (IMPS) and Unified Payment Interface (UPI) for the instant payment settlements to the introduction of Bharat Bill Payment System (BBPS) and the enactment of separate legislation for Payment and Settlement Systems, evolutionary journey is embarked with milestones **(RBI, 2022)**.

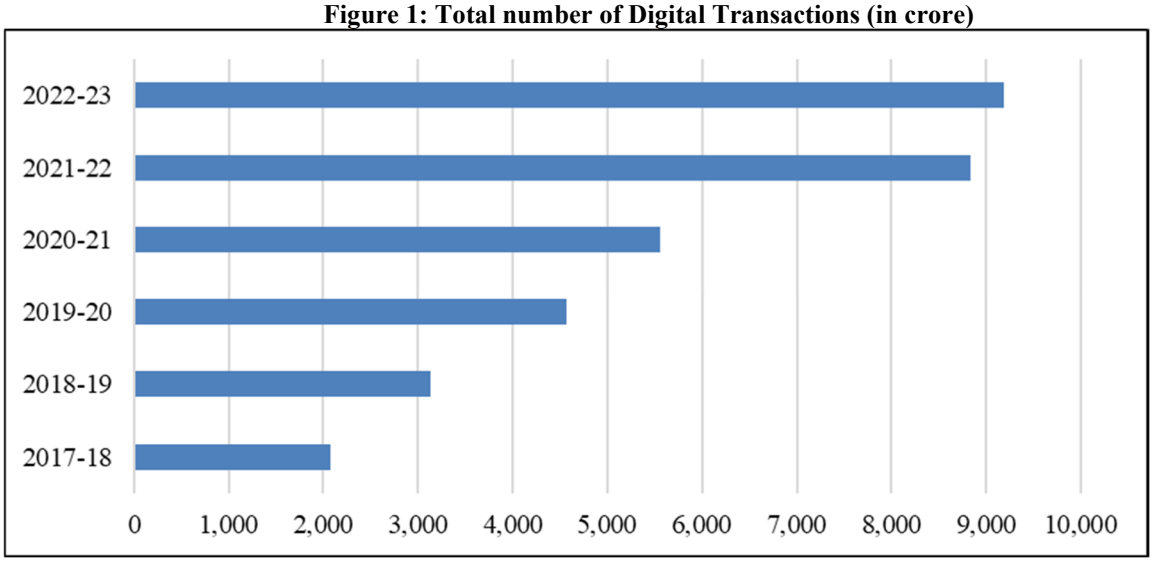
Given below the Table 1 and the Figure 1 depicting the total number of digital payment transactions undertaken in the past five financial years and in the last year (up to 31st December, 2022).

Table 1: Number of Digital Transactions from 2017-18 to 2022-23

Financial Year	Total number of digital transactions (in crore)
2017-18	2,071
2018-19	3,134
2019-20	4,572
2020-21	5,554
2021-22	8,840
2022-23	9,192

Source: RBI, NPCI and other banks, retrieved from https://www.pib.gov.in/PressReleasePage.aspx?PRID=1897272

Figure 1: Total number of Digital Transactions (in crore)



Source: Drawn by the researchers with the Table 1 data

The Table 1 and the Figure 1 show that the in the past five years there has been an almost steady increase in the number of digital transactions. The highest increase took place in the year 2021-22 and the reason for the same can be attributed to uncertainties, fear created by the pandemic in the minds of the people.

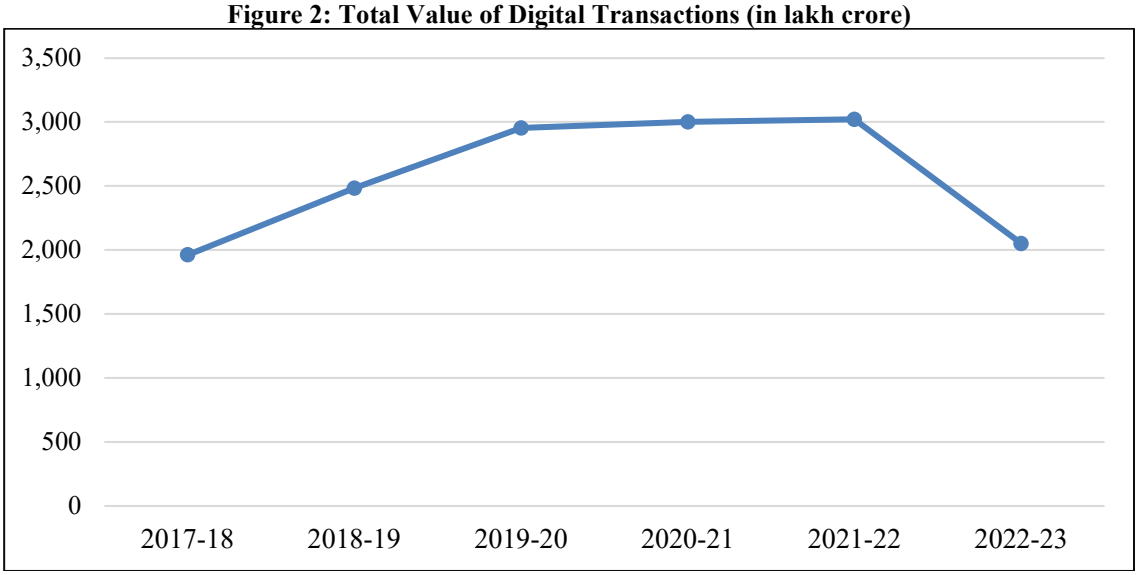
The Table 2 and the Figure 2 given below depicting the total value of digital transactions in the past five financial years and the current year (up to 31st December, 2022) show similar trend of increase from one year to another.

Table 2: Total Value of Digital Transactions (in lakh crore)

Financial Year	Total value of digital transactions (in lakh crore)
2017-18	1,962
2018-19	2,482
2019-20	2,953
2020-21	3,000
2021-22	3,021
2022-23	2,050

Source: RBI, NPCI and other banks, retrieved from https://www.pib.gov.in/PressReleasePage.aspx?PRID=1897272

Figure 2: Total Value of Digital Transactions (in lakh crore)



Source: Drawn by the researchers with the Table 1 data

Its only in the last year i.e., 2022-23, the total value of Digital Transactions (in lakh crore) seems to drop as the data assimilated is up to 31st December, 2022. The steep rise in value of digital transactions is observed in the years 2018-19 and 2019-20. The digital payment modes considered in the above tables are BHIM-UPI, IMPS, NACH, AePS, NETC, debit cards, credit cards, NEFT, RTGS, PPI, etc.

Money has four attributes like the Issuer (Central Bank or not), the form (physical or digital), accessibility (wide or narrow) and the technology (peer to peer tokens or accounts) **(Bech and Garratt, 2017 as cited in RBI, 2022)**. Central Bank Digital Currency (CBDC) is the legal tender issued by the Central Bank in digital form as stated by the RBI. It is a sovereign currency that can be exchanged at par with the paper currency and the deposits in commercial banks without loss in value. CBDC is unique from the existing digital forms of money as the former is the liability of the Central Bank and not of the commercial banks. CBDC must be accepted as the legal tender, medium of payment and a safe store of value universally **(RBI, 2022)**.

In India, where the existing digital ecosystem is dominated by the well-established UPI system, the question is whether the CBDC will act as a game changer and add value to the existing system or not. Presently, the value of digital rupee or e-rupee in circulation after it was set in motion by the RBI on December 1st, 2022 is 5.70 crore involving 17.1 lakh pieces of digital notes as on March 31st, 2023. The corresponding figure of the value of physical currency in circulation is Rs. 33.66 lakh crore as on May 5th, 2023 indicating a sharp contrast and raising a question whether CBDC will be impactful for India or not. The pilot phase of the retail CBDC was introduced in Mumbai, New Delhi, Bengaluru and Bhubaneshwar with Ahmedabad, Chandigarh, Gangtok, Guwahati, Hyderabad, Indore, Kochi, Lucknow, Patna, Shimla also joining the pilot in a phase-wise manner including customers and merchants in the closed user group. The first participating banks in the retail CBDC pilot projects were State Bank of India (SBI), ICICI Bank, Yes Bank, IDFC First Bank followed by Bank of Baroda, Union Bank of India, HDFC Bank, Kotak Mahindra Bank. Few more banks namely Punjab National Bank (PNB), Canara Bank, Axis Bank, IndusInd Bank, Federal Bank would be brought under pilot run too **(The Indian Express, May, 2023)**. In the existing scenario, CBDC is being launched in 16 locations with 13 participating banks. Some banks are introducing Retail CBDC to select group of customers through e-rupee app like HDFC Bank. Yes Bank on the contrary does not impose any restriction on the account holders to be a part of the CBDC project. RBI has been urging the banks, NBFCs and Fintechs to convince their customers to embrace digital payments solutions. Reliance Retail and Reliance General Insurance has already been the torchbearer for the retail segment and insurance segment by accepting payments in CBDC from their customers **(Forbes India, June, 2023)**.

In the midst of all these proactive steps to increase the acceptability of the CBDC, there lie some pertinent questions. Firstly, when the advanced economies in the world are still hesitant to introduce CBDC in a full-fledged manner and small economies have launched the same, why the emerging economies like China and India are going ahead with it? Secondly, will there be any impact and transformation in the user experience when the majority of the population in India has already adopted UPI based payment solutions **(The Indian Express, May, 2023)**? In the next two sections, the authors will try to explore some key motivations to introduce CBDC in the other countries and motivations in Indian context.

II) Key Motivations to introduce CBDC in the International Scenario

Out of 118 countries, following is the status of the CBDC projects as on 16th June, 2023.

Table 3: Status of CBDC projects in Different Countries

Status	No. of Countries
Launched	11
Pilot	18
Development	32
Research	40
Inactive	15
Cancelled	2

Source: https://www.atlanticcouncil.org/cbdctracker/

Every country has its own policy goals for introducing CBDC to meet its specific needs. Following are some key motivations for introducing CBDC across different jurisdictions.

1. **Making payment system accessible**- Shortage of cash, non-acceptance of cash by business firms, persistent disruption in the digital infrastructure affect the accessibility of payment options. The geographical features of some countries like the island of the Bahamas pose a constraint in the way of distributing cash and digital infrastructure. Hence, CBDC is introduced in many nations with the objective of ensuring the accessibility of the payment **(Soderberg et al., 2022).** But there is a need to explore whether digital payment options have significantly reduced demand for cash or not. Not only that, whether CBDC can act as an alternative or supplement to cash or not for all sections of the population is again a question **(CPMI, 2018)**. The distribution of population across demographical parameters like age, social status, location, disability, etc. may demand universal acceptance of CBDC and make its design accordingly **(Soderberg et al., 2022)**.
2. **Improving the Efficiency in Payment System**- Increase usage of cash involves high cost of printing and high operational cost of physical cash management. Offering a digital counterpart of the physical cash is an effective way to reduce these costs that also has a positive bearing on environment. In some countries, digital payment options are also expensive. CBDC can also be effective in cross-border payment systems which are usually slow, expensive, and less transparent **(ibid.)**. So, the cost efficient and environment friendly initiative of the Central Banks to introduce CBDC is the way ahead in the payment scenario.
3. **Reinforcement of resilience of a country's retail payment system**- This motivation is primarily significant for those countries that are prone to natural disasters like Bahamas and Eastern Caribbean Currency Union (ECCU) countries. The disasters lead to the complete disruption of the country's physical and financial infrastructure. In that scenario, the government must ensure people's ability to pay or receive and enabling government transfers in severe situations. Countries like China who have highly efficient digital payment infrastructure also face challenges of digital disruption and risk of concentration since the digital service market is monopolised by few operators like AliPay, WeChat Pay, etc.**(ibid.)**. Banks, too, in some nations may face challenges to meet the demand for credit transfers **(CPMI, 2018)**. In all these circumstances, Central Banks feel that CBDC can be a viable solution ensuring resilience in retail payment system.
4. **Financial Inclusion**- Financial Inclusion remains a challenge for many jurisdictions due to many factors. Factors like vast stretch and remote locations in a country, lack of identity documents contribute to that challenge. Moreover, presence of market inefficiencies such as lack of economies of scale and lack of profitability to cater to the unserved segment, susceptibility of some segments of population like women, disabled, low-income groups people also aggravate the issue of exclusion of the population**(Sudha**. **P., 2023)**. Hence, financial inclusion remains a significant policy goal for the introduction of CBDC in many jurisdictions like the Bahamas, ECCU, Uruguay, etc. **(Soderberg et al., 2022)**. But, again, an impediment in the usage of digital currency among some segments of population may lead them to demand for easier alternatives like cash **(CPMI, 2018)**.
5. **Combating with unlawful use of money**- Cash transactions with lack of audit trail and anonymity encourage money laundering and financing of terrorism activities **(FATF, 2015 as cited in Soderberg et al., 2022)**. Among the various nations, only Bahamas has kept this objective as its top policy goal for introducing CBDC **(Soderberg et al., 2022)**. But this objective comes with the incidental costs of complying with KYC formalities either falling on commercial banks or the Central Bank depending upon the design feature adopted **(CPMI, 2018)**.
6. **Protecting the sovereignty of Central Bank's currency**- The rise of a parallel economy for cryptocurrency or private digital tokens poses a threat to the Central Bank currency and majority of the countries feel the urgent need to give a digital equivalent of the Central Bank currency. The cryptocurrency markets are volatile and do not have adequate protection to the investors rendering them unsafe **(CPMI, 2018)**. China and Canada consider this as one of their motivations for initiating CBDC **(Soderberg et al., 2022)**.
7. **Augmenting Competition**- CBDC is expected to enhance the competition in the payment scenario. In one perspective, it will compete with other existing forms of payments increasing the efficiency in the payment system. In another perspective, CBDC can be offered as a platform for private payments service providers to operate. The latter situation will foster new entry of payment service providers and will eventually augment

the competition **(Soderberg et al., 2022)**.

III) Key Motivations to introduce CBDC and their Relevance in Indian context

In this section, an attempt has been made to highlight the key motivations to introduce CBDC in India as per RBI's concept note on CBDC and evaluate the relevance of the same in Indian scenario.

1. **Saving the costs associated with physical cash management**- Digital currency is expected to reduce operational costs related to cost of printing, distributing and storing currency notes. This cost is borne by the Central Bank, banks, consumers and business entities. Moreover, the Environmental, Social and Governance (ESG) impact due to the usage of digital currency will prove to be beneficial in the long run **(RBI, 2022)**. The total expenditure incurred on security printing during 2022-23 was Rs 4,682.80 crore compared to Rs 4,984.80 crore in the preceding year. The RBI also disposed of 4,824 lakh pieces of soiled Rs. 2,000 notes in the last financial year, rising against 3,847 lakh pieces in the preceding year. According to RBI's annual report, there was an increase of 8.4% and 14.4 % in the counterfeit notes detected in the denominations of Rs 20 and Rs 500 (new design), respectively in 2022-23 in comparison to 2021-22. However, there was a decline in the counterfeit notes detected in the denominations of Rs 10, Rs 100 and Rs 2,000 by 11.6 per cent, 14.7 per cent and 27.9 per cent, respectively in 2022-23 versus the last year **(The Indian Express, 30th May, 2023)**.
2. **Moving towards more digitalisation in payment systems and aiming for less cash economy**- India has made substantial progress in providing digital payment options to her citizens. In spite of it, there is still demand for cash in the economy **(RBI, 2022)**. As per RBI's report, there were 5,16,338 lakh pieces of Rs 500 denomination notes aggregating to Rs 25,81,690 crore at the end of March, 2023. The number of Rs 500 notes at the end of March, 2022 were 4,55,468 lakhs. The report also stated there were 4,55,468 lakh pieces of Rs 2,000 notes amounting to Rs 3,62,220 crore at the end of March, 2023**(The Indian Express, 30th May, 2023)**.The above figures glaringly point out the increased usage for cash and the tendency of the common people to hold cash for precautionary motive. Preference for cash is mostly observed as per RBI's pilot project due to the advent of uncertainty like pandemic, for regular receipts and payments and for small-value transactions **(RBI, 2022)**. Against this backdrop, whether CBDC will be a game changer or not in achieving less cash economy is a wait and watch situation.
3. **Reinforcing Financial Inclusion-** Financial Inclusion has been the policy goal for introducing CBDC in many countries. RBI's composite Financial Inclusion (FI) Index rose from 53.9 on March, 2022 to 56.4 on March, 2023. The index captures multiple aspects of FI classified across three broad parameters namely access, usage and quality **(Ray, ET, 2nd August, 2022)**. The rise in the index shows improvement in FI and CBDC is expected to augment the inclusion as per RBI. According to Ministry of Information and Broadcasting, India had more than 1.2 billion mobile phone users and 600 million smart phone users in November, 2022 **(Anand, Mint, 16th November, 2022)**. The rapid use of mobile phone (both the feature and the smart phones) will aid in the penetration of CBDC in the excluded segments of the population due to its unique design features. The offline functionality of the CBDC and its suitability across multiple devices and arrangements for universal access devices is expected to aid in FI in the long run **(RBI, 2022)**.
4. **To counter the rise in cryptocurrency**- The first cryptocurrency Bitcoin emerged in 2009 aiming to release the public money from the control of the central bank for giving more autonomy and control to the people **(https://coinmarketcap.com/all/views/all/ as cited in Basu, 2023)**. There are approximately 22,904 cryptocurrencies as on March, 2023 out of which approximately 8832 active cryptocurrencies exist. Presently, there are more than 300 million cryptocurrency users worldwide and roughly 18000 businesses agree to take a form of crypto currency as their payments **(https://explodingtopics.com/blog/number-of-cryptocurrencies)**.

   The following Table 4 shows the Market Capitalisation, Volume (24 hours) and Circulating Supply of the top three cryptocurrency as on 16th July, 2023from18:00- 18:30 IST. Market Capitalisation is synonymous to the free-float market capitalisation in the stock market. Volume refers to the volume of trade in the last 24 hours and Circulating Supply indicates the number of coins circulating in the market and with the public.

Table 4: Market Capitalisation, Volume (24 hours) and Circulating Supply of the top three cryptocurrencies

Name	Market Capitalisation	Volume (24 hours)	Circulating Supply
Bitcoin	$589,062,981,723 approximately	$7,780,580,912 approximately	19,430,762 BTC approximately
Ethereum	$232,263,947,798 approximately	$4,123,159,996 approximately	120,200,189 ETH approximately
Tether	$83,673,897,125 approximately	$16,539,378,004 approximately	83,638,374,851 USDT

Source: https://coinmarketcap.com/

The above table clearly depicts the rise in the use of cryptocurrency increasing the probability of a parallel economy. This will defeat the purpose of the monetary policy and will adversely affect the stability of the domestic currency. The increased circulation, volume and market capitalisation data glaringly point out that the cryptocurrencies will provide a conducive mechanism for financing terrorism activities. Against this backdrop, it is obvious that the central banks including RBI will try to curb the same and provide a sovereign digital equivalent of the rupee **(RBI, 2022)**.

5. **To improve the cross-border payment systems**- Cross-border payment systems is an area that can leverage from the advent of new technological innovations, one of them being CBDC. As per the World Bank report, India is the largest receiver of cross-border remittances amounting to roughly $87 million in 2021 from US contributing 20% of these funds. It's needless to mention that the cost of sending remittances to India assumes significance especially increasing the chance of use of illegal or improper channels of remittances. The present inhibitions in the cross-border payment scenario include high costs, low speed, limited access, inadequate transparency to name a few. Trying to eliminate these challenges will have long-term implications in international trade, economic growth, financial inclusion, etc. The Bank for International Settlements (BIS) has pointed out that CBDC should have some attributes in the initial design phase in order to make it an enabler in the cross-border payment systems eventually. The interoperability of the CBDC will aid in reducing the challenges and improve the cross-border payment systems **(RBI, 2022)**.

IV) Some pertinent issues and Objectives of Study

In July, 2023 RBI announced interoperability of CBDC with UPI QR codes. This will help the people to use the e-rupee in the wallet to make payment through UPI QR code at stores and other similar outlets. The business people and the merchants will not be required to keep a separate QR code for CBDC transactions and the same single QR code can be used seamlessly with CBDC as well. This move definitely will act in favour of the acceptance of CBDC as a medium of payment and receipts. HDFC Bank becomes the first bank to introduce this interoperability feature in CBDC **(Saha, 13th July, 2023)**.

Expecting this move by RBI in mind, *the study tries to analyse the payment habits of the individuals and their preference for cash, digital payments, cheques or CBDC in the situations of regular receipts and payments, small value transactions and in times of uncertainty*. *The study tries to explore whether RBI backed digital currency will be preferred over all the other options in these contexts as mentioned above*.

One of the motivations of RBI for issue of CBDC is that it would make the payment system more efficient, competitive, innovative, and resilient for both inter-bank settlements and retail purposes and cross-border transactions.

Hence, *the study aims to explore the expectations of the respondents whether CBDC will augment and improve the existing retail payment systems and cross-border transactions*.

One of the motivations of RBI for issue of CBDC is Financial Inclusion. To promote financial inclusion, CBDC should have anonymity. But a trade-off is required in the anonymity of transactions as CBDC cannot be purely anonymous like physical cash. We need to keep in our mind that there is another global objective for issue of CBDC, i.e., it would reduce illicit use of money. So, the twin objectives of Financial Inclusion and Prevention of Illicit use of money must be balanced.

The study takes a look in the design features of e-rupee to attain and balance between the twin objectives of Financial Inclusion and Prevention of Illicit Use of Money.

There is a concern that CBDC may conflict with bank deposits. If people withdraw from banks and keep the money in CBDC form, it would affect the credit creation capacity of the banks and impact the financial stability of the country. In order to prevent it, some design features are incorporated in CBDC so that it does not conflict with bank deposits as well the attractiveness of the same is maintained. *So, the study tries to study the expectations of the respondents in this regard*.

The study aims to find out whether CBDC will prevent the use of cryptocurrency and what may be the possible challenges like security concerns and technological uncertainty for operating this robust digital system from the respondents' opinion.

V) Research Methodology:

The study is empirical and explanatory in nature. The research will be conducted based on secondary data and primary data collected through convenience sampling method. The structured questionnaire is used for sample collection and each question is well administered among respondents. The respondents will be classified across three demographic criteria namely the Age, Educational Qualification and the Occupation. The age group has 5 sub-groups. The criteria Educational Qualification have 4 classifications. The criteria Occupation have 4 groups. This survey is conducted to study the perceptions of the Academicians, Accounting professionals (CA, CS, CMAs, etc.), Bankers (employees in the banking sector) and Business Owners/Managerial people. The

study is based on 100 respondents. The expectations are collected

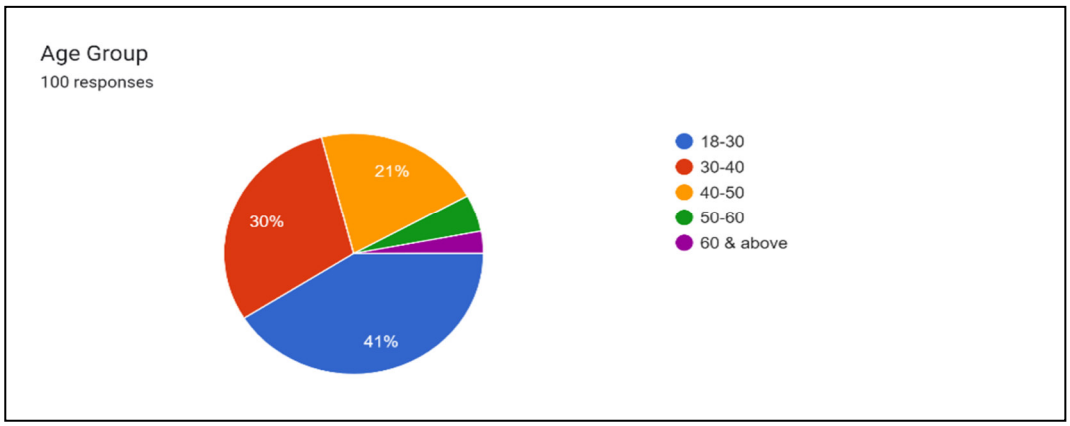
a. regarding CBDC over other modes of payment,
b. whether CBDC will improve the existing retail digital payment systems and cross-border transactions,
c. whether CBDC will balance financial inclusion and anonymity
d. whether CBDC may conflict with the bank deposits
e. whether CBDC will be able to curb the use of cryptocurrency
f. regarding the uncertainties that CBDC may face.

The variables are measured through 7-point Likert Scale (Ordinal Scale). The Kruskal–Wallis (K-W test) test has been used to understand the variance regarding each variable across different categories of the three criteria. The K-W test is used for hypothesis testing considering categorical independent and ordinal dependent variables. Chi-square has been used to see the impact of the demographic criteria on the variables that are measured on nominal scale. The parameters were selected based on personal judgment of researchers, backed by extensive review of literature and thorough understanding of the real-life issues associated with the CBDC and digital payment scenario in India. The samples were collected from various places of West Bengal. West Bengal has been considered considering convenience in data collection.

VI) Data Analysis and Findings

A) Demographical Details

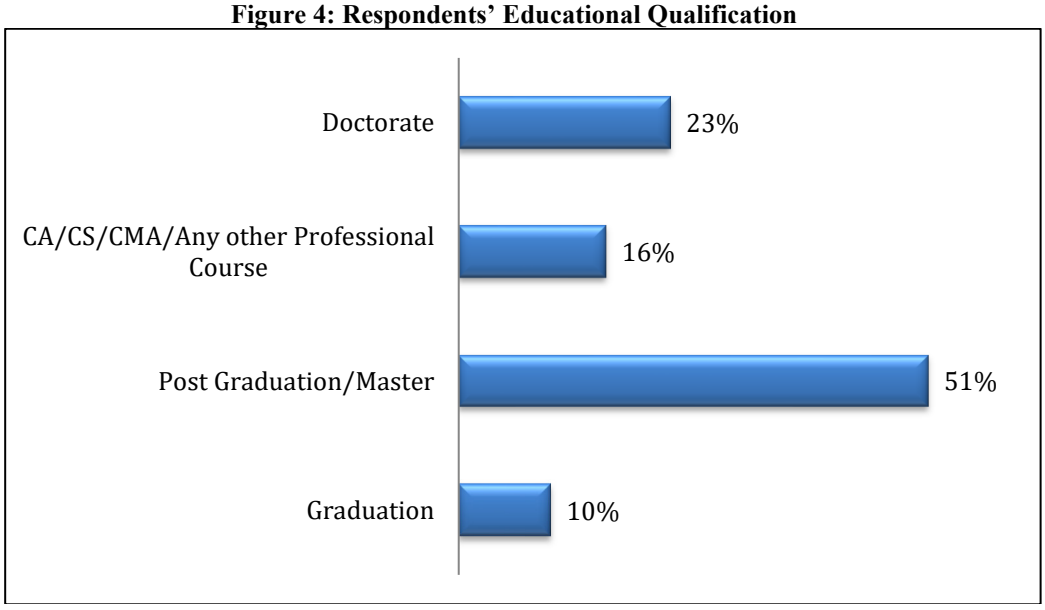
Figure 3: Respondents from Different Age Group



Source: Computed from collected data

Figure 3 indicates that the maximum respondents i.e., 41% belong to the age group of 18-30, followed by 30% belonging to the age group of 30-40. The sample contains only 5% and 3% of the respondents in the age groups 50-60 and 60 and above respectively.

Figure 4: Respondents' Educational Qualification

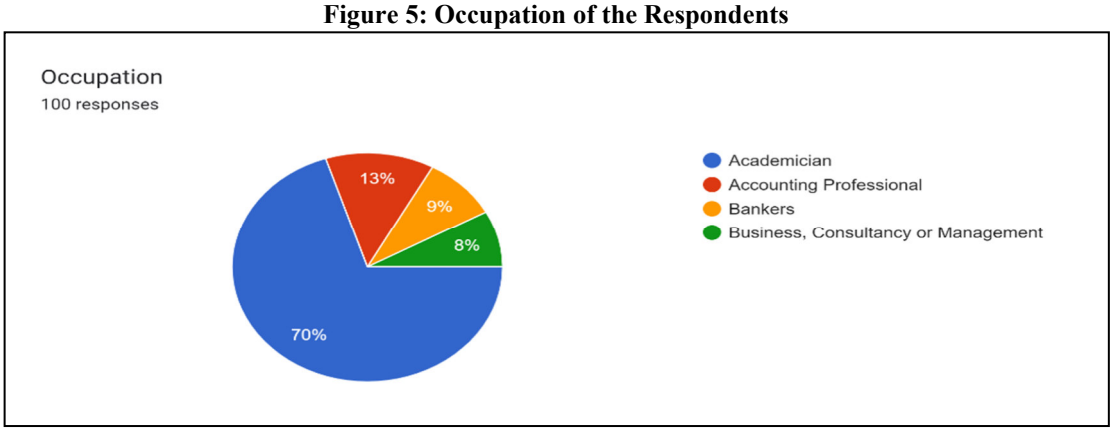


Source: Computed from collected data

The above Figure 4 shows that 51% of the respondents are Post Graduated, 23% are Ph.D. holder, 16% have

done professional courses like CA/CS/CMA and 10% of the total respondents are only graduated.

Figure 5: Occupation of the Respondents



Source: Computed from collected data

Figure 5 shows that 70% of the respondents are Academicians, followed by Accounting Professionals like CA/CS/CMA comprising 13%. Bankers and Business owners, managerial people are 9% and 8% of the respondents.

B) Analysis of the Variables across Demographical Criteria

The researchers initially conducted the reliability test to understand whether there is internal consistency among the variables.

Table 5: Result of Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.841	0.851	20

Source: Computed from collected data using SPSS

From the above table, it is evident that the Cronbach's Alpha is 0.851 indicating overall reliability and internal consistency of the measure as it is more than 0.7.

There are 20 variables measured on 7-point Likert scale classified among various pertinent issues of CBDC.

Given below is the result of the analysis to find significant effect of the age group on the 20 variables where level of significance is 5%.

Table 6: Result of Anova Test in respect to Age Group

Null Hypothesis (No significant impact across Categories of Age Group)	Sig.	Decision
Objective 1: Preference for CBDC over other modes of payments		
Prefer CBDC more for regular receipts and payments	0.77	Retain H_0
Prefer CBDC for small value transactions	0.762	Retain H_0
Prefer CBDC during uncertainties like pandemic, natural calamity, etc.	0.969	Retain H_0
Objective 2: CBDC's expected role in Retail Digital Payment system		
Existing Retail Digital Payment System is efficient, resilient, etc.	0.467	Retain H_0
CBDC will add to the efficiency, resilience, etc. of Digital Retail Payment System	0.688	Retain H_0
Objective 3: CBDC's expected role in cross-border payment system		
Existing cross-border payment system is not efficient	0.41	Retain H_0
CBDC will make the cross-border payment efficient, competitive, etc.	0.755	Retain H_0
Objective 4: CBDC's expected role in Financial Inclusion		
CBDC should have anonymity of transactions	0.142	Retain H_0
CBDC should have offline capabilities	0.183	Retain H_0
Objective 5: CBDC's expected role in preventing illicit use of money		
Anonymity of transactions for lower value transactions	0.894	Retain H_0
KYC-AML requirements for higher value transactions	0.945	Retain H_0
Objective 6: CBDC's probable conflict with bank deposits		
Cap limit on CBDC balances in the wallet	0.192	Retain H_0
Tax imposed on balances/transactions above a threshold limit	0.057	Retain H_0
CBDC should not carry interest like bank deposits	0.402	Retain H_0
CBDC will still be attractive with limit, tax imposed, without interest	0.018	**Reject H_0**
Bank Deposits will still be attractive after CBDC issue	0.184	Retain H_0
Objective 7: CBDC's expected role in preventing use of cryptocurrency		
CBDC will prevent the use of cryptocurrency	0.043	**Reject H_0**

CBDC is more attractive than cryptocurrency due to security and RBI's backing	0.273	Retain H_0
Objective 8: Uncertainties/ Challenges that CBDC may face		
Issues of Cyber security	0.686	Retain H_0
Technological uncertainty	0.324	Retain H_0

Source: Computed from collected data using SPSS

Out of 20 cases, only in 2 cases it is observed that the age has significant impact on the opinion at 5% level of significance. The variable measuring the opinion on '*CBDC will still be attractive with limit, tax imposed, without interest*' differs significantly across age groups. This indicates that different age groups significantly differ in their opinion that initiatives like imposition of tax/ limit on transactions/balance above a threshold limit and no interest feature on CBDC balance to reduce CBDC's conflict with bank deposits may dilute the attractiveness of CBDC. The variable measuring opinion on '*CBDC will prevent the use of cryptocurrency*' differs significantly across age groups. This indicates that different age groups significantly differ in their opinion that one of the main motivations to issue CBDC to curb the use of crypto currency, may not be a reality.

Given below is the result of the analysis to find significant effect of the educational qualification on the 20 variables where level of significance is 5%.

Table 7: Result of Anova Test in respect to Qualification

Null Hypothesis (No significant impact across Categories of Educational Qualification)	Sig.	Decision
Objective 1: Preference for CBDC over other modes of payments		
Prefer CBDC more for regular receipts and payments	0.089	Retain H_0
Prefer CBDC for small value transactions	0.648	Retain H_0
Prefer CBDC during uncertainties like pandemic, natural calamity, etc.	0.63	Retain H_0
Objective 2: CBDC's expected role in Retail Digital Payment system		
Existing Retail Digital Payment System is efficient, resilient, etc.	0.584	Retain H_0
CBDC will add to the efficiency, resilience, etc. of Digital Retail Payment System	0.933	Retain H_0
Objective 3: CBDC's expected role in cross-border payment system		
Existing cross-border payment system is not efficient	0.504	Retain H_0
CBDC will make the cross-border payment efficient, competitive, etc.	0.924	Retain H_0
Objective 4: CBDC's expected role in Financial Inclusion		
CBDC should have anonymity of transactions	0.383	Retain H_0
CBDC should have offline capabilities	0.232	Retain H_0
Objective 5: CBDC's expected role in preventing illicit use of money		
Anonymity of transactions for lower value transactions	0.987	Retain H_0
KYC-AML requirements for higher value transactions	0.004	**Reject H_0**
Objective 6: CBDC's probable conflict with bank deposits		
Cap limit on CBDC balances in the wallet	0.507	Retain H_0
Tax imposed on balances/transactions above a threshold limit	0.123	Retain H_0
CBDC should not carry interest like bank deposits	0.843	Retain H_0
CBDC will still be attractive with limit, tax imposed, without interest	0.304	Retain H_0
Bank Deposits will still be attractive after CBDC issue	0.031	**Reject H_0**
Objective 7: CBDC's expected role in preventing use of cryptocurrency		
CBDC will prevent the use of cryptocurrency	0.154	Retain H_0
CBDC is more attractive than cryptocurrency due to security and RBI's backing	0.155	Retain H_0
Objective 8: Uncertainties/ Challenges that CBDC may face		
Issues of Cybersecurity	0.225	Retain H_0
Technological uncertainty	0.706	Retain H_0

Source: Computed from collected data using SPSS

Out of 20 cases, only in 2 cases it is observed that the educational qualification has significant impact on the opinion at 5% level of significance. The variable measuring the opinion '*Use of CBDC should have KYC-AML requirements for higher value transactions*' differs significantly across categories of educational qualification. This reflects that the respondents of different categories of educational qualification vary in their opinion significantly that imposition of KYC-AML measures on CBDC use to prevent illicit use of money may defeat the nature of CBDC as equivalent to physical cash. The variable measuring the opinion '*Bank Deposits will still be attractive after CBDC issue*' differs significantly across categories of educational qualification. This shows that respondents belonging to different educational qualification differ significantly that CBDC may compete with the bank deposits and may affect the financial stability of the economy in the long-term.

Given below is the result of the analysis to find significant effect of the educational occupation on the 20 variables where level of significance is 5%.

Table 8: Result of Anova Test in respect to Occupation

Null Hypothesis (No significant impact across Categories of Occupation)	Sig.	Decision
Objective 1: Preference for CBDC over other modes of payments		
Prefer CBDC more for regular receipts and payments	0.518	Retain H_0
Prefer CBDC for small value transactions	0.481	Retain H_0
Prefer CBDC during uncertainties like pandemic, natural calamity, etc.	0.984	Retain H_0
Objective 2: CBDC's expected role in Retail Digital Payment system		
Existing Retail Digital Payment System is efficient, resilient, etc.	0.556	Retain H_0
CBDC will add to the efficiency, resilience, etc. of Digital Retail Payment System	0.351	Retain H_0
Objective 3: CBDC's expected role in cross-border payment system		
Existing cross-border payment system is not efficient	0.199	Retain H_0
CBDC will make the cross-border payment efficient, competitive, etc.	0.719	Retain H_0
Objective 4: CBDC's expected role in Financial Inclusion		
CBDC should have anonymity of transactions	0.938	Retain H_0
CBDC should have offline capabilities	0.582	Retain H_0
Objective 5: CBDC's expected role in preventing illicit use of money		
Anonymity of transactions for lower value transactions	0.181	Retain H_0
KYC-AML requirements for higher value transactions	0.327	Retain H_0
Objective 6: CBDC's probable conflict with bank deposits		
Cap limit on CBDC balances in the wallet	0.369	Retain H_0
Tax imposed on balances/transactions above a threshold limit	0.596	Retain H_0
CBDC should not carry interest like bank deposits	0.973	Retain H_0
CBDC will still be attractive with limit, tax imposed, without interest	0.637	Retain H_0
Bank Deposits will still be attractive after CBDC issue	0.957	Retain H_0
Objective 7: CBDC's expected role in preventing use of cryptocurrency		
CBDC will prevent the use of cryptocurrency	0.384	Retain H_0
CBDC is more attractive than cryptocurrency due to security and RBI's backing	0.123	Retain H_0
Objective 8: Uncertainties/ Challenges that CBDC may face		
Issues of Cybersecurity	0.353	Retain H_0
Technological uncertainty	0.827	Retain H_0

Source: Computed from collected data using SPSS

None out of 20 cases above show significant impact of the occupation on the variables measuring opinion on different parameters of CBDC based on the objectives of study at 5% level of significance. So, in all the cases the Null Hypothesis is retained.

Pearson Chi-square test has been performed for the variables that are measured on nominal scales to find the association of the demographic variables of age, qualification and occupation on them at 5% level of significance.

Table 9: Results of Chi-Square Test

Null Hypothesis (No Association among group)	Asymp. Sig. (2-sided)		
Financial Inclusion	Pearson Chi-Square	Likelihood Ratio	Decision
Age Group	0.908	0.817	Retain H_0
Education Qualification	0.416	0.377	Retain H_0
Occupation	0.706	0.657	Retain H_0
Prevent Illicit Use			
Age Group	0.43	0.411	Retain H_0
Education Qualification	0.778	0.778	Retain H_0
Occupation	0.062	0.047	**Reject H_0**
Negative Impact on the Financial Stability			
Age Group	0.098	0.045	**Reject H_0**
Education Qualification	0.136	0.093	Retain H_0
Occupation	0.207	0.169	Retain H_0

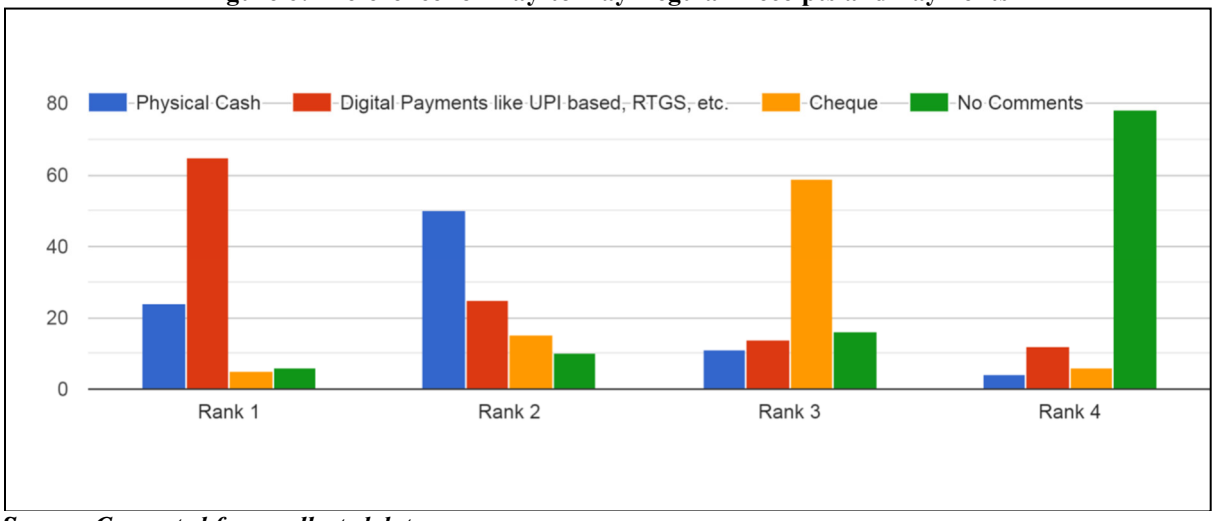
Source: Computed from collected data using SPSS

It has been attempted to check if the expectation of respondents regarding whether CBDC will be inclusive or not vary with the age, education qualification and occupation of the respondents. From the Table 8, there is no significant evidence has been found regarding association of the age, education qualification and occupation of the respondents regarding whether CBDC will be inclusive or not.

It has been attempted to check if the expectation of respondents regarding whether CBDC will be prevent illicit use or not vary with the age, education qualification and occupation of the respondents. From the Table 8, there is no significant evidence has been found regarding association of the age and education qualification but there exist significant association with the occupation of the respondents regarding whether CBDC will be preventing illicit use or not.

It has been attempted to check if the expectation of respondents regarding whether CBDC will have negative impact on the financial stability or not vary with the age, education qualification and occupation of the respondents. From the Table 8, there is no significant evidence has been found regarding association of the education qualification and occupation but there exist **significant association** with the age of the respondents regarding whether CBDC will have negative impact on the financial stability or not.

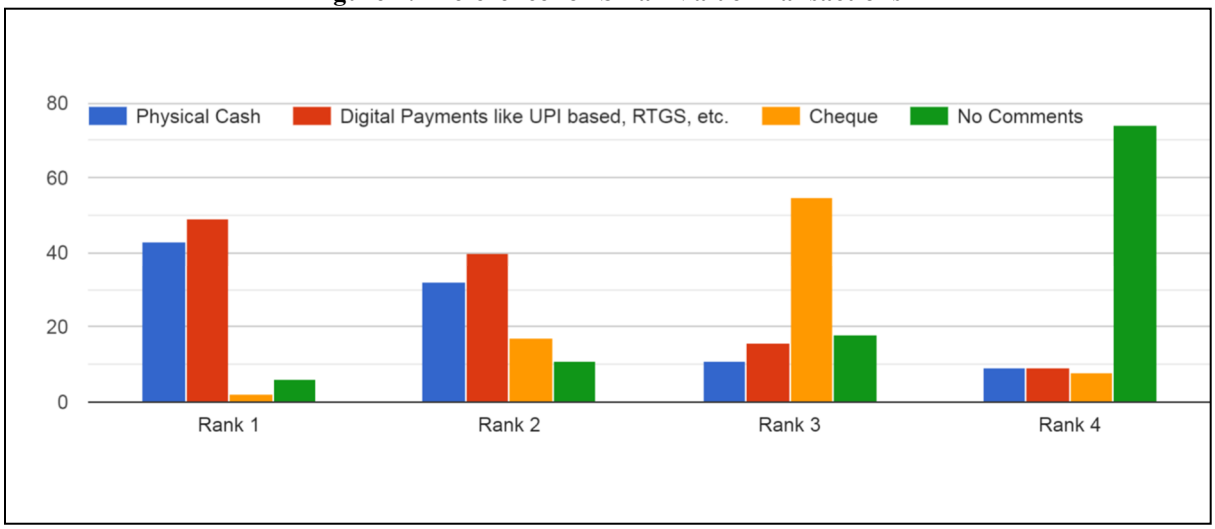
Figure 6: Preference for Day-to-Day Regular Receipts and Payments



Source: Computed from collected data

It has been found from the above Figure 6, more than 60% of the respondents prefer digital payments for their regular receipts and payments like UPI based, RTGS, internet banking, etc. followed by cash payment and cheque payment for their day-to-day transactions.

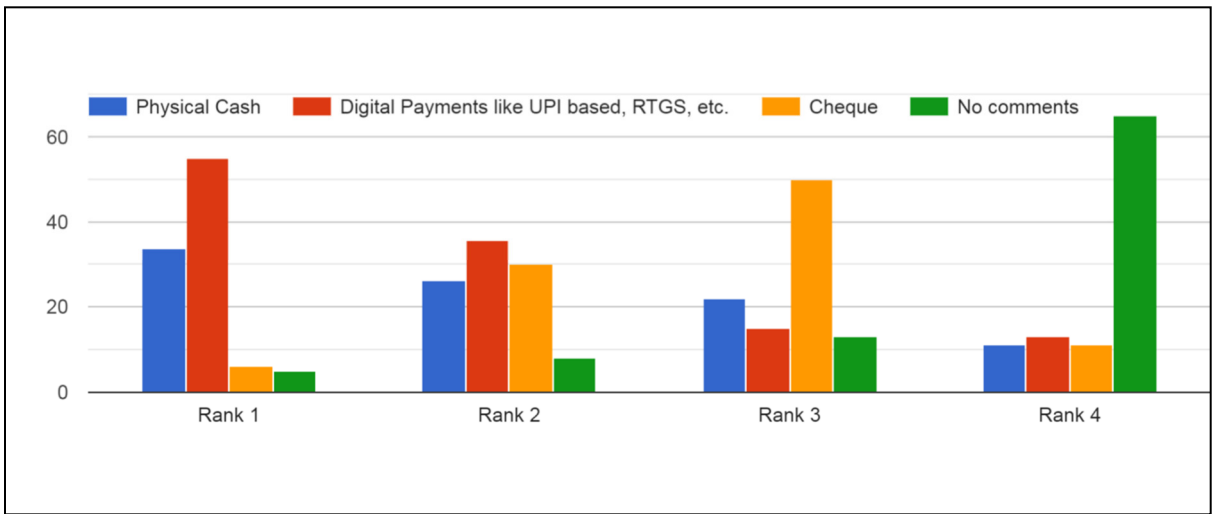
Figure 7: Preference for Small Value Transactions



Source: Computed from collected data

From the above Figure 7 it can be observed that near about 45% of the respondents mostly prefer digital payments like UPI based, RTGS, internet banking, etc. and followed by cash payment and cheque payment for the small value transactions.

Figure 8: Preference at Times of Uncertainty like Natural Calamity, Pandemic, and Political Disturbances



Source: Computed from collected data

It has been found from the above Figure 8, more than 50% of the respondents prefer digital payments like UPI based, RTGS, internet banking, etc. followed by cash payment and cheque payment during natural calamity, pandemic and political disturbances.

VI) Conclusion

At present, retail CBDC transactions are close to an average of 18,000 in a day as against the one million targets in a day by 2023 end set by the RBI. To boost the number and volume of transactions, RBI is planning to introduce some design features in the retail CBDC. One of them is the offline capability of CBDC enabling the users to use it without internet connectivity and in feature phones as well. Secondly, introduction of interoperability of CBDC with UPI-QR code will ease the flow of payment across well-established UPI-QRs. Some public and private sector banks are working to launch these features in the retail CBDC **(The Indian Express, Sept 11th, 2023)**.

RBI plans to introduce wholesale CBDC in the call money market, this October. In November, 2022, wholesale CBDC was introduced in pilot stage in the secondary market for government securities **(Mint, Sept 10th, 2023)**.

The research article traces the journey of CBDC in India starting from the key motivations for its introduction to its present status in the retail segment primarily and understanding the people's expectations regarding it. From the above, it's evident that CBDC is a novel initiative but every Central Bank of a nation should predict the timing of its introduction. The design features of the CBDC should not only encompass the policy motivations for its introduction but should have features that popularise the e-rupee. It should help it to gain acceptability as an alternative payment medium. India is still in the pilot stage with its trial-and-error mechanism regarding CBDC and is gradually moving in the path to boost its acceptability.

The variables measuring respondents'' opinion on '*CBDC will still be attractive with limit, tax imposed, without interest*' and'*CBDC will prevent the use of cryptocurrency*' differ significantly across age groups. Hence, the features like imposition of limit or tax on CBDC balances or transactions, no interest on CBDC balances may adversely affect the popularity of CBDC in gaining momentum among the retail sector. These features on the contrary are essential too to reduce the conflict of e-rupee with bank deposits. The chance of CBDC preventing the use of cryptocurrency is also a test of time for us to observe. The variables measuring respondents' opinion on '*Use of CBDC should have KYC-AML requirements for higher value transactions*' and '*Bank Deposits will still be attractive after CBDC issue*' vary significantly across qualifications. The objective to maintain the trail of CBDC transactions to prevent its illicit use like KYC-AML requirements for high-value transactions may prove detrimental in CBDC's journey to be at par with cash. The trade-off of the attractiveness of the CBDC vis-à-vis bank deposits is also a major concern for the policy makers. Hence, it's evident that the design features of the e-rupee should ensure an optimum balance between the policy objectives and ensuring attractiveness of the CBDC. This will definitely be in the form of experimentation, wait, watch and respond approach by the RBI.

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