

CBDC: EMPIRICAL STUDY ON DETERMINANTS OF CBDC USAGE PURPOSE AMONG CONSUMERS

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Abstract

The initiative from the government of India in making India into a digitally vibrant nation is highly admirable. India economic growth over the decade is raising at higher rate, it due to adoption of digitalization in every part of economy from banking, business, and international payment. Banks are updating according to needs and demands of the consumers providing amenable services at finger tips of the consumers. From small vendor to high business transitions are carry forward with the help of digital transition or digital currency. The primary objective of the study is determining CBDC usage purpose among consumers. The study used convenient sampling method and covered 160 banking consumers using digital banking. The findings of the study show Determinants of CBDC Usage Purpose among Consumers have been segregated into two dominant dimensions namely Payment Terminal and Financial Stability Factor which dealing with cost of using online banking, usage of the same at all branches both nationally and internationally and security of the banking. The second factor is Usage and Payment Efficiency Factor which deals with usage of the digital banking, efficiency of the payment over the geographical location and ability of use the same without internet connections. Consumer Perception on CBDC have been segregated into two dominant dimensions namely Expectancy and Performance Factor which deals with expectancy of the consumers over usage of CBDC, knowledge on using digital currency and trust over the banking while using digital currency. A positive and significant impact of Consumer Perception on CBDC on Determinants of CBDC Usage Purpose among Consumers has been identified.

Keywords: Payments, Digital, Security, Stability and Security

INTRODUCTION

Central bank digital currency (CBDC) is a form of digital currency, issued and regulated by the central bank of a country or a region. The adoption of CBDC could potentially lead to significant changes in the financial landscape, with the benefits and risks associated with it being uncertain. This paper aims to analyze the potential risks and challenges associated with the adoption of CBDC.

Background

CBDC is a type of digital currency that is backed by the central bank's reserves and regulated by the monetary policy of a country. It is an extension of the central bank's responsibilities, as it currently manages the monetary policy and provides financial

stability.

CBDC seeks to offer an alternative to cash and physical currency, as well as complementing current forms of digital currency such as credit and debit cards. The Idea of digital currency is notnew, and several countries have already begun exploring the possibility of issuing CBDC. China has been at the forefront of CBDC adoption, having launched a pilot program in several cities. Other countries such as the European Union, the United States, Japan, and the United Kingdom have also expressed interest and intentions to explore the idea of CBDC.

Benefits of CBDC

The potential benefits of CBDC are numerous, such as improving financial inclusion by providing a digital currency that is equal to physical cash. It could provide secure and decentralized transactions that are faster and more efficient than traditional payment methods, reducing the costsassociated with maintaining physical cash. CBDC could also enhance transparency and allow forbetter tracking of financial transactions, minimizing the risk of money laundering and financing terrorism. Additionally, CBDC could provide governments with new tools to implement monetarypolicies such as negative interest rates, effectively influencing economic activity. CBDC also provides a way to manage systemic risk, reducing the likelihood and impact of financial crises.

RISKS AND CHALLENGES OF CBDC

Despite the potential benefits of CBDC, there are various challenges and risks associated withthe adoption of CBDC.



1. **Security Challenges:** Digital currencies are vulnerable to cyber-attacks, fraud, and hacking. CBDC could potentially store sensitive information about individuals and institutions, creating security concerns. Any breaches could lead to the loss of funds, identity theft, and leakage of confidential information, causing significant financial losses to individuals and institutions.
2. **Centralization Risk:** Centralization of CBDC in a few dominant players could lead to a concentration of power and control, reducing competition and innovation. This creates the possibility of de-monopolizing CBDC, with the potential emergence of various competing CBDC providers.
3. **Privacy Risks:** The implementation of CBDC could threaten individual privacy, as it would allow for the monitoring of transactions, making them more transparent. This could potentially expose the financial information of individuals, leading to the loss of anonymity in financial transactions.
4. **Implementation Risks:** The adoption of CBDC could be challenged by the slow adoption among the public as well as the infrastructure required for CBDC use. The lack of infrastructure such as payment gateways, devices, and software could cause significant delays in its deployment.
5. **Macro Prudential Risks:** CBDC could trigger shifts in mobility patterns between financial constructs, creating spillover effects on the wider economy. It could impact the process of credit creation, causing a shift in liquidity between different sectors of the economy.

LITERATURE REVIEW

Salampasis, D et al., (2023)¹The goal, advantages, and use cases of digital money are subjects of greater disagreement; CBDCs can present chances for innovation and experimentation at the systemic and central bank levels. CBDCs could open the door to democratizing access to unbundled financial services while challenging conventional ideas about the function of money, monetary systems, and international trade.

K. Ahiabenu (2023)² have explored the dark side of fintech and implications CBDC is expensive but can give tangible benefits at present but can lead a negative impact in implication of monetary policy or controlling it by central banks. The most highlighted concept is security analysis due to vulnerabilities in the exposure of the financial stability the risk associated with it are large.

Ozili, P.K(2023)³The digital equivalent of physical money produced by a central bank is known as central bank digital currency (CBDC). Nigeria was the first African nation to introduce the eNaira, also known as the CBDC. Findings: The chapter makes the case for the eNaira to carry interest, have improved security measures, and have no transaction fees associated with eNaira transactions. The eNaira currently lacks these design elements.

Solberg Söilen, K. and Benhayoun, L(2022)⁴ Continuous household adoption of CBDCs is highly likely and encouraged by the technology's anticipated high performance, social recommendations, and the presence of enabling conditions. However, the adoption of a flexible and intelligible currency would only profit from institutions' efforts if they also work to increase household confidence in the currency's structure.

R S Samudrala,S K Yerchuru (2021)⁵ the conclusion is drawn that no central Bank has decided to launch CBDC due to disturbed technology which is the basement for crypto currencies when it is being one of the important or one option for the mode of transactions in implementing it. These are based on the study which is conducted based on a single factor that is technology as a risk as well as a challenge which is therefore inclusive.

N Agarwal – International Journal of Blockchains(2020)⁶ in this paper the author describes the concept as whether the CBDC will become the mode or cryptocurrencies will be the future money or harmoniously both exist within the paradigm of the economy and it describes that it reduces the burden on the risks associated with the monetary policy and how that can be achieved with comparative study with the cryptocurrencies like Bitcoin, Ethereum, Ripple and leading central banks like the People's Bank of China and Riksbank (Swedish Central Bank).

RESEARCH METHODOLOGY

The present study is descriptive and analytical which shows the impact of Consumer Perception on CBDC on Determinants of CBDC Usage Purpose among Consumers. For the purpose of data collection, the study used convenient non-random sampling method to data from

consumers of digital banking in Bangalore city. A sample of 200 consumers of CBDC has been targeted, after scrutinizing and rejecting unsupported data 160 responses were finalized for the study. The data is collected from June 2023 to August 2023. The data were collected using structured questionnaire using Google Forms. The questionnaire consists of four personal profiles of the CBDC users, 12 aspects on Determinants of CBDC Usage Purpose among Consumers which is measured with 5-point Likert scale of strongly agree to strongly disagree with a weightage of 5,4,3,2 and 1 respectively. The 8 aspects on Consumer Perception on CBDC which is measured with 5-point scale of Highly satisfied to Highly dissatisfied with a weightage of 5,4,3,2 and 1 respectively. Statistical tests like Factor analysis and Multiple Linear Regression have been used to examine the significance of relation among the variables.

Objectives of the Study

1. To examine the latent dominant dimensions of Determinants of CBDC Usage Purpose among Consumers and Consumer Perception on CBDC.
2. To examine the significant influence of personal profile of the CBDC users and Consumers and Consumer Perception on CBDC on Determinants of CBDC Usage Purpose among Consumers and Consumer Perception on CBDC.

- To understand that CBDC would provide the central bank with better tools to implement monetary policy and maintain financial stability.

Data Analysis and Interpretation

The study used multivariate statistics in order to study the significant relationship among the variables and determining the dominant dimensions in the variables. Statistical techniques like Factor analysis and Multiple Linear Regression has been used to validate the objectives and the results are shown in below tables.

Table 1: Factorisation of Determinants of CBDC Usage Purpose among Consumers (DCUPC)

Determinants of CBDC Usage Purpose among Consumers	Factor Loading	Mean	Std. Deviation	Commo nalties	Eigen value	Variance explained	Factor Name
Ability to use smartphone and at payment terminals	0.811	3.84	0.974	0.737	4.763	39.690%	Payment Terminal and Financial Statibility Factor (PTFSF)
Financial Inclusion	0.801	3.72	1.020	0.707			
Financial stability	0.796	3.97	0.934	0.670			
Take the form of a dedicated physical device	0.772	3.49	1.084	0.612			
No additional costs	0.732	4.03	0.984	0.644			
Ability to use internationally	0.705	4.06	0.891	0.613			
More secure than other digitalpayment	0.674	3.84	0.945	0.695			
Transitions completed promptly	0.633	3.86	0.945	0.590			
Ease of use	0.836	4.06	0.979	0.754	2.973	24.775%	Usage and Payment Efficiency Factor (UPEF)
Privacy	0.793	3.75	0.993	0.647			
Payment efficiency acrossboarder	0.658	3.9	0.969	0.519			
Ability to use without internetconnections	0.601	3.93	0.942	0.550			
KMO:0.914, Bartlett's Test of Sphericity: 1137.995, P<0.000Total variance Explained:64.465%							

Table 1 reveals factorization of 12 DCUPC variables. The 12 DCUPC variables have been factorized into two dominant latent factors which account for 64.465% of total variance in DCUPC. The obtained value of KMO is 0.914 with Bartlett's Test of Sphericity is 1137.995 which is significant at 1% level $P < 0.000$, indicating factor analysis can be applied to 12 DCUPC variables in order to extract dominant latent factors. Out of two latent factors the first and foremost factor is Factor 1 which consist of eight variables namely Ability to use smartphone and at payment terminals, Financial Inclusion, Financial stability, Take the form of a dedicated physical device, No additional costs, Ability to use internationally, More secure than other digital payment and Transitions completed promptly in the order of their relative position and correlation among the variables it has been termed as

Payment Terminal and Financial Stability Factor (PTFSF). This factor shows all the loadings values are above the threshold value. The highest mean value is

possessed by Ability to use internationally {M=4.06, SD:0.891} and the communalities values arerange between 0.590 to 0.737 indicating all the variables are good contribution towards explain the variance in the factors. The eigen value for factor one is 4.763 and it explaining 39.690% of variance in Payment Terminal and Financial Stability Factor (PTFSF). The second factor is Factor 2 which consist of four variables namely Ease of use, Privacy, Payment efficiency across boarder and Ability to use without internet connections in the order of their relative position and correlation among the variables it has been named as **Usage and Payment Efficiency Factor (UPEF)**. This factor shows all the loadings values are more than the threshold values. The highestmean value is hold by Ease of use of CBDC {M=4.06, SD:0.979} and the communalities value are ranging between 0.519 to 0.754 indicating all the variables are good contribution towards explain the variance in the UPEF. The eigen value for factor two is 2.973 and it explaining variance of 24.775% in **Usage and Payment Efficiency Factor (UPEF)**.

Table 2: Factorisation of Consumer Perception on CBDC (CPCBDC)

Consumer Perception on CBDC	Factor Loading	Mean	Std. Deviation	Commo nalties	Eigen value	Variance explained	FactorName
Effort expectancy	0.873	2.99	1.166	0.762			Expectancy and Performance Factor (EPF)
Knowledge	0.853	2.89	1.241	0.733			
Performance expectancy	0.616	3.53	1.066	0.485	2.720	33.998	
Trust	0.598	3.51	1.119	0.455			
Personal services	0.541	3.43	1.093	0.489			
Facilitating Conditions	0.878	4.01	0.951	0.773			Facilitation and Influencing Factor (FIF)
Social influence	0.860	3.83	1.045	0.753	2.312	28.901	
Behavioural Intention	0.630	3.55	1.106	0.582			
KMO:0.771, Bartlett's Test of Sphericity: 442.367, P<0.000Total variance Explained:62.899%							

Table 2 shows factorization of 8 CPCBDC variables. The 8 CPCBDC variables have been factorized into two dominant latent factors which explain variance of 62.899% of total variance in CPCBDC. The identified value of KMO is 0.771 with Bartlett's Test of Sphericity is 442.367 which is significant at 1% level P<0.000, indicating that factor analysis can be applied to eight CPCBDC variables in order to extract dominant latent factor. From the two latent factors the firstfactor is Factor 1 which consist of five variables namely Effort expectancy, Knowledge, Performance expectancy, Trust and Personal services in the order of the relative position and correlation among the variables it has been termed as **Expectancy and Performance Factor (EPF)**. This factor indicating that all the loadings' values are more than threshold value. The highest mean value is shown by Trust of using CBDC {M=3.510, SD:1.119} and the communalities values are ranging between 0.455 to 0.762 indicating all the variables have good contribution towards explaining the variance in the factors. The Eigen value for factor one is 2.720and

it explaining 33.998% of variance in Expectancy and Performance Factor (EPF). The second factor is Factor 2 which consist of three variables namely Facilitating Conditions, Social influence and Behavioural Intention, in the position of their relative importance it has been labelled as Facilitation and Influencing Factor (FIF). This factor indicating that all the loadings are above the threshold values. The highest mean value is shown by Facilitating Conditions {M=4.01, SD:0.951} and Communalities values are ranging between 0.582 to 0.773 indicating all the variables have good contribution towards explaining the variance in the factors. The eigen value for the factor two is 2.312 and it explaining 28.901 of variance in Expectancy and Performance Factor (EPF).

Table 3: Influence of Personal profile, Consumer Perception on CBDC (CPCBDC) on overall Determinants of CBDC Usage Purpose among Consumers (DCUPC)

	Unstandardized Coefficients		Standardized Coefficients	t	P value
	B	Std. Error	Beta		
(Constant)	24.840	2.886		8.608	0.000**
CBDC	0.779	0.102	0.521	7.648	0.000**
R:0.521, R²: 0.371, Adjusted R²: 0.367, F=58.499(P<0.000)					

Table 3 shows the linear combination of personal profile of CBDC consumers and Consumer Perception on CBDC (CPCBDC) significantly determines DCUPC {F=58.499, P<0.000}. The value of R is 521 which shows a moderate relationship between the independent variables and dependent variable (**Determinants of CBDC Usage Purpose among Consumers**). The value of R² is 0.371 indicating CBDC is explaining 37.1% of variance in DCUPC.

The Co-efficient value for the above model is 0.521 which account for 37.1% of variance in DCUPC. The standard beta value of 0.521 indicating that 0.521-unit change in CBDC leads to 1 unit change in DCUPC. The relationship is significant at 1% level of significant and there is positive influence of Consumer Perception on CBDC on **Determinants of CBDC Usage Purpose among Consumers**.

RESULTS AND DISCUSSION

Common number of the CBDC users are male with higher educational qualification and earning income of more than fifty thousand per month. The 12 DCUPC variables have been factorized into two dominant latent factors. factors the first and foremost factor is Factor 1 which consist of eight variables namely Ability to use smartphone and at payment terminals, Financial Inclusion, Financial stability, Take the form of a dedicated physical device, no additional costs, Ability to use internationally, More secure than other digital payment and Transitions completed

promptly in the order of their relative position and correlation among the variables it has been termed as Payment Terminal and Financial Statibility Factor (PTFSF). This factor shows all the loadings values are above the threshold value. The highest mean value is possessed by Ability to use internationally. The eigen value for factor one is 4.763 and it explaining 39.690% of variance in Payment Terminal and Financial Statibility Factor

(PTFSF). The second factor is Factor 2 which consist of four variables namely Ease of use, Privacy, Payment efficiency across boarder and Ability to use without internet connections in the order of their relative position and correlation among the variables it has been named as Usage and Payment Efficiency Factor (UPEF). This factor shows all the loadings values are more than the threshold values. The highest mean value is hold by Ease of use of CBDC The eigen value for factor two is 2.973 and it explaining variance of 24.775% in Usage and Payment Efficiency Factor (UPEF).

8 CPCBDC variables have been factorized into two dominant latent factors which explain variance of 62.899% of total variance in CPCBDC. Factor 1 which consist of five variables namely Effort expectancy, Knowledge, Performance expectancy, Trust and Personal services in the order of the relative position and correlation among the variables it has been termed as Expectancy and Performance Factor (EPF). This factor indicating that all the loadings' values are more than threshold value. The highest mean value is shown by Trust of using CBDC. The Eigen value for factor one is 2.720 and it explaining 33.998% of variance in Expectancy and Performance Factor (EPF). The second factor is Factor 2 which consist of three variables namely Facilitating Conditions, Social influence, and Behavioural Intention, in the position of their relative importance it has been labelled as Facilitation and Influencing Factor (FIF). This factor indicating that all the loadings are above the threshold values. The highest mean value is shown by Facilitating Conditions The eigen value for the factor two is 2.312 and it explaining 28.901 of variance in Expectancy and Performance Factor (EPF).

The standard beta value of 0.521 indicating that 0.521-unit change in CBDC leads to 1 unit change in DCUPC. The relationship is significant at 1% level of significant and there is positive influence of Consumer Perception on CBDC on **Determinants of CBDC Usage Purpose among Consumers.**

CONCLUSION

CBDC provides an exciting opportunity to reimagine the role and function of traditional money. Governments, regulators, and central banks must account for the risks and challenges of the adoption of CBDC. The risks associated with implementing CBDC must be effectively identified and mitigated for its adoption to be successful. Governments and central banks must provide the necessary infrastructure for the seamless rollout of CBDC and ensure that security concerns regarding its adoption are carefully addressed. The implementation of CBDC must take into consideration privacy concerns, ensuring that its adoption does not further threaten individual privacy. The potential benefits of CBDC should be weighed against the potential risks, with regulators adopting an informed, balanced approach to ensure that the financial system operates

optimally. The present study is conducted with an objective of determining the impact of Consumer Perception on CBDC on Determinants of CBDC Usage Purpose among Consumers. The results of the study show Determinants of CBDC Usage Purpose among Consumers have been segregated into two dominant dimensions namely Payment Terminal and Financial Stability Factor which dealing with cost of using online banking,

usage of the same at all branches both nationally and internationally and security of the banking. The second factor is Usage and Payment Efficiency Factor which deals with usage of the digital banking, efficiency of the payment over the geographical location and ability of use the same without internet connections. Consumer Perception on CBDC have been segregated into two dominant dimensions namely Expectancy and Performance Factor which deals with expectancy of the consumers over usage of CBDC, knowledge on using digital currency and trust over the banking while using digital currency. A positive and significant impact of Consumer Perception on CBDC on Determinants of CBDC Usage Purpose among Consumers has been identified.

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