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Techno Smart Digitalization of Currency: e-Rupee, The Indian Prospective

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Abstract

"Central Bank Digital Currency" is the new buzzword in world economy in recent past. Digital currency has a potential to bring revolutionary shift in the economy and uplift the monetary infrastructure of global economy. Till December 2022, 11 countries had launched their digital currencies in pilot survey or fully functional form. Recently, India has launched Digital Rupee -Wholesale (e₹-W), on November 1, 2022, and Retail (e₹-W), on December 1, 2022. The Global digital payment market has marked exponential growth in past few years. Even in India the value of e-payment market grew from ₹1393 lakh crore in 2016 to ₹3,000 lakh crore in 2021. With increasing user-friendly interfaces like UPI, also convenient modes like internet banking, debit cards, credit cards, NEFT, RTGS etc. and cutting-edge technologies, the population is livered to digital platform for payments. And hence it can be assumed that people would respond to e-rupees as a digital currency as well.

Purpose:

The concept of digital currency is still under research and development in global economies. In India retail and wholesale model were undergoing pilot survey. So, in this very initial phase the paper is intended to present strengths, weakness, opportunities and challenges of e-Rupees. This will help to analyze the position of e-Rupee by evaluating its internal and external environment.

Methodology:

The research is exploratory in nature as it traces growth rate of e-payment market for past five years. Also, the paper presented future forecast for global and Indian digital payment market using Compound annual growth rate formula. The data is collected from secondary sources like RBI circulars, reports, government press-note, Bank of International Settlement reports etc. Evaluating all the data author has applied SWOC analysis to find out Strengths, Weakness, Opportunities and Challenges of Digital currency in India.

Conclusions:

e-Rupees is likely to bring a revolutionary change to the economy with digital transactions in the near future. It will need a complex regulatory framework which includes privacy, consumer protection, and anti-money laundering standards. Since CBDC will be backed by distributed ledger technology (DLT) and lies on a permissioned blockchain, it will be more authentic. Digital currency will therefore provide better efficiency and security.

Keyword: Digital currency, SWOC Analysis

1) Introduction:

India today has been able to carve out a reputation as the fastest growing developing economies with a lucrative market to support it. The revolutionary innovations in money and finance together mark many milestones in monetary history. Currency has taken several different forms right from metal coin, paper currency, plastic money, e-payment platforms and now money i.e. currency itself in digital form. India has made impressive progress towards innovation in e-payments. Banks and financial institutions together facilitate finances and payments network. This payment preference gain momentum with the creation of robust round the clock electronic payment systems such as Real Time Gross Settlement (RTGS), National

Electronic Funds Transfer (NEFT) and that has facilitated seamless real time fund transfers. Then for bulk and repetitive payments use of Electronic Clearing Service (ECS), National Automated Clearing House became popular. And the launch of Unified Payments Interface (UPI) in 2016 revolutionized payment system in India. Digital payment solution fueled the growth of cashless transactions in economy. The demonetization of currency in year 2016 gives real push to payments system towards digital mode. With the outbreak of Covid 19 the economy was jeopardized, that forced the institutions worldwide to rethink over whole payment system; digital transactions started taking leap from there. A Capgemini survey of 11 countries states that India has emerged as the leader in digital payments during the global pandemic. Recently, the Reserve Bank of India has proposed,"Payments Vision 2025" which states that 'e-Payments for Everyone, Everywhere, Every time' (4Es) and aims to provide every user with safe, secure, fast, convenient, accessible and affordable e-payment options. The changing features of money are defining new financial landscape of the economy and now reached the threshold i.e., Digital-Rupee.

1) Objectives:

- To understand the various e-payments modes and its growth over a period of time.
- To present Indian digital market value forecast based on CAGR.
- To conduct a SWOC analysis of e-Rupee, Indian Digital Currency.

2) Methodology:

In this study, the exploratory research approach is used to understand the growth profile of World as well as Indian digital payment industry. Information was gathered by exploring secondary sources such as circulars/notifications issued by Bank of International Settlement, Reserve Bank of India, working papers, published research papers. Based on the data gathered, the SWOC analysis is carried out to find out Strengths, Weakness, Opportunities and Challenges of Indian digital currency i.e., e-Rupee.

3) World History of Digital Payments:

When the world enters into a computer age in early eighties, the idea of exchange of money (without being tracked) lingered over some computer program coders. David Chaum, an American cryptographer published a scientific paper "Blind Signatures for Untraceable Payments" in 1983 that introduced the concept of digital money. Hongkong Octopus card system (1997) as an electronic purse, London Transport's Oyster card system, Japan's FeliCa smart card, Netherlands' Chipknip an electronic cash system and Belgium's Proton an electronic purse application (1995) were government adopted e-wallets by different countries as a means to replace cash for small transactions. The Bitcoin was the first Cryptocurrency which exists as open-source software in 2009. It uses decentralized control as against to a central bank digital currency (CBDC). The concept of Bitcoin become popular rapidly and reaches to its peak in 2013. People get involved in Bitcoin as speculative activity for unrealistic hopes of future gains. Despite of its popularity among masses, no government in the world could ever be able to adopt decentralized form of block chained based crypto currency as secure digital money to put to use as commercial transactions in economy. But rapid growth of e-payments via various digital modes and cutting-edge technologies most of the countries across globe explore the concept of digital currency or more specifically CBDC.

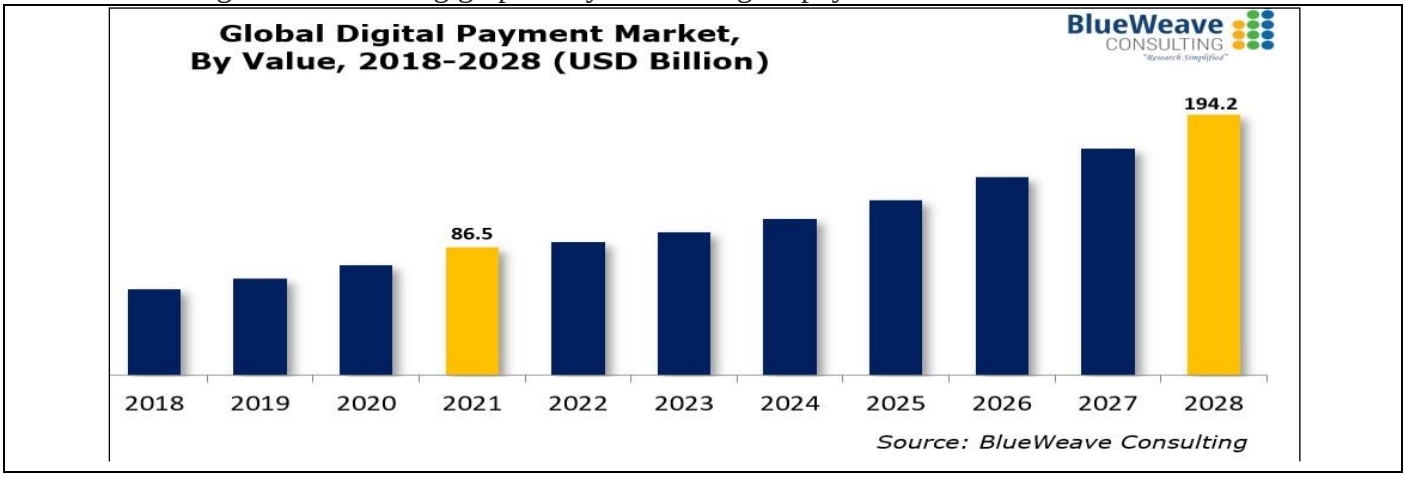
4.3) Global Digital Payment Market

The Global Digital Payment Market has made exponential growth in past five years. In 2021 it was valued at worth $ 86.5 Billion and forecasted to $194.2 Billion by the year 2028, growing at a Compound Annual Growth Rate of 12.1%. North America, Europe, Asia-Pacific (APAC), Latin America (LATAM), and Middle East & Africa (MEA) are the region mostly contributed to digital payment market.

Table 1: Global Digital payment Market Value Forecast

SN	Attributes	Details
1	Market size available for years	2018-2028
2	Base year considered	2021
3	Forecast Period	2022-2028
4	Market size value in 2028 & Growth rate	$194.2 Billion & 12.1%

Figure 1: Presenting graphically Global Digital payment Market Value Forecast



4.1) Worldwide introduction to "Digital Currency"

In major global economies, the Central Bank Digital Currency is in different stages of development. Till December 2022, 11 countries have fully launched CBDCs. Seventeen countries are in pilot survey stages for retail or wholesale model. Major economies like USA, UK Norway, Brazil, Mauritius etc. are in development stages. Some are in research phase and Senegal and Ecuador had cancelled the concept.

Figure 2: Presenting progress status of economies about Central Bank Digital Currency

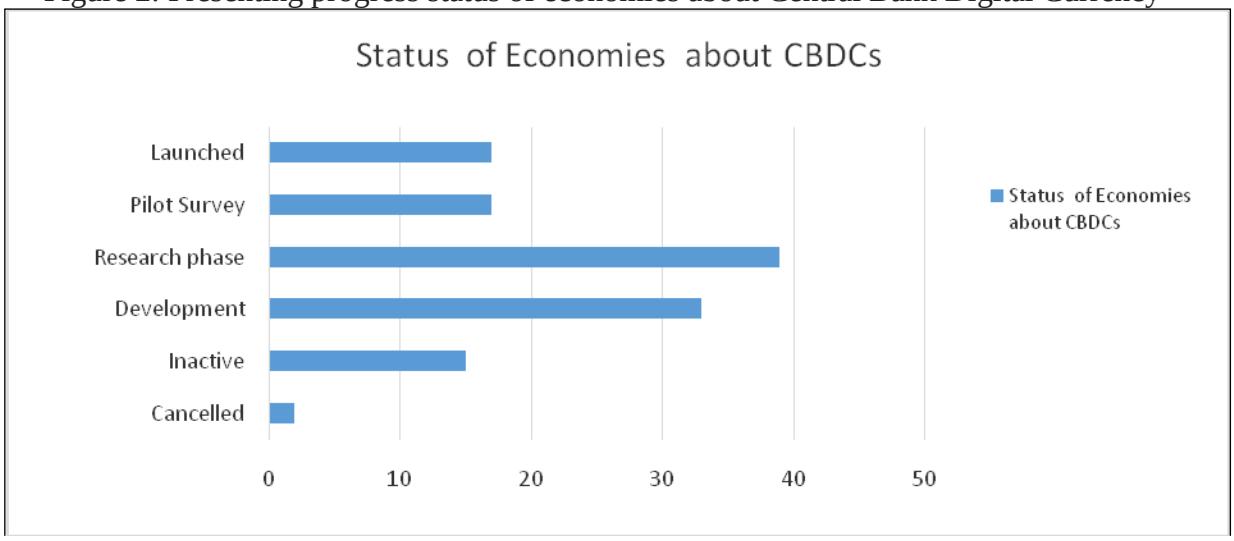


Table 2: Showing Countries which has fully launched CBDCs

S N	Country	Status	Case	Digital Currency
1	Bahamas	Oct,2020	Retail	Sand dollar
2	Jamaica	June,2022	Retail	Jam-Dex
3	Eastern Cariibean (8 Countries)	March,2021	Retail	DCash
4	Nigeria	Oct,25,2021	Retail	eNaira

Table 3: Showing Countries which are in Pilot survey stages of CBDCs

S N	Country	Status	Case	Digital Currency
1	India	Pilot	Retail + Wholesale	Digital Rupee
2	Thailand	Pilot	Retail+ Wholesale	CBDC
3	Australia	Pilot	Retail+ Wholesale	CBDC
4	South Africa	Pilot	Retail + Wholesale	CBDC
5	China	Pilot	Retail + Wholesale	e-CNY
6	Saudi Arabia	Pilot	Wholesale	CBDC
7	Singapore	Pilot	Wholesale	Diem
8	Malaysia	Pilot	Wholesale	CBDC
9	Ghana	Pilot	Retail	E-Cedi
10	Sweden	Pilot	Retail	e-Krona
11	Russia	Pilot	Retail	Digital ruble
12	Kazakhstan	Pilot	Retail	CBDC
13	Iran	Pilot	Retail	Ramzrial (digital rial)
14	Eastern Mediterranean	Pilot	Retail	CBDC

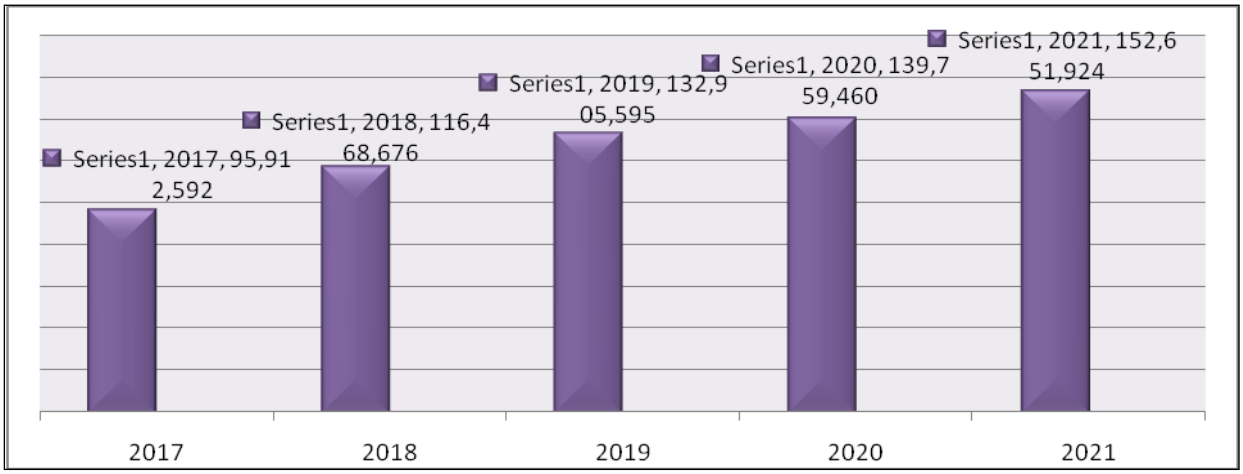
5) **Digital Payment Market: India Scenario**

Larger geography and vast population, our nation has a great potential for digital payments. With about 25.5 billion real-time payment transactions, India ranked first in the world in terms of the number of transactions in 2020.

Table 4: Growth in e-payments value between 2017-2021 in India.

SN	Yearly Transaction Value in crore	Year
1	95,912,592	2017
2	116,468,676	2018
3	132,905,595	2019
4	139,759,460	2020
5	152,651,924	2021

Figure 3: Graphically presenting growth of e-payments value between 2017-2021 in India.



5.1) The Digital Rupee (e₹):

The Digital Rupee (e₹) is a tokenized digital form of the Indian currency, to be issued by the Reserve Bank of India (RBI) as a central bank digital currency (CBDC). The Digital Rupee was proposed in January 2017 and recently launched on 2nd December 2022.

Figure 4: Digital Rupee as Indian Central Bank Digital Currency.

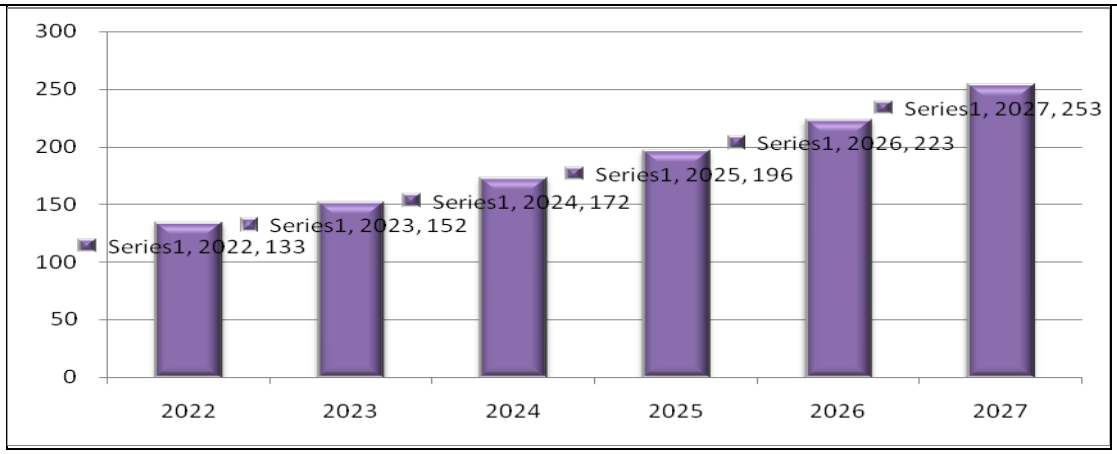
To commence pilot survey RBI has identified nine banks: State Bank of India, Bank of Baroda, Union Bank of India, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, Yes Bank, IDFC First Bank, and HSBC. Total transaction value in the Digital Payments segment is projected to reach US$133.40bn in 2022. Total transaction value is expected to show an annual growth rate (CAGR 2022-2027) of 13.66% resulting in a projected total amount of US$253.00bn by 2027.

CAGR= (Final Value/ Beginning Value)$^{1/t}$ -1= (150.742/133.40) $^{1/1}$- 1= 13.66%

Table 4: Indian digital payment market value forecast for 2022-2027

SN	Year	Yearly Transaction Value in Billions
1	2022	$ 133.40
2	2023	$ 151.62244
3	2024	$ 172.33406
4	2025	$ 195.87489
5	2026	$ 222.63140
6	2027	$ 253.04286

Figure 5: Indian digital payment market value forecast for 2022-2027

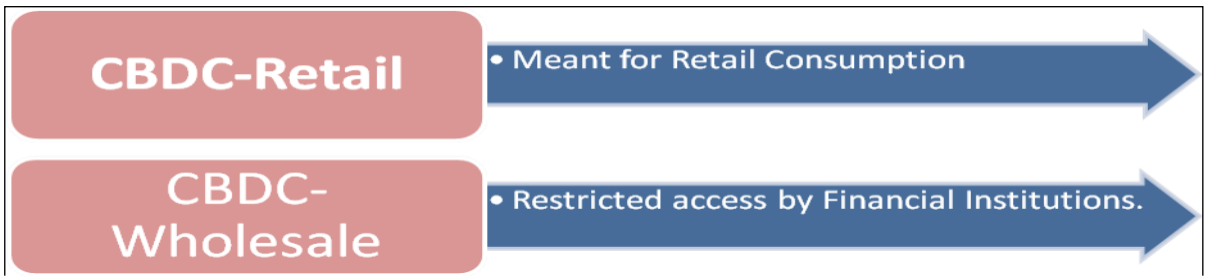


5.2) Features:

CBDC is sovereign currency issued by Central Banks in line with their monetary policy. It appears as a liability on the central bank's balance sheet. Users need not have a bank account. Like traditional fiat currencies, it gives holders a direct claim on the central bank and allows businesses and individuals to make electronic payments and transfers. This helps to eliminate risks to the consumer, such as the collapse of a commercial bank, and creates a direct connection between consumers and a central bank.

5.3) Types and Models:

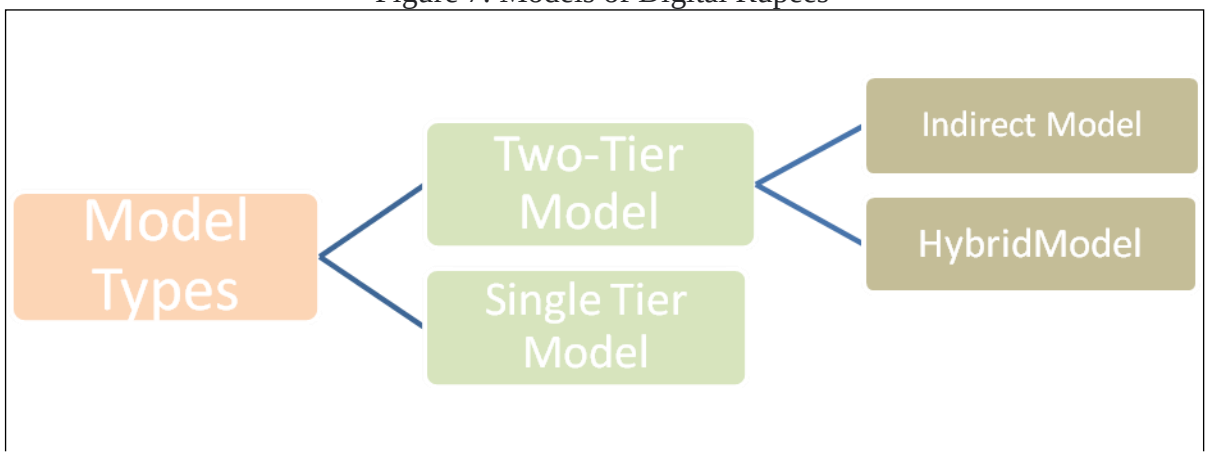
Depending upon the function s CBDC has two type's viz. general purpose (retail) **CBDC-R** and wholesale **CBDC-W**. It is electronic cash primarily meant for retail consumption. It is available for all private sector, non-financial consumers and businesses. On other hand, wholesale CBDCs are designed for restricted access by financial institutions. It has the potential to transform the settlement systems for financial transactions undertaken by banks in the G-Sec Segment, Inter-bank market and capital market more efficient and secure in terms of operational costs, use of collateral and liquidity management. Figure 6: Types of Digital Rupees



Depending upon the legal claims and the record keeping there are few arrangements like: **A) Single Tier model** "**Direct CBDC Model",** where the central bank is responsible for managing all aspects of the CBDC.**B) Two-Tier Model :** It consists of **Indirect Model** in which consumers would hold their CBDC in

an account/ wallet with a bank, or service providers. And **Hybrid Model**, where commercial intermediaries (payment service providers) provide retail services to end users, but the central bank retains a ledger of retail transactions.

Figure 7: Models of Digital Rupees



Functionality: In a token-based CBDC system, a digital token issued by and representing a claim on the central bank and whoever 'holds' the token would be presumed to own them. On other hand, the account-based system would require record keeping of balances and transactions of holders and so indicate the ownership. CBDC is introduced with denominations like physical currencies. i.e Rs. 500, 100, 50 etc., shall facilitate in building the same level of trust and experience among public albeit in digital form. This similarity with existing currency is expected to give wider acceptance and adoption of CBDC among masses.

6) SWOC Analysis of e-Rupee, Indian Digital Currency

6.1) Strength

1) Digital currencies provide transparency, convenience, lower transaction cost, traceability and thus lead to more flexible monetary policy.
2) Use of CBDC will proves to be the safest and most liquid settlement asset because payments are reflected as direct liability of the central bank.
3) The cost related to importing note paper, printing and circulation of physical currency will cut down to great extent.
4) It will boost the health of economy through better financial inclusion.
5) The cost of transaction in cross-border remittance will be significantly lower.

6.2) Weakness:

1) Hackers may steal digital currencies from online wallets or change the protocol for digital currencies and corrupt them.
2) Users may not feel safe and familiar to digital currencies as compared to transacting in cash.
3) As intermediaries get removed and all the transactions will be directed towards central bank, operational burden and costs will increase.
4) The use of digital currency is completely technology and network dependent, failing on any part will collapse the whole system.

6.3) Opportunities:

1) Interoperability of digital currencies could facilitate cross-border e-payments between financial institutions, corporate and end users by lowering the costs for payment service providers and shortening transaction queues, which result in greater speed in low cost.

2) Blockchain based CBDC will be able to track all payment transactions, unlike the present system of mobile wallets offered by private players and so more helpful to fight against crime, money laundering and financing frauds.
3) It enables smart contracts and can be featured to collect taxes automatically.
4) Digital money can be used without internet and smart phones; this will make it more financially inclusive.
5) As third-party intermediaries will be removed, the whole process will be fast, low cost and enhance transparency to end users and government.

6.4) Challenges:

1) If the concept of e-cash can be widely adopted and no limit will be placed by RBI for ewallets then weaker banks face issues regarding low-cost deposits.
2) As technology is the backbone for digital money, relating issues like its obsolescence, upgradation, overlapping between different regulators, data breaches, poor connectivity to rural places need to be addressed precisely.
3) Trades in digital currencies may experience extreme price swings.
4) Counterfeiting and Cyber security will be remained key issues to address.
5) In initial phase making people aware about digital money and shift their habits from use of physical currency will be difficult.
6) Account based CBDC suits to wholesale nature of applications while the token-based approach suits the retail customers. There will be challenged to balance the different need of users and go for hybrid mode

7) **Findings:**

1) Over a period of time various payments mode like RTGS, NEFT, ECS and UPI largely contributed to digital payment market value in India.
2) Out of 105 major economies in world, till December 2022, 11 countries have fully launched CBDCs. 17 countries are in pilot survey stages for retail or wholesale model. 38 economies are in research phase. 34 are in development state, 15 are inactive and 2 countries had cancelled the concept.
3) Value of global digital payment market was worth $ 86.5 Billion in 2021 and forecasted to $194.2 Billion by the year 2028, growing at a Compound Annual Growth Rate of 12.1%.
4) Since, 2016 the Indian e-payment market value was grew from Rs 95,912,592 crore to Rs 152,651,924 crore till 2021. And forecasted to US$253 billion by 2027 at 13.66 CAGR.
5) In India digital currency is issued through Wholesale and Retail model in pilot survey.

Single Tier model as “Direct CBDC Model”, Two-Tier Model as Indirect Model and Hybrid Model are proposed by RBI for legal claims and record keeping purpose. 6) Token based and Account based are two ways to issue e-rupees to public.

8) Conclusions:

Looking at the history of e-payment system across the globe and its adoptability, success in past years, government has gained confidence to introduce digital currencies in economy. This will hugely impact the monetary system and open endless opportunities for economies to grow multidimensional. CBDC is likely to bring a revolutionary shift to the economy with digital transactions in the near future. It will require a complex regulatory framework including privacy, user protection, and anti-money laundering standards which need to be improved before stepping up to this technology. Since CBDC will be backed by distributed ledger technology (DLT) and based on a permissioned blockchain, it will carry more authenticity. Digital currency will therefore offer better efficiency and security.

9) Suggestions:

e-Rupee is a sovereign currency issued by Reserve bank of India in line with its monetary policy. It must be accepted as a medium of payment, legal tender, and a store of value by all people, businesses, institutions and government bodies. Digital currency can enhance the present financial structure, making it

low cost and faster to process monetary transactions. By transcending overseas, digital money ensures flexibility and economic upgradation. Digital currencies can pave a way to numerous opportunities and thus strengthen the financial health of the global economies.

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I am presently working as CHB faculty in PGT Department of Business Administration and Management, Sant Gadgebaba Amravati University. Also pursuing PhD coursework under the same university. Earlier I had corporate experience in audit department at bharatiWalmart, Amravati. I have pursed Masters in Business Administration from the same Institution where I am presently working with Finance specialization. And qualified NET and SET. My research interest areas are Entrepreneurship in agricultural, project development methods selections and innovations in finance fields.

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He's presently working as Principal at Lokmanya Mahavidhyalaya, Wani, Yawatmal. He has pursued his PhD in Global Finance and SET. Post-graduation honours as Masters in Commerce. He's an instrumental personality in education field with twenty-two years of experience. He's member of Board of studies- Business Economics, Committee Faculty of Commerce and Management, SGBAU. Being a Intellectual personality, he has published 14 papers in International journals, presented 23 papers in total for International,

National and State Conferences. He's excellent and transformational speakers, had conducted more than 100 motivational workshops and facilitating training for more than 5000 learners.

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