

CENTRAL BANK DIGITAL CURRENCY: Reshaping Currencies and Finance



Authors

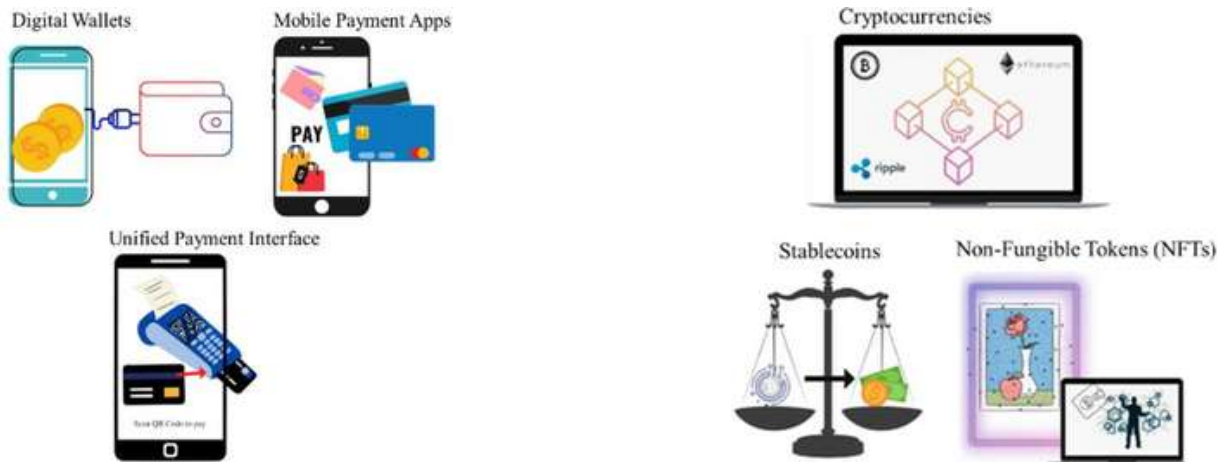
Vaibhav Ranjan
Nupur Mandal
Saurabh Sundar
Ameesha Mehta

Central Bank Digital Currency Reshaping Currencies and Finance

Executive Summary	3
Introduction	3
Understanding the Digital Currency Landscape	4
Central Banks Vision and Mission for CBDC	4
Challenges, Criticisms, Drawbacks of CBDC	5
Countries Embarking on a CBDC	6
Private Players and Central Banks show the way Forward	6
Future Possibilities	7
Conclusion	8
Abbreviations	9
Sources	9
Authors	9

Executive Summary

Today, the cash-based transactions and paper-based systems of record-keeping have been at a faster decline than ever seen. Almost all of these are now being done digitally; cash payments are being replaced by online banking and mobile payments. The last decade saw a new wave of financial products and services, and a completely novel class of digital assets.



Central Bank Digital Currency, or 'CBDC', also represents one such innovation in the field of digital assets. Issued and regulated by the central bank of a country, CBDC is a type of digital currency or digital token that is pegged to the value of the country's fiat money. While some countries, such as China and South Korea, have already launched or piloted their CBDCs, other large economies, including the US, Australia, the UK, and India are also exploring these. It is argued that the CBDCs would help central banks improve financial inclusion and provide banking services to the lower rungs of society. It would also aid them in increasing the efficacy of their monetary policies. Other agencies have also taken an active interest in establishing their relevance in the value chain. For example, SWIFT, a payments protocol and messaging provider for global banks, along with Capgemini disclosed its trial run to connect different CBDC protocols for interoperability among CBDCs, in May 2022. All these benefits of CBDCs are not without their fair share of risks. Some of the top apprehensions of CBDCs include their misuse for money laundering activities, possible increased surveillance from the governments, and their adverse implications on the current, intricate, global financial system. Banks, institutions, and governments worldwide are performing rigorous research and analysis on the economic and technical feasibility of introducing CBDCs and their impact on monetary and fiscal policy and the current economic system.

Introduction

A central bank digital currency (CBDC) is a legal tender issued by a central bank in a digital form. Pegged to a fiat currency, it is exchangeable one-to-one with the fiat currency and could function as a conventional currency but without a physical form. CBDCs would be hosted by the central bank or a custodian and be transferred to the accounts of banks for distribution or directly to households and businesses.

Key Features of CBDC

Stability

CBDC, backed and controlled by the central banks, would provide households, consumers, and businesses with stable means of exchanging digital currencies

Transferability and Convenience

CBDCs represents the liability of the issuing central bank, which makes any money transfer or exchange of goods via CBDC faster. Without any commercial bank in the loop, CBDC transactions would be instant, i.e., as if done using cash

Efficiency and Low Cost of Transactions

Likewise, the transaction costs would be minimal since there are no merchant banks or settlement bodies involved in the process. CBDC makes transactions efficient and at a fraction of cost for public and businesses

Understanding the Digital Currency Landscape

(a) Decentralized Cryptocurrencies

- These are digital tokens or currencies on distributed and decentralized blockchain networks that use cryptography for encryption of transaction records. Every record is stored in a block and added to the existing chain, and is updated across all the nodes, creating an immutable ledger
- These are cheaper, faster, and irreversible
- Built on permission-less networks and distributed across the computers, they are immune to shutdowns
- Cryptocurrencies can only have a limited number of coins in circulation or be issued over the lifetime
- **Bitcoin** is the first cryptocurrency that was released in 2009; **Altcoins** are other cryptocurrencies with differentiated features, such as Ethereum, BNB, Litecoin; **Ethereum** is a programmable currency with logic conditions. They are foundations for smart contracts that execute on meeting a set of rules

(a.1) Decentralized Finance (DeFi)

- A self-sustaining system of lending, transacting, and investing in digital assets
- No central bodies and financial intermediaries
- Accessible 24/7, 365 days a year
- Automated offerings: insurance, loans, trading, derivatives, investments, money markets
- Uses: Decentralized exchange (Coinbase), Decentralized lending platforms, Yield farming, Prediction platforms, Derivatives, Money Legos

(a.2) Stable Coins

- They are considered “stable” and safe, as opposed to the volatile ones – Bitcoin or Ether
- Backed by fiat currency, or gold, cryptocurrency, or an algorithm; form the basis of DeFi offerings
- Most are designed to maintain a price of USD 1
- Tether is the largest stable coin, pegged to USD; TerraUSD (UST) is an algorithmic coin; Other stablecoins - USDC, Dai, Binance USD
- UST crashed in May 2022

(b) Centralized Cryptocurrencies

- These are issued and controlled by a private entity and are based on permissioned-blockchain networks
- Has an additional access control layer that lets users in only after approvals from the network owners

(b.1) Private Digital Currencies

- Issued by a private body, and not a central bank
- Diem stablecoin (or The Libra) project, was initially backed by a group, including Visa and Mastercard, and led by Meta Platforms. Meta sold Diem to Silvergate Capital in 2022

(b.2) Central Bank Digital Currency (CBDC)

- Issued by the Central banks, CBDCs are pegged to some form of an asset
- Most current CBDC projects are pegged to their fiat currencies

Central Banks' Vision and Mission for CBDC

Financial Inclusion and Expansion of Offerings

With CBDC, individuals may not even be required to have bank accounts to transact. This creates opportunities for the unbanked to have access to organized banking-type products and services.

Low Distribution Costs of Money

Fiat currencies involve costs of printing, transportation, storage, and distribution before they reach the banks for circulation. A CBDC would be a cheaper and a robust alternative to a fiat currency.

A Solution to Counterfeiting of Fiat Currency

Criminals have advanced ways of bringing real-like fake fiat currencies into circulation, which leads to losses for an entire economy. CBDCs limit any possibilities of counterfeiting.

<p>A Plug to Tax Leakages in the System</p> <p>Cash transactions are outside the purview of banks and have possibilities of tax evasion by non declaration to tax officials. As CBDCs replace cash, the possible tax evasion will be negligible and would lead to improved social welfare.</p>	<p>Improved Transmission of Monetary Policy</p> <p>With more remote reachability, monetary policies can better attain their objectives, such as immediate transfer of benefits in cases of emergencies. It has been demonstrated that the negative interest rates too can be better transmitted with a CBDC.</p>	<p>Lower Need for Government Insurance on Deposits</p> <p>Deposits and cash held with financial institutions are subject to default risk by the institutions and so, are government insured. Use of CBDC would imply lower deposits, improved financial stability and reduced need for government backing.</p>
<p>Reduction in Cross-Border Transaction Costs and Time</p> <p>The current system of international money transfers is expensive and takes 3-5 days. By removing intermediaries and making CBDCs interoperable, real-time cross-border transactions can be made efficient at very low rates.</p>	<p>A Strong Counter to Private Cryptocurrencies</p> <p>Private cryptocurrencies, though volatile, have rising users across the world. These threaten the role of central banks, and make terror-funding and money laundering easier. CBDCs provide a stable, secure alternative to private digital currencies.</p>	

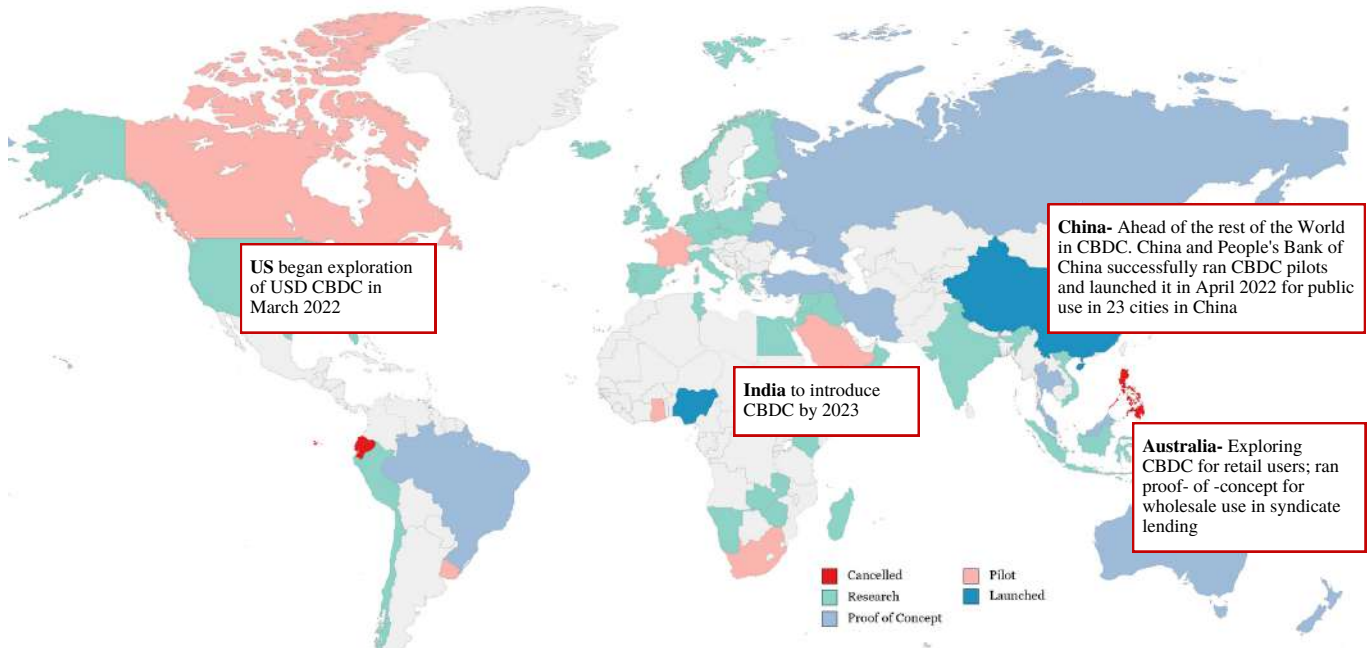
Challenges, Criticisms, Drawbacks of CBDC

<p>Impacts to the Financial System</p>	<p>Liquidity Creation Deposits collected by the banks are lent to create and control liquidity in an economy. As people start holding more CBDCs and lesser deposits, the commercial banks will have fewer reserves that can be lent to create money supply in the economy through a multiplier effect.</p>
	<p>Profitability for the banks In case of higher use of CBDCs, commercial banks would be required to hold more digital currencies to keep up with the withdrawals, instead of lending those out at higher interest rates. This could affect the profitability of the banks.</p>
	<p>Impact on Weaker Currencies With negligible transaction costs, stronger CBDCs may replace the less stable currencies of smaller nations. USD CBDC, due its strength and safety, may see higher adoption from the citizens of other countries. This can make their currencies unstable and even lead to collapse.</p>
<p>Security Concerns</p>	<p>Privacy Concerns – Newer applications in the form of programmable digital currencies, can be used by the governments in their surveillance of the citizens. Central banks could attach a few conditions on CBDCs to control the way consumers spend them. Digital yuan, for instance, currently can be spent only after getting the ‘activation’ from the PBOC.</p>
	<p>Susceptible to Server Issues or System Failures – Given that a CBDC is centralized, it is vulnerable to shutdowns in central bank servers or failures in any of the system in the process.</p>
	<p>Cybersecurity Risks – A digital currency controlled by a single entity could allow cyberattacks to happen easily by increasing the number of potential susceptible places of an attack, as well as creating points of failure that do not currently exist, such as the central bank itself.</p>

Gaps in Execution

For a CBDC's success, significant advancements are needed for - High-speed internet with low latency at even the remotest places of the world; and Financial literacy of its citizens

Countries Embarking on a CBDC

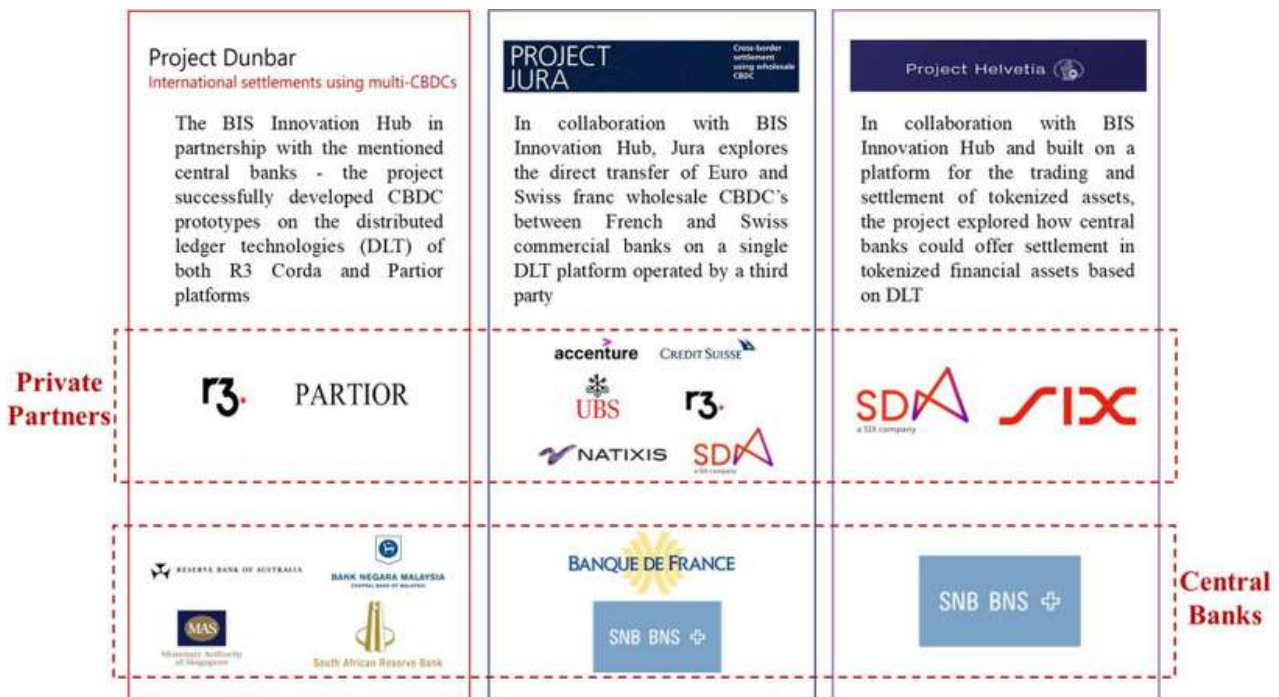


Private Players & Central Banks show the way Forward

With the introduction of CBDCs, the national payments ecosystem will undergo major developments, where key stakeholders, such as commercial banks, financial intermediaries, and small businesses will need to play a role to provide for a smooth integration. Although the market is nascent to confidently predict outcomes, these constituents can take valuable steps to position themselves for upcoming developments in the future.

With CBDCs, Fintechs may be able to directly engage with their retail customers without a banking intermediary in between, curtailing the role of the commercial banks. With banks currently at the center of financial system, launch of CBDCs would change the dynamics of the entire ecosystem. Banks may look to acquire or collaborate with Fintechs to gain technological superiority and stay relevant in the new reality.

As always, a new payment infrastructure will require new technologies to fulfil its objectives. With an opportunity to provide distributed ledger technology (DLT) or real-time settlement platforms, financial intermediaries can create a space for themselves by directly partnering with the central banks to provide them with the necessary technologies for the implementation of CBDCs. The table below showcases a few such initiatives current in play, where BIS innovation hub, central banks and private players have collaborated.



Apart from commercial banks and technology companies, payment processors such as Mastercard, Visa and SWIFT, are also playing an important role to build the CBDC ecosystem. Mastercard launched a proprietary virtual testing environment for central banks to evaluate CBDCs' use cases which allow users to virtually customize the platform to replicate their environments. Similarly, Visa is providing solutions to central banks to test the retail applications for their CBDCs. It has also planned to conduct a pilot program in mid-2022 with ConsenSys Inc., a blockchain software company, after having discussed with roughly 30 central banks.

In 2021, SWIFT, in collaboration with Capgemini, launched its first experiments with CBDCs to demonstrate a cross-border transaction between one entity on a DLT-based CBDC network and another entity on a real-time gross settlement (RTGS) system. In its new set of experiments in 2022, SWIFT and its partner, Capgemini, are testing ways to interlink multiple domestic-based CBDC networks from across the world to make cross-border CBDC payments seamless and frictionless.

Future Possibilities

Emerging & underdeveloped markets more likely to be early adapters of CBDCs

A report published by the Official Monetary and Finance Institutions Forum reveals CBDCs could significantly push forward payments in emerging markets, where systems are less developed, compared to countries such as the US and Germany, where consumers have many established payment options already. This insight indicates that the financial intermediary market is required to grow to support CBDCs in emerging and underdeveloped markets. These central banks, hence, would need to collaborate with domestic players, including the Fintechs, to setup the technology infrastructure needed to issue digital coins.

Market growth in Cybersecurity Technology

With anonymity being one of the top features of blockchain, technology cyber security threats are likely to see an expected rise in 2022. As seen already, flawed security and fake hardware wallets have been identified as crypto hardware-based threats. And, with advanced computing methods, it may be possible to compromise many data encryption methodologies, further increasing cybersecurity costs and risks for digital platforms. In light of this, the central banks will need to implement a new age and sophisticated cybersecurity defense mechanism while setting up the infrastructure for CBDCs. A lot is being done to develop a robust technology to withstand a future quantum attack, such as quantum-proof encryption, replacing existing encryption methodologies in the systems. Through collaborations with advanced security technology companies, such as Giesecke + Devrient, central banks can leverage the expertise of these players to build an impenetrable CBDC ecosystem. They may also set up early-stage ventures funds to encourage innovation in this space.

Growth of fintechs in the CBDC Ecosystem

Fintech companies in the recent past have been gaining traction in their mission to disrupt the banking system through technological advancements. With a multitude of offerings, the CBDC landscape will benefit from these innovations, which will also create an opportunity for well-financed acquirers (large financial intuitions, banks) to snap up Fintech firms. This is evident from the highly fragmented landscape of Fintech firms, which presents the acquirers with attractive avenues for reducing the costs and maintaining their profitability. Prominent fintech players in this space include SIX (a Swiss real-time gross settlement system and a platform for the trading and settlement of tokenized assets), R3 Corda (a US-based permissioned peer-to-peer distributed ledger technology platform), and Partior quorum (a joint venture between Temasek, DBS, and J.P. Morgan, and a Singapore based blockchain-based technology platform in the cross-border payments sector). Fintechs would, thus, have a vital place in the ecosystem by gaining a significant share of the customer base.

Conclusion

As economies become increasingly digital, user needs are rapidly evolving, and innovation is reshaping financial services. The declining use of cash and the advent of new forms of digital money issued by non-bank private sector entities (such as, stablecoins) have prompted central banks to issue their own digital currencies as a credible payment solution. Today, central banks are exploring how they can continue to deliver their public and economic policy objectives while responding to a future system that appears to be changing rapidly. CBDCs are likely to have wide-ranging impacts on the current economic and public policy landscape. Therefore, the countries and their central banks have been taking time to assess all the possible scenarios and risks before implementing them for their currencies. Given that the implications of CBDCs are far-reaching, their roll outs cannot be rushed without a strong ecosystem and an unbeatable cybersecurity in place. Moreover, different economies, institutions, and all other stakeholders of a financial network will have to work together to ensure that the system is not only robust but also serves its intended purpose.

Abbreviations

AML - Anti Money Laundering

BIS - Bank of International Settlement

CBDC - Central Bank Digital Currency

DLT - Distributed Ledger Technology

NFT – Non-Fungible Token

Sources

International Monetary Fund report, 2022

Bank for International Settlements Innovation Hub

U.S. Federal Reserve report, 2022

Reserve Bank of India report, 2022

Giesecke + Devrient report

Central Bank Digital Currencies Live Tracker

Economic Inquiry report,2022

Authors

Vaibhav Ranjan
Principal | Head - International Business

Nupur Mandal
Engagement Manager

Saurabh Sunder
Junior Associate

Ameesha Mehta
Analyst