

CBDCs and Financial inclusion: A developing story.

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Abstract

With momentum gaining around CBDC design, more and more central banks are experimenting with prototypes customized to respond to national problems and priorities. While payment innovation and efficiency are the main motivation for advanced economies, financial inclusion is the prime driver for low income and developing countries. Large sections of the poor and vulnerable populations remain entrapped in the informal cash economy. A carefully designed retail CBDC can offer cash like convenience and risk-free access to the financial system with the potential to lift people out of poverty. Choices regarding servicing of legal claims, role of intermediaries, ledger architecture, accounts or token usage will determine how competitive a particular CBDC is vis-à-vis existing digital payment alternatives like mobile money and stablecoins. Facilitation of cross-border payments is particularly crucial to the remittances sector which is a lifeline for migrant families. Beyond product design, foundational issues of payment and ICT infrastructure, supportive legal systems and private-public collaboration are key to ensure mass adoption and usage. As central banks explore new roles and share responsibility with private sector intermediaries, they must also be mindful of the disruptive effect on commercial banks and implement adequate safeguard/mitigation measures. ‘A minimally invasive CBDC’² which offers cash like access and convenience has the potential to be a gamechanger for financial inclusion.

Introduction

Global interest in CBDCs is high at the moment, and a recent survey by the Bank of International Settlements (BIS) found that about 60% of central banks are undertaking proofs-of-concept while 14% are moving forward to development and piloting arrangements for CBDCs³. Experimentation and research into the feasibility of a central bank-issued digital currency began as early as 2014 in China, which subsequently became the first major economy in the world to reach advanced stages of carrying out trials with CBDCs⁴. However, the pandemic has seen rapid adoption of the concept across

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² BIS (June 2021), ‘Central bank digital currency: the quest for minimally invasive technology’, Auer, Raphael and Rainer Boehme, BIS Working Papers No. 948, www.bis.org.

³ BIS (2021), ‘Ready, steady, go? – Results of the third BIS survey on Central Bank Digital Currency’, Boar, Codruta, and Andreas Wehrli, BIS Papers No. 114.

⁴ “PwC CBDC Global Index PwC Global CBDC Index 2021.” April 2021.

jurisdictions. Central banks collectively representing a fifth of the world's population will likely issue a general purpose CBDC in the next three years⁵.

Central bank **exploration of digital currencies initially focused on innovation and efficiency of legacy payment systems**. These efforts picked up pace when the private sector rolled out plans for 'global stablecoins'. Facebook's announcement of Libra (now Diem) in 2019 and its implications for monetary sovereignty forced national regulators to look at the possibility of similar offerings by central banks.⁶ The reduced dependence on cash and rapid digitalization during the pandemic generated widespread interest in CBDCs.

A recent paper jointly published by the Bank of International Settlements (BIS) and a group of central banks from advanced economies, including the US, UK and Japan, has identified three **foundational features of any CBDC project**⁷. Firstly, the introduction of a CBDC should not in any way erode broader policy objectives of supporting monetary and financial stability⁸. Secondly, it should ensure the coexistence and complementarity of public and private forms of money and finally, it should promote broader innovation and efficiency in the payment system as a whole.⁹

Countries with an underdeveloped financial industry are saddled with less efficient financial services, characterized by high transaction costs and rigid onboarding procedures, which are neither affordable nor acceptable to those at the bottom of the pyramid. The poor fall back upon cash and informal methods for their financial needs and enter into debt traps that exacerbate poverty and exclusion. Criminals use cash-intensive businesses for the placement of gains derived from illegal activities. When the unbanked and underbanked depend on cash-based finance, they become susceptible to exploitation by these criminal elements. They remain stuck in a cycle of perpetual cash dependence and become unwitting participants in activities that further strengthen illicit financial flows.

CBDCs can provide a safe alternative to the cash economy in the form of low-cost digital financial services. The possibilities offered by CBDCs to rapidly reach out to the poor and offer various financial services has fueled interest among policy analysts working on financial inclusion. At this early stage of development there is **limited empirical evidence to conclusively determine whether and when CBDCs can displace cash as the preferred medium of exchange for the poor and marginalized**. A recent blog by CGAP argues that the claim of CBDCs providing improved access to digital financial services and more efficient payment systems at low costs seems to be at odds with actual behavior

⁵ BIS (2021), 'Ready, steady, go? – Results of the third BIS survey on Central Bank Digital Currency', Boar, Codruta, and Andreas Wehrli, BIS Papers No. 114.

⁶ www.theguardian.com/technology/2019/jun/18/what-is-libra-facebook-new-cryptocurrency.

⁷ BIS (2020), European Central, Sveriges Riksbank and Swiss National Bank, 2020. 'Central Bank Digital Currencies: Foundational Principles and Core Features Executive Paper', www.bis.org/publ/othp33.htm.

⁸ Ibid

⁹ Ibid

patterns and preferences of the low-income customer.¹⁰ It makes the point that the deepening digital divide and convenience of cash leave the poor and the unbanked with neither the “means” nor the “desire to move from a cash economy to a fully digital one.”¹¹

How then can CBDCs play a role in bringing the unbanked and underbanked into the formal financial system? What better value proposition can they provide over existing e-money issuers (EMIs)? Are there inclusive products, services, and delivery methods where CBDCs can incentivize low-income individuals and businesses to enter the formal economy? If yes, what design features of CBDCs would be most conducive to supporting such a shift? As we examine these questions, we may come closer to answering whether CBDCs are a gamechanger for financial inclusion or simply a case of ‘reinventing the wheel’.

Features of an inclusive CBDC

As a payment instrument guaranteed by the central bank, CBDC is inherently risk-free compared to other existing forms of digital money. CBDCs can include features that combine cash-like convenience and accessibility for deployment as a mass payment instrument. From an inclusion perspective, **‘retail CBDCs’ can enable P2P transfers and business transactions** and thereby improve the penetration of the formal economy. However, central banks lack the expertise and infrastructure to provide the entire gamut of customer services and regulatory compliances for operating retail payment systems¹².

To introduce CBDCs, central banks can adopt **different governance and operational frameworks**. Under the disintermediated **‘Direct’ CBDC** model, the central bank must run the payment system and the customer interface. It is not a feasible option for most central banks, particularly in low income and developing countries, to bear this responsibility¹³. ‘Indirect’ and ‘hybrid’ frameworks where third parties intermediate to varying degrees are functional options similar to the existing two-tier financial system¹⁴. The leveraging of private sector/ commercial bank expertise in handling retail payments, servicing customer disputes and performing KYC processes enables the central bank to focus on its core functions of maintaining financial and monetary stability.¹⁵ In the **‘indirect model’** access to the central bank is through the intermediaries who service the customers’ claims against their own deposits held at the central bank, handle payment

¹⁰ CGAP (May 2021), Is Financial Inclusion a Reason to Push Central Bank Digital Currencies? , CGAP, Washington DC, www.cgap.org/blog/financial-inclusion-reason-push-central-bank-digital-currencies .

¹¹Ibid

¹²BIS Quarterly Review (March 2020), “The Technology of Retail Central Bank Digital Currency.”Auer, Raphael and Rainer Böhme : 85–100, www.bis.org/publ/qtrpdf/r_qt2003j.htm.

¹³ Ibid

¹⁴ These third parties maybe commercial banks, ‘narrow bank’ or private providers of payment services.

¹⁵ Ibid.

messages with other intermediaries, conduct netting of payments leaving the settlement of wholesale accounts with the central bank.¹⁶

In the '**hybrid**' design, the private sector continues the client onboarding, AML checks and retail payment functions but the central bank also retains records of all retail balances.¹⁷ In such a system, the central bank has the complete information to oversee CBDC transactions conducted through intermediaries. The hybrid model helps service customer claims in the event of insolvency/failure of private sector participants and preserves the central bank's primacy as the supervisor/overseer of the payment system. The Peoples' Bank of China's has adopted this model in its DCEP project. An alternate construct where the central bank records only the wholesale balances whereas individual intermediaries keep the retail records may be more aligned to data privacy requirements¹⁸.

The decision of a direct/indirect/hybrid model will determine the legal nature of claims and the bifurcation of roles between the central bank and the intermediaries. Still, it is the **choice of architecture that will affect the scalability and performance** of the system. In conventional banking, the copies of the **centralized ledger** are maintained at different locations, but the authority to update it rests with a single node. Distributed systems based on blockchain technology share the ledger across nodes and update it jointly through an algorithmic 'consensus mechanism'¹⁹. This approach of block verification is both computationally intensive and energy-consuming. It slows down transactions to the extent that Bitcoin processes 2,41,861 transactions per day, which compares poorly with 4,00,000 transactions per minute by major credit card systems on peak days²⁰. If the CBDC architecture is built around **distributed ledger technology** (DLT), it will face speed and scalability issues both of which are crucial for building customer trust and acceptability.

Another critical issue in CBDC design is whether the currency will be offered as **central bank accounts or a digital token**. A digital token can be stored on a handheld device like a mobile phone or physical card and exchanged/transferred directly without access to a central/master ledger²¹. This disintermediation can enable offline transactions that mimic cash availability but may need built-in caps on transaction value/volumes to safeguard against fraud/system failures²². In an account-based system, transactions occur between central bank accounts after due verification of identities of account holders, thereby facilitating efforts to 'follow the money' and identify suspicious transactions. Digital tokens,

¹⁶ Ibid.

¹⁷ BIS Annual Economic Report (June 2021), 'CBDCs an opportunity for the monetary system', BIS, Basel, www.bis.org.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ <https://exchange.blockchain.com> (charts-and- transactions accessed on June 15, 2021).

²¹ BIS (2020), European Central, Sveriges Riksbank and Swiss National Bank, 2020. 'Central Bank Digital Currencies: Foundational Principles and Core Features Executive Paper', www.bis.org/publ/othp33.htm

²² An account based CBDC would need to be processed through the central ledger for settlement.

on the other hand, can offer cash-like anonymity by enabling offline transactions within preset transaction and volume limits.

From pilots to live projects: China, The Bahamas, and Cambodia

While CBDC research and experimentation are ongoing in many jurisdictions, two retail projects have gone live in the Bahamas and Cambodia, respectively.

China: The Peoples Bank of China (PBoC) is in the advanced stages of piloting a digital yuan for widespread use²³. The exact details are not available, but China is planning to roll out its dual-use '**Digital Currency/Electronic Payment (DCEP)**' project on time for the Beijing Winter Olympics in 2022²⁴. This project will likely be a two-tiered model with the top-tier intermediaries (TTIs) comprised of large banks and technology corporations like Ant and Tencent. The TTIs will distribute the tokens issued by the People's Bank of China (PBoC) to the digital wallets of end-users. The use of permissioned DLT will leverage blockchain technology for system security and transparency.

The Bahamas: The Sand Dollar was first introduced on a trial basis in the Okuma and Oyuna provinces of the Bahamas before being rolled out in October 2020. The Sand Dollar is the digital version of the Bahama Dollar, and one Sand Dollar is equivalent to one Bahama Dollar and one USD. It is meant for domestic use only and seeks to extend formal financial services across the 700 islands which make up this nation²⁵. This account-based CBDC is available as a digital wallet accessible on a mobile phone and in the form of a physical card. The objectives for its introduction are to modernize the financial system through secure transactions and reduced settlement times²⁶. An estimated 93% of the population owns a mobile phone, though many remote islands lack access to essential banking services²⁷. The Sand Dollar is expected to widen financial inclusion by enabling populations in remote islands to access the formal financial system. The digital currency will reduce dependence on cash and thereby strengthen the "defenses against money laundering, counterfeiting and other illicit ends'.

Cambodia: The National Bank of Cambodia (NBC) started exploring digital currencies in June 2018. Subsequently, it launched '**Project Bakong**' officially in October 2020²⁸. Project Bakong involves a DLT based interbank payment system that currently links 11 domestic commercial banks and payment processors. A pilot is also underway for facilitating cross border remittances between Cambodia and Malaysia through a partnership with the

²³ BIS (2021), 'Ready, steady, go? – Results of the third BIS survey on Central Bank Digital Currency', Boar, Codruta, and Andreas Wehrli, BIS Papers No. 114.

²⁴ King, Kpmg Law, Wood Mallesons, UNSW Sydney, and Douglas W Arner. 2021. "Practice Papers Sovereign Digital Currencies: Reshaping the Design of Money and Payments Systems." 15(1): 7–22

²⁵ <https://www.sanddollar.bs/>

²⁶ <https://www.sanddollar.bs/>

²⁷ Codruta Boar, Henry Holden and Amber Wadsworth (January 2020), 'Impending Arrival – Sequel to the survey on Central Bank Digital Currency', BIS Papers No 107.

²⁸ <https://bakong.nbc.org.kh/>

Malaysian Bank, Maybank. Bank penetration in Cambodia is low, and there is heavy usage of mobile phones. Project Bakong allows real-time electronic transactions in Cambodian riels compared with the bulk of the transactions being in US dollars today. NBC expects this project to improve rural financial sector development and improve credit access for SMEs.

Regulators in other emerging markets are also researching retail CBDCs. Uruguay's e-peso project and the DXCD/DCash project of the eastern Caribbean are examples²⁹. These projects aim to reduce cash dependence and to encourage the formalization of financial services. On the other hand, central banks in advanced economies with more developed interbank systems and capital markets are considering **CBDC in wholesale transactions**³⁰. A strong motivation is the efficiency and interoperability of cross-border payments. There are multiple partnerships underway to promote interoperability - examples include Hong Kong SAR-Thailand, Singapore-Canada, Europe-Japan, United Arab Emirates-Saudi Arabia.

The various CBDC models reflect different policy priorities, with advanced economies looking at payment efficiency while low income and developing economies view it as a tool to further financial inclusion. Regulators can design CBDCs as bearer instruments designed to meet the financial requirements of those living at the bottom of the pyramid. Traditional financial institutions find it unremunerative to service low-income customers, particularly in remote locations. The finance gap has been partly filled up by e-money services which provide access to formal financial services through mobile and computer applications.

The opportunities and challenges of e-money

E-money Issuers (EMIs) are typically **mobile network operators** or non-bank finance companies who accept cash (or other official currency) from customers and credit their digital accounts with e-money. Cash-in/Cash-out (CICO) agent networks provide the crucial interface between the cash and digital economy. Low income households and businesses can **access the value(s)** stored in their **accounts/wallets and use it for peer-to-peer transfers and merchant banking**. Sub-Saharan Africa has been at the forefront of the mobile money revolution since a decade with the launch of M-Pesa in Kenya in 2007. Part of a joint initiative of Vodafone subsidiary Safaricom, DFID and the Central Bank of Kenya it now has 30 million users in ten countries. ³¹

Mobile money services expanded rapidly during the pandemic with a 12.7 % global **increase** in registered accounts in 2020 and 136 million added in just one year. ³² The latest insights provided by 'The GSMA State of the Industry Report' point to increase in

²⁹ PwC CBDC Global Index PwC Global CBDC Index 2021." 2021. (April)

³⁰ Ibid

³¹ IMF FAS Survey, 2020.

³² GSMA (2021), "State of the Industry Report on Mobile Money", www.gsma.com.

transaction values expected to surpass 3 billion USD per day by the end of 2022³³. The findings illustrate not only increase in account ownership but also account activity with **300 million monthly active mobile money accounts in 2020**. These are positive trends for improving access and use of formal financial services by the poor and marginalized.

While remote working protocols and contactless payments have accelerated the push towards digital financial services in the last year, cash continues to be the currency of choice for those at the bottom of the pyramid. In a recent article CGAP has analyzed data from the latest GSMA report to illustrate how mobile money users continue to use cash for retail purchases.³⁴ In December 2020, **only 4% of 70 billion USD mobile money funds in circulation were used for merchant payments** whereas cash in/cash-out (CICO) payments represented 43% of total transaction value (24% cash-in and 19% cash-out).

Merchant banking systems rely on an efficient and interoperable payment ecosystem to remain competitive. The small merchants/retail shops particularly in rural areas and remote locations need affordable technologies and innovative solutions to service the low income customer. **Mobile money services** are typically **closed loop systems** which mostly operate 'within network'. Capacity gaps also exist at the end user level, where basic feature phones offer limited access and functionality. This limits the scale and scope of goods and services available to the low income individual/businesses to make retail purchases using mobile money.

CBDCs can improve the customer interface particularly through digital tokens which offer cash like ease of access and convenience. The use of **permissioned DLTs** as mentioned above can offer secure and transparent recording as well as improve speed of transactions. Government issued mandates can support dedicated payment platforms/devices for enabling merchant banking using CBDCs. These platforms can become gateways for merchants to access other financial services like credit and insurance. Together this can enable an inclusive ecosystem that benefits households, Small and Medium Enterprises (SMEs) and other vulnerable groups.

E-money issuers' (EMI) reliance on agent networks for loading/'topping up' of customer's wallets/accounts makes customers susceptible to **fraud or manipulation by agents**. E-Money regulations prescribe stringent requirements for selection and onboarding of agents in accordance with the FATF guidelines for a broad range of E-money services classified as Money and Value Transfer Services (MVTs).³⁵ Jurisdictions prescribe different mandates which vary from the more stringent 'listing for approval' to mere 'listing for information' for use by designated authorities. Digital tokens issued by a central bank, recorded on a

³³ Ibid.

³⁴ CGAP (May 2021), Is Financial Inclusion a Reason to Push Central Bank Digital Currencies?, CGAP, Washington DC, www.cgap.org/blog/financial-inclusion-reason-push-central-bank-digital-currencies.

³⁵ FATF (2013), The FATF Guidance Note on Anti-money Laundering and Terror Financing and Financial Inclusion, www.fatf-gafi.org/publications.

central or decentralized ledger improve the traceability of transactions and thereby ensure better monitoring of agent activities.

The competition from stablecoins

While traditional E-money providers like mobile network operators (MNOs) have advanced digital access to financial services, the **entry of Bigtechs** is likely to revolutionize the ecosystem for retail payment products and services. Private tokens linked to a basket of assets/ currencies offer a stable store of value unlike many existing cryptocurrencies and promise to be a gamechanger for inclusive finance. By leveraging the existing data repositories and platforms of technology giants, these stablecoins can be tailored for a global market with enormous ramification for sovereign currency systems. This explains the **regulatory pushback** for Facebook's Libra 1.0 which indirectly flagged the global race for central bank issued currencies.

A **stablecoin** has **similar features of design and access as E-money** issued by MNOs and non-bank finance companies. It is a digital store of value guaranteed by the issuer and accessible through a mobile or other handheld device. It offers equally convenient and seamless services for P2P transfers and ecommerce. However, **stablecoins** offered by Bigtechs enjoy competitive advantages of both scale and scope through strong **network effects**.³⁶ The stablecoin models use existing platforms to access huge customer bases out of bounds for many national currency systems.

As new users opt to join the network, the entire customer base reaps benefits from access to **cheaper and efficient products and services**. However, the **concentration of market power** and data in the hands of a few technology behemoths raises the risk of monopolistic trade practices and data privacy concerns.³⁷ Stablecoins also pose **separate risks** in the context of **cross border transactions** as will be discussed in the next section. These fears have been temporarily stalled through regulatory intervention as with Libra 1.0 but need to be systematically addressed in the long term. One **direct response** is to examine whether **central bank issued digital currencies** can provide the same experience to the retail user as stablecoins.

CBDC and cross border payments

The scope and scale of 'global stablecoins' makes them particularly suited for cross-border transactions. These **remittances** are **crucial for sustenance of migrant families**, mostly living in rural areas. In recognition of this role there is international commitment towards reducing the transaction cost of sending remittances by incorporating it in **Sustainable Development Goal (SDG) 10.C** of the UN.³⁸ The **G 20** under the Saudi Presidency has in

³⁶ BIS Annual Economic Report (June 2021), 'CBDCs an opportunity for the monetary system', www.bis.org.

³⁷ Ibid.

³⁸ www.un.org/en/our-work/support-sustainable-development-and-climate-action.

their **Riyadh Declaration** of November 2020 endorsed the G 20 Roadmap to enhance cross-border payments.³⁹

Inherent frictions in existing correspondent banking relationships due to incompatible operating systems, messaging formats and regulatory frameworks introduce cost and time overheads into cross border payments. This adversely affects the families of migrant workers who depend on remittances for meeting their basic needs. By 2030, the UN has committed to reduce the transaction costs of migrant remittances to less than 3 percent and to eliminate remittance corridors with costs higher than 5 per cent.⁴⁰

Financial sector regulators have been exploring solutions which can facilitate safe and efficient access to remittances for migrant families. National Retail Fast Payment Systems (FPS) built around Digital ID have been successful in providing robust and reliable payments promoting account ownership and usage. ‘Global stablecoins’ offer the same features but their extensive networks give them unparalleled access and influence.⁴¹ This has prompted central banks to experiment with different design features of CBDCs that can streamline cross border and cross currency financial flows.

Central bank issued digital currencies have inherent advantages over private tokens/coins in cross border transactions. When foreign exchange denominated remittances are exchanged for CBDCs, the foreign currency remains within and **adds to the country’s forex currency reserves** to be utilized for meeting fiscal and monetary policy objectives.⁴² Stablecoins however may be backed by a basket of different assets or currencies and may be held overseas in the issuer’s home country.⁴³ When remittances are received, the foreign currency may be sent out to support the value of the asset basket located in the issuer’s domestic jurisdiction.

Apart from their direct impact on foreign exchange reserves, CBDCs can also introduce **efficiencies into cross currency transactions**. A central bank issued currency pegged 1:1 to fiat money involves a single step conversion in cross border transactions in comparison to two or three steps for private stablecoins linked to a basket of assets/currencies.⁴⁴ This improves both speed and lowers transaction cost thereby facilitating small ticket remittances. The spillover into microfinance has huge benefits for SMEs and poor households.

³⁹www.g20.org.

⁴⁰ www.un.org/en/our-work/support-sustainable-development-and-climate-action.

⁴¹ BIS Working Paper (November 2020), ‘Stablecoins: Risks, potential and regulation’, Arner, Douglas, Raphael Auer and Jon Frost, BIS Working Paper No. 905, www.bis.org/publ/work905.pdf.

⁴² Prompts, Discussion (2020), ‘Could the Poor Bank on Stablecoins?’, Discussion Prompts for Innovators, Regulators, and Consumers, F. Christopher Calabia (July 2020).

⁴³Ibid.

⁴⁴ Ibid.

Even as interest in CBDC design is picking up, the number of Proofs-of-concept (PoCs) targeting cross border use remain limited. Both ‘Sand Dollar’ and China’s DCEP remain restricted to domestic users at the moment, though the latter allows non-resident individuals/companies to participate.⁴⁵ Project Bakong in Cambodia is undertaking trials with Maybank, Malaysia for facilitating remittances sent by Cambodians working in Malaysia.⁴⁶ The BIS through its Innovation Hub is leading research into viable arrangements for interoperable cross-border and cross-currency transactions. The three different approaches being examined are for **compatible, interlinked, and single system** of multicurrency CBDCs respectively.⁴⁷

Compatibility in message formats, technical standards and user interfaces can ensure smooth plug-in among multicurrency CBDC systems. A necessary prerequisite is co-ordination of legal principles and operational processes. Another option is interlinking systems using either a shared **technical interface or common clearing** mechanisms linked through settlement accounts. The Inthanon-Lion Rock joint project of the Bank of Thailand and the Hong Kong Monetary Authority uses a ‘shared corridor’ with a jointly controlled operator, allowing participants to make cross-border payments using depository receipts tied to CBDCs held in domestic systems.⁴⁸ A single multicurrency CBDC is also envisaged where use of a **single ledger, rulebook and governance** system solves problems of incompatibility among national CBDC frameworks. Here driving consensus on rules and administration will be difficult and involve hard negotiation and trade-offs between competing priorities of central banks.⁴⁹

Laying the foundation

As more and more central banks begin CBDC research, there is general agreement that much ground needs to be covered before these instruments can deliver the expected results. The ‘**critical enablers**’ in the form of payment and communications infrastructure, legal frameworks and public private partnerships are crucial to laying the foundation for development of CBDC frameworks.⁵⁰ Different choices around who services the customers’ claims, role of intermediaries, whether centralized or shared ledger is used and accounts or tokens will then be the ‘**catalytic pillars**’ of an inclusive payment system.⁵¹

⁴⁵ , <https://www.sanddollar.bs/>. (2021), ‘Practice Papers Sovereign Digital Currencies : Reshaping the Design of Money and Payments Systems.’, King, Kpmg Law, Wood Mallesons, Unsw Sydney, and Douglas W Arner 15(1): 7–22.

⁴⁶ <https://bakong.nbc.org.kh/>

⁴⁷ ‘Multi-CBDC arrangements and the future of cross-border payments’, Auer Raphael, Phillip Haene and Henry Holden, www.bis.org/publ/bppdf/bispap115.pdf, March 2021.

⁴⁸ Ibid.

⁴⁹ Ibid.

⁵⁰ World Bank (2018, updated 2020), ‘Payment Aspects of Financial Inclusion (PAFI) Guidance’, World Bank-Committee on Payment and Market Infrastructures (CPMI), World Bank, Washington DC, www.worldbank.org/en/topic/financialinclusion/brief/pafi-task-force-and-report.

⁵¹ Ibid.

A working paper published by the IMF's Legal Department found that among 171 central banks which are members of the IMF only 23% directly allow the issuance of currency in a digital format.⁵² These **gaps** need to be addressed through **introduction/amendment of necessary legislation** before rollout of CBDC projects. Financial and telecommunications infrastructure provide 'last mile connectivity' and need to be in place to allow the necessary bandwidth for development and testing of CBDC prototypes. Bridging the **digital divide is a necessary prerequisite to addressing the existing finance gap** among poor and vulnerable sections of the economy.

A thriving private sector enabled by an **innovation friendly policy environment** can be incentivized to invest in CBDCs in partnership with central banks. This collaboration will be key to success of central bank issued accounts/tokens in achieving deeper and wider financial inclusion. Lowering barriers to entry of payment service providers and fintech companies will introduce competition to the ultimate benefit of the end user. Safe, affordable, and reliable delivery of financial services through CBDCs will encourage wide adoption for retail purposes.

Conclusion

The pandemic induced poverty and income inequalities have focused attention of low income and developing countries towards innovative solutions to extend financial access to the unbanked and underbanked sections of the economy. Specific design features of '**general purpose**' CBDCs as discussed can provide a **risk-free instrument** which facilitates peer-to-peer transfers on a mass scale. Through a 'tiered' system, central bank issued currency will be distributed by intermediaries and is expected to offer cash like convenience to end users among poor and marginalized communities.

Cash like features of a retail CBDC will hopefully **encourage wide adoption** of a central bank issued payment instrument which can through decentralized ledgers promote a transparent and secure financial system. Shared ledgers improve the settlement process and introduce operational efficiency into payment systems. Blockchain technology will safeguard against accident/failure of single node systems. Programmability through smart contracts will ensure automatic bulk transfers/autopay facilities particularly useful in G2P payments and the scope of 'embedded supervision'. DLT systems are inhibited by scalability issues and trade-offs will have to be made to achieve desired performance levels.

Equally important is not to lose sight of the **disruptive potential of CBDCs** particularly for commercial banks who may witness '**bank runs**' as customers flee to park funds in safe central bank accounts.⁵³ Mitigation measures in terms of zero or negative interest rates for

⁵² IMF (November 2020), 'Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations', IMF Working Paper, Legal Department, WP/20/254, www.imf.org/en/Publications/WP/Issues/2020.

⁵³ BIS Annual Economic Report (June 2021), 'CBDCs an opportunity for the monetary system', BIS, Basel, www.bis.org.

central bank accounts will have to be implemented to pre-empt such events. Another area of concern with regard to multicurrency CBDCs is '**currency substitution**' where rush for stronger currency CBDCs can undermine the monetary sovereignty of weak currency systems.⁵⁴ Adequate safeguards and damage control mechanisms will allay such fears and improve trust and acceptability.

Central bank issued digital tokens/accounts represent a new form of fiat money which aims to provide a cash like instrument for widespread public consumption. This novel payment instrument backed by the central bank depends on private sector buy-in and participation for effective delivery and implementation. The private sector success in delivering scalable tokens, has been the immediate driver of central banks efforts to look beyond their original mandates(in most cases) and offer a new currency with matching functionalities. There is much ground to cover and urgency to adopt a collaborative supranational approach involving key private sector stakeholders. How central banks prepare for this new role and navigate through competing priorities will determine whether CBDCs can indeed be '**an idea whose time has come**'.

⁵⁴ BIS Annual Economic Report (June 2021), 'CBDCs an opportunity for the monetary system', BIS, Basel, www.bis.org.