

# CIBAFI BRIEFING

## ***Overview of Central Bank Digital Currencies (CBDCs): Concept, Current Developments, and Potential Implications for Islamic Banks***

*CIBAFI is pleased to present its seventeenth "Briefing" on "Overview of Central Bank Digital Currencies (CBDCs): Concept, Current Developments, and Potential Implications for Islamic Banks". This Briefing helps in gaining an understanding of the concept of CBDCs and its potential implications. It outlines the key potential designs of CBDCs, current developments, and possible opportunities and challenges. It also presents the implications of CBDCs on Islamic banks and suggests recommendations to ensure readiness in dealing with these novel structures.*

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Overview of Central Bank Digital Currencies (CBDCs): Concept, Current Developments, and Potential Implications for Islamic Banks

## 1. Introduction

Technological advancements and innovations have been revolutionising financial services in recent years. One aspect of this is the integration of technology into money and payment systems, bringing in important developments at both the back and front ends. Benefits that have come about as a result include faster payment settlements, advancement of interoperability, and broadened payment instruments and service channels. However, while technology has contributed significantly to financial inclusion, the increasing popularity of electronic transactions meant a decrease in cash payments across many societies, creating new issues for smaller businesses and the unbanked. At the same time, the development of distributed ledger technology (DLT) has stirred up the possibility of new stores of value.

These developments have resulted in Central Banks (CBs) considering the possibilities for Central Bank digital currencies (CBDCs). A CBDC would be, in the simplest terms, a digital banknote, in many structures using some version of the DLT which underpins cryptocurrencies. CBDCs have potential benefits in promoting diversity in payment options, making cross-border payments faster and cheaper, and increasing financial inclusion. Despite its advantages, however, there are also risks: technical risks, risks to the structure of financial intermediation, and risks to the payment system from incompatible technologies in different jurisdictions.

Given this context, it is important for financial institutions to understand CBDCs' possible trajectory and the potential implications on their business models to appropriately adapt to these novel structures. It is not possible in this brief paper to give a full overview of the subject and of current developments, but there is extensive material available on the website of the Bank for International Settlements (BIS)<sup>1</sup> and other international bodies to which readers can refer.

## 2. The CBDC Concept

A CBDC is a digital form of CB currency. Traditionally, the monetary base of CBs is composed of banknotes and coins (physical in nature) as well as reserves<sup>2</sup> (digital in nature). CBs have normally offered a digital form of currency solely to financial institutions through reserves and settlement accounts, while households and businesses were allowed access only to the physical form of CB money or to commercial bank money (that is, accounts with commercial banks where the liability for the currency claims are on commercial banks, rather than the CB itself). A CBDC introduces a third element to the monetary base, combining the characteristics of both banknotes and reserves. Depending on the architecture, it may allow a digital currency that is a direct liability of the CB to be held by households, businesses, and/or financial institutions<sup>3</sup>.

A CBDC can be either token-based or account-based. A token-based CBDC is where the CB issues the CBDC as individual tokens (assets), with each having a specific value (similar to physical notes), whereas an account-based CBDC is where the

CB opens accounts for CBDC holders with balances. Token-based and account-based money differ in the form of verification required; token-based money depends on the payee's ability to verify that the payment object is valid, while account money depends primarily on the ability to verify the identity of the account holder.

While CBDCs are a type of digital currency alongside cryptocurrencies and stablecoins, they differ in the sense that they are issued and backed by CBs; they are therefore considered legal tender and possess low market and counterparty risk. This contrasts with cryptocurrencies and stablecoins, which are privately owned and issued, have limited acceptance, and possess a medium to high market and counterparty risk.

## 3. Design Considerations for a CBDC

There exists no commonly-accepted model of CBDCs to be implemented by all CBs, but rather the adoption of CBDCs involves the consideration of several interrelated factors to determine the purpose of the CBDC, its structure, and its mode of functioning within the current monetary and payment system. Differences in the implementation of these factors can result in CBDCs that vary substantially from one application to another. The vast divergence between CBDCs can have disadvantages, particularly for international payments and interoperability<sup>4</sup>. It may be that, after a period of experimentation, there will be convergence on relative few models.

The key driver and determinant for the introduction of a CBDC is the policy objective(s) which sets out what the CBDC is intended to achieve and consequently determines the choices needed for its structure. Several policy objectives are fuelling the adoption of CBDCs by CBs. These include increasing financial inclusion, optimising the efficiency and resilience of payments, securing monetary sovereignty and trust, enhancing the implementation of monetary and fiscal policies, and increasing traceability of transactions and reducing illicit use of money. The objectives targeted will depend on the development of the financial system within each jurisdiction and the priorities for its future evolution.

Once policy objectives are outlined, CBs will decide on the CBDC's form, design, operating model, underlying technology, and legal considerations, in line with the desired aims for its introduction<sup>5</sup>.

### 3.1. Form

The first consideration is the form desired for the CBDC. This relates to the choice between a retail-based and a wholesale-based CBDC, and between a token-based and an account-based CBDC. Each of these allows for different advantages and can serve different purposes. For example, a retail-based CBDC will allow for financial inclusion since it is open for public use, but it will need to support a much greater number of transactions and may be more vulnerable to cyberattack. On the other hand, a wholesale-based CBDC is aimed at enhancing interbank transactions and cross-border settlements. Similarly, a token-based CBDC can enhance financial inclusion and is a much closer analogue for cash, while an account-based CBDC can allow

1. See: BIS, 2022. *BIS Innovation Hub work on central bank digital currency (CBDC)*. Available at: <https://www.bis.org/about/bisih/topics/cbdc.htm>

2. Reserves refer to account balances held by commercial banks at the central bank.

3. CBDCs that can be held and used by individuals are called retail CBDCs, or sometimes general-purpose CBDCs. In contrast, wholesale CBDCs are designed to support interbank payment systems or cross-border settlements between financial institutions.

4. See: BIS, 2022. *Options for access to and interoperability of CBDCs for cross-border payments*. Available at: <https://www.bis.org/publ/othp52.pdf>

5. (IMF, 2022)

for stronger verification and monitoring of transactions – but effectively requires each participant to have a direct relationship with the CB depending on the CBDC’s structure.

### 3.2. Design

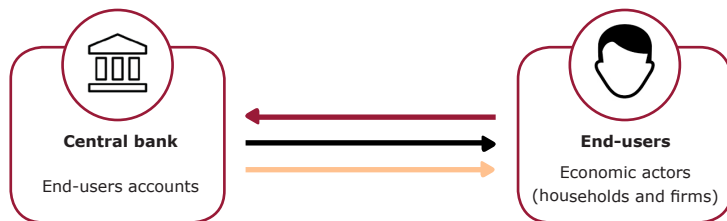
The second consideration is the CBDC design. This refers to the choice of characteristics and functions that the CBDC will assume in terms of availability (only online use or offline as well), anonymity (the level of privacy of the holder of the CBDC towards the CB), limitation (quantitative limits on the use of the funds, perhaps with a goal to restrict their use for money laundering), and cross-border payment functions. Some functions will only be available depending on the form of the CBDC. For example, token-based CBDCs will allow for anonymity, while account-based CBDCs will not.

### 3.3. Operating model

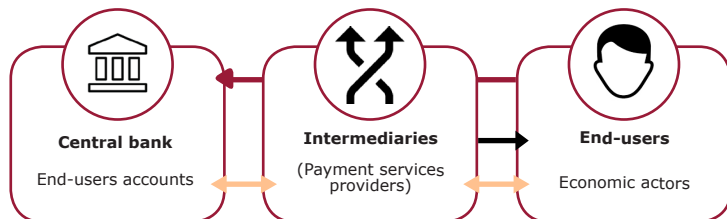
The third consideration is the operating or architecture model of the CBDC. This relates to who will be assuming the various functions of issuance, validation, and distribution of CBDCs. A distinction is made between (1) a single-tier system where the CB assumes all functions from issuance to interaction with end users; (2) a two-tier system where the CB assumes the issuance and allows intermediaries (commercial banks and/or payment service providers) to deal with end users for client-facing operations; and (3) a two-tier system where commercial banks assume the functions of issuance and distribution of money backed by holdings of CB assets. The latter option is sometimes called a synthetic CBDC. These three models are presented in Figure 1. The choice of operating model will have a significant impact on the role of intermediaries in the payment system.

**Figure 1. CBDC Operating Models**

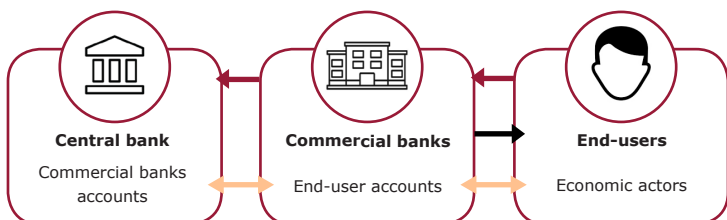
#### Direct CBDC Model



#### Hybrid CBDC Model



#### Indirect CBDC Model (Synthetic Model)



← CBDC claim  
 → AML/KYC responsibilities  
 ↔ Payment transactions

Source: Deloitte (2022)

### 3.4. Technology

The fourth consideration is the underlying technology for running the CBDC. CBDC holdings are recorded in a database, known as a ledger, which is updated as CBDCs get issued and are transferred among users. Authorities may choose to have the ledger centralised, i.e., owned and updated by a single entity, or distributed across a network through DLT. In the latter, different structures could exist for who owns the infrastructure of the ledger and who updates it.

### 3.5. Legal framework

The fifth consideration is ensuring the existence of a legal framework that allows for the issuance and use of CBDCs. In many jurisdictions, legal reforms would be needed to allow the CB or the relevant authority to issue CBDCs and have it as legal tender.

Some of the factors that may drive these choices will be discussed further in Section 5.

## 4. The Rising Momentum of CBDCs and Global Projects

CBDCs have been gaining increased attention over the past couple of years, not only from CBs, but also industry players and global authorities who have been increasingly exploring their structures and potential opportunities and risks for the financial sector<sup>6</sup>.

**It is reported that 115 countries, representing over 95% of global GDP, are in different phases of CBDC exploration as of January 2023, compared to only 35 countries in May 2020.**

This includes 11 countries that have successfully launched their CBDCs (Bahamas, Nigeria, Jamaica, and eight countries in the Eastern Caribbean), 17 that deployed pilot projects (China, Sweden, Malaysia, Australia, Saudi Arabia, UAE, and others), 33 that are in a phase of CBDC development (European Union, Bahrain, Turkey, Indonesia, Japan, Canada, and others), and 39 that are actively researching CBDCs (Morocco, Jordan, Qatar, Oman, Kenya, Bangladesh, Pakistan, and others)<sup>7</sup>.

Retail and wholesale CBDCs are being both examined, with some countries focusing only on one of the use cases while others investigating both. Countries are developing their own CBDC projects as well as increasingly engaging in cross-border CBDC projects to test their various functionalities and features. This includes exploring the use of CBDCs for international settlements, the cybersecurity implications of two-tier retail CBDCs, and the use of wholesale CBDCs for cross-border settlement on a DLT platform, among others. Several cross-border CBDC projects have been developed in partnership with the BIS Innovation Hub, such as Project mBridge, Project Rosalind, and Project Aurum, among others.

The table below outlines some selected CBDC projects and their main features.

6. See for example BIS, 2018. *Central bank digital currencies*; International Monetary Fund, 2022. *Behind the Scenes of Central Bank Digital Currency*; BIS, 2022. *Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies*.

7. Atlantic Council, 2022. *Central Bank Digital Currency Tracker*. Available at: <https://www.atlanticcouncil.org/cbdctracker/>

# CIBAFI BRIEFING

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**Table 1. Features of Selected CBDC Projects**

Project name	Country	Status	Policy objective	Form	Operating model	Technology
<b>Sand Dollar</b>	Bahamas	Launched	<ul style="list-style-type: none"> <li>Support financial inclusion</li> <li>Fight against illegal economic activities and money laundering</li> <li>Reduce transaction costs</li> <li>Strengthen economic surveillance</li> </ul>	<ul style="list-style-type: none"> <li>Retail and wholesale</li> <li>Token-based</li> </ul>	Hybrid CBDC model	Blockchain
<b>eNaira</b>	Nigeria		<ul style="list-style-type: none"> <li>Support financial inclusion</li> <li>Improve monetary and financial stability policies</li> <li>Growth in cross-border trade</li> <li>Improve FX position</li> <li>Empowerment and poverty reduction</li> </ul>	<ul style="list-style-type: none"> <li>Retail</li> <li>Account-based</li> </ul>	Hybrid CBDC model	Blockchain
<b>E-CNY</b>	China	Pilot	<ul style="list-style-type: none"> <li>Diversify forms of cash</li> <li>Satisfy public demand for digital cash</li> <li>Support financial inclusion</li> <li>Fair competition, efficiency, and safety of retail payment services</li> </ul>	<ul style="list-style-type: none"> <li>Retail</li> <li>Quasi-account-based</li> </ul>	Hybrid CBDC model	Centralized technology but is fully compatible with blockchain
<b>mBridge</b>	China, Hong Kong, Thailand, UAE, and the BIS		<ul style="list-style-type: none"> <li>Improve solutions for international payments</li> <li>Advance cross-border settlement in central bank money</li> <li>Support the use of local currencies in international transactions</li> <li>Create opportunity for new and innovative payment products and services</li> </ul>	<ul style="list-style-type: none"> <li>Wholesale</li> <li>Token-based</li> </ul>	Hybrid / Indirect CBDC model	Blockchain
<b>Aber</b>	Saudi Arabia and UAE		<ul style="list-style-type: none"> <li>Improve efficiency of international remittances</li> <li>Make settlements between the two CBs and other selected banks</li> </ul>	<ul style="list-style-type: none"> <li>Wholesale</li> <li>Account-based</li> </ul>	Indirect CBDC model	Blockchain
<b>E-krona</b>	Sweden		<ul style="list-style-type: none"> <li>Provide risk-free money to the public and make it accessible to all</li> <li>Enhance competition and innovation in payments</li> <li>Increase efficiency of financial transactions and cross-border payments</li> </ul>	<ul style="list-style-type: none"> <li>Retail</li> <li>Token-based</li> </ul>	Hybrid CBDC model	Blockchain
<b>Digital Euro</b>	Eurozone	Investigation	<ul style="list-style-type: none"> <li>Competition, innovation and resilience of the EU payment system</li> </ul>	<ul style="list-style-type: none"> <li>Retail</li> </ul>	To be determined	To be determined

Source: CIBAFI adapted from Atlantic Council (2022), Bank for International Settlements (2022), BIS Innovation Hub (2022), Central Bank of the Bahamas (2019), Deloitte (2022), eNaira (n.d.), European Central Bank (2023), and People's Bank of China (2021)

Most applications of CBDCs so far assume a hybrid model, indirect model, or a combination of both. Very few countries are considering a direct model. Account- and token-based CBDCs are both being equally explored.

## 5. Potential Opportunities and Challenges of CBDCs' Adoption

The potential economic benefits of CBDCs are motivating CBs globally to consider their issuance. However, CBDCs can also lead to several challenges and risks, requiring a thorough and careful contemplation before being introduced<sup>8</sup>. Below, we outlined some of the main opportunities and challenges in three groups<sup>9</sup>.

### 5.1. Payment aspects

One of the primary benefits highlighted earlier is the use of CBDCs as a mode of payment. In some countries, there is a

8. Benefits and challenges of CBDCs tend to differ greatly between advanced and emerging economies due to variances in technological and economic conditions, but there can also be significant variation between jurisdictions within the same type depending on their specific circumstances.

9. Largely following the structure of the BIS 2018 paper.

clear trend of people preferring digital methods of payment over cash payment, which may reduce individuals' and businesses' access to secure and resilient CB money. CBDCs could provide a robust alternative payment method, offering diversification and healthy competition among stakeholders.

For the unbanked population, CBDCs could provide the foundation for innovative and cost-effective financial services provided by the private sector. FinTech companies could use the CBDC infrastructure to provide access to an extended range of financial services. Note, however, that any use of a CBDC is likely to involve some relationship with a financial institution, even if it is not a traditional bank.

Another area where CBDCs are likely to have significant impact is international payments. CBDCs could be deployed in a foreign jurisdiction or designed to be interoperable with other currency systems. This would allow for direct connections between networks and the use of common technological standards which will contribute to overcoming challenges such as the complex, slow, and costly process related to these transactions.



***In terms of transparency, CBDC payments could provide better traceability, which will present opportunities to comply with international standards – especially relating to anti-money laundering (AML) and combatting the financing of terrorism (CFT).***

However, there are also challenges of implementing CBDC payment systems. While CBs would be unlikely to issue a CBDC which does not allow compliance with AML/CFT concerns and other supervisory and tax requirements, it is not clear how these can be carried out practically for anonymous forms of CBDCs. The use of CB and commercial bank deposits typically provides some level of privacy for their users, and cash provides anonymity to all users. Thus, achieving an appropriate level of privacy is a design challenge.

Additionally, cyber-threats such as malware and fraud pose a particular challenge for a general purpose CBDC, which is open to many participants and points of attack. At the same time, many of the technologies used have not been tested extensively and there is limited experience of their robustness and scalability, as well as any vulnerabilities to cyber-threats.

## **5.2. Monetary policy aspects**

It has been argued by some that a CBDC would help CBs to implement monetary policy by providing a mechanism for direct pass-through of the policy rate rather than relying on financial institutions to pass changes through to their customers. This would imply paying interest (or some other return) on the CBDC. However, there appears to be very limited interest by CBs in this option, partly because it is not clear that it addresses a practical problem. Even if this option is not followed, there will be implications for the mechanics of monetary policy as a result of introducing a new form of money with its own inflows and outflows.

## **5.3. Financial stability and financial intermediation aspects**

There has been much discussion over whether CBDCs could have a significant adverse impact on financial stability, but there is limited consensus at this stage. However, the most likely risk is that a (general purpose) CBDC could lead to an increase in the instability of commercial bank deposits. Even if designed primarily for payment purposes, in times of stress, a flight to the inherently safer CB money could occur quickly and on a large scale, presenting a challenge to commercial banks and the CB as well as potentially affecting financial stability.

Introducing a CBDC could also result in a wider presence of CBs in financial systems. To the extent that individuals and businesses hold their money in the CBDC, this is likely to be as an alternative to holding it in an account with a commercial bank. Hence the role of banks in financial intermediation is likely to be reduced and CBs may have a greater role in allocating economic resources. Additionally, if a CBDC leads to more payments bypassing commercial banks, apart from any direct commercial impact, the relationship of banks with their customers (and therefore banks' knowledge of their customers) is likely to be attenuated.

All the factors set out above, and others, have implications not only for whether a CBDC is considered desirable in a particular jurisdiction, but also for its design. They at least partly explain the diversity of CBDC designs currently being considered.

## **6. Key Implications of CBDCs for Islamic Banks**

Countries where Islamic banks are prevalent are increasingly researching or in the process of developing a CBDC. This means that Islamic banks in these countries will very soon be confronted with these novel structures. The implications of a CBDC would be very dependent on the architecture decided on by the CB of a given jurisdiction. This is because, as explained earlier, each choice in the constructing elements of a CBDC could present different impacts on banks and the financial sector at large.

One of the choices that could present important implications for Islamic banks relates to the design of CBDCs. In the case where a CB of a given jurisdiction decides to deploy the CBDC for monetary policy and adopt an interest-bearing embedded feature in its design, this could have effects on Islamic banks' dealings in the CBDC of the respective jurisdiction. Islamic banks may be excluded in this case from any CBDC dealings, losing business to conventional counterparts. Fortunately, interest-bearing CBDCs do not appear to be very attractive to CBs at present. However, even without such a feature embedded, monetary policy and financial safety net instruments based on CBDCs may well emerge and Islamic banks would thus require parallel developments on a non-interest basis, as they do in relation to existing forms of money.

Another important consideration is related to the use of CBDCs for financial inclusion. Given the majority of Islamic banks are of small size and operating in emerging markets, CBDCs in their respective jurisdictions could have financial inclusion as a key policy objective in their development. This could lead to different impacts on Islamic banks, depending on what type of financial inclusion is sought.

***The adoption of a CBDC model that bypasses the role of commercial banks, either totally or by sharing the market with payment service providers, could lead to the weakening or destruction of the business of Islamic banks. This could compromise the stability of the financial system, with the role of banks diminishing.***

This goes in line with the general concern about the impact of CBDCs on financial intermediation.

Undeniably, CBDCs could also provide important efficiencies for Islamic banks. It could lessen the burden of de-risking in international payment systems through increased traceability and recording of transactions, which could potentially build trust with correspondent banks. Additionally, if financial inclusion leads to more customers entering the financial system, it could translate into an expanded customer base for Islamic banks and increased business.

# CIBAFI BRIEFING

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### **7. Conclusion and Recommendations**

The momentum of CBDCs has been on the rise, and it is projected to continue as CBs continue exploring their use in response to technological and market developments. While CBDCs have a host of potential benefits, especially in payment systems, their development is not quite straightforward – not only for technical reasons (such as cybersecurity), but because it involves the choice of various elements that can make each CBDC materially different from another. This could result in various implications for Islamic banks, some technical but others potentially implying major changes in their role in the financial system. Banks and financial institutions should be vigilant to what developments are happening in this regard and take a proactive approach to ensure that any future structure proposed by the CBs of their respective jurisdictions takes these considerations fully into account. Islamic banks, in particular, should ensure that they are able to keep pace with conventional banks of similar size and with similar business models; they should also ensure that any required Islamic specificities are taken into account, notably in the way monetary policy and financial safety net instruments based on CBDCs may develop.

It is thus recommended that Islamic banks should:

- Engage with CBs in respective jurisdictions to understand the technical options of the CBDC that is being pursued and the possible implications on their business models.
- Develop the necessary technical capacity to respond to the policy choices under consideration by the CB.
- Map out scenarios to anticipate compliance and privacy requirements relating to CBDCs.
- Provide training and awareness to employees on CBDCs and their related processes.
- Engage with global institutions and national or regional banking bodies to understand developments in CBDCs and build related strategies.

### **About CIBAFI**

CIBAFI is an international non-profit organisation founded in 2001 by the Islamic Development Bank (IsDB) and a number of leading Islamic financial institutions. CIBAFI is affiliated with the Organisation of Islamic Cooperation (OIC). With over 130 members from more than 30 jurisdictions from all around the world, CIBAFI is recognised as a key piece in the international architecture of Islamic finance. Its mission is to support the Islamic financial services industry's growth by providing specific activities and initiatives that leverage current opportunities while preserving the value proposition of Islamic finance. CIBAFI is guided by its Strategic Objectives, which are 1) Advocacy of Islamic Finance Values and Related Policies & Regulations; 2) Sustainability and Innovation Integration; 3) Industry Research and Analysis; and 4) Professional Development.

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### **References**

For more information about the references, please access the following link:

[References of CIBAFI's 17<sup>th</sup> Briefing](#)