

Chapter 7

The Technological Foundations of Central Bank Digital Currencies (CBDCs)

Azadeh Eskandarzadeh

Acsenda School of Management, Canada

ABSTRACT

Central bank digital currencies (CBDCs) are being recognized as a possible advancement in sovereign money. Although CBDCs have the potential to bring about positive changes such as enhanced financial inclusion and updated payment infrastructures, there are still important considerations regarding the suitable designs of the underlying technology. This chapter provides a comprehensive review of the current state of technological research and experimentation in order to assess architecture options and considerations for CBDCs.

1. INTRODUCTION TO CBDCS (CENTRAL BANK DIGITAL CURRENCIES)

Indeed, there has been a lot of interest in and conversation around Central Bank Digital Currencies (CBDCs) in the fields of financial technology and monetary policy. Considerable investigation and analysis have been conducted into the motivations, consequences, and design concerns of CBDCs in light of their prospective introduction Auer et al. (2020). Research has focused on the macroeconomic implications of CBDCs, looking at how they can affect financial stability, monetary policy, and institutional changes in the banking industry (Infante et al., 2022; Mishchenko et al., 2021). In addition, the implementation of CBDCs has been perceived as a way for central banks to participate in extensive intermediation, possibly posing a threat to private financial intermediaries in terms of deposit competition (Fernández-Villaverde, 2020).

A number of issues, such as technological considerations, monetary policy goals, and the potential impact on financial inclusion, influence the creation and application of CBDCs. In order to assure the best possible functionality and security, the creation of CBDCs is a complicated and comprehensive process that calls for a careful evaluation of the underlying technological solutions, such as distributed ledger

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technology and blockchain (Dionysopoulos & Giaglis, 2022). Furthermore, there have been arguments made for and against CBDCs' ability to successfully raise the level of financial inclusion in relation to the problems surrounding financial inclusion (Ozili, 2022; Ozili, 2021).

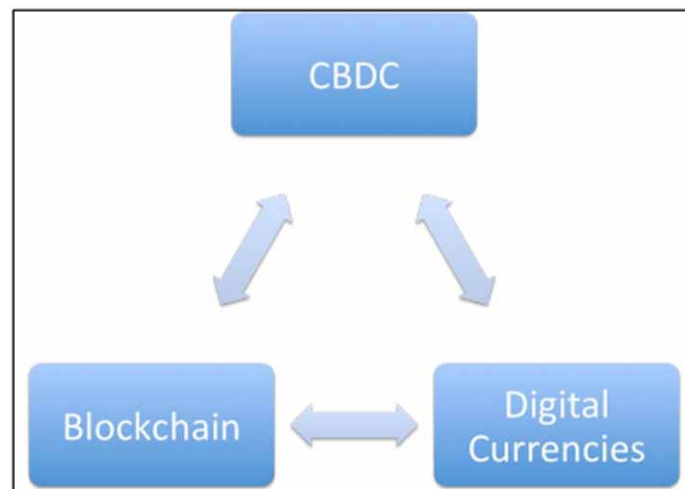
Discussions on the future of institutional changes in the banking industry and the role of central banks in guaranteeing deposit safety and providing liquidity have been sparked by the emergence of digital money, including the possible introduction of CBDCs (Zabczyk & Griffoli, 2019).

According to Cukierman (2020), Chan et al. (2020), Ozili (2021), and Ozili (2021), CBDCs have gained a substantial amount of interest due to their potential to influence monetary policy, improve financial inclusion, and solve regulatory difficulties.

According to Cukierman and 2020, the significance of this developing kind of digital money is shown by the fact that central banks throughout the world are doing research and piloting CBDCs already. According to Chan et al.'s research from 2020, the deployment of CBDCs necessitates a full grasp of the legal and regulatory context in order to guarantee compliance with the frameworks that are already in place. Furthermore, in order to provide a safe and dependable access to digital currency services, it has been underlined that there is a requirement for robust digital identification and authentication procedures, as well as resilience and redundancy in CBDC infrastructures (Schilling et al., 2020; Ozili, 2021).

In order to address concerns pertaining to anti-money laundering (AML), know-your-customer (KYC) rules, consumer protection, and data privacy, the technological underpinnings of CBDCs need to be aligned with the regulatory frameworks and legislative standards that are already in place (Ozili, 2021). According to Ozili (2021), it is essential for technologists, policymakers, and legal experts to work together in order to guarantee compliance and reduce the likelihood of future liabilities.

Figure 1. Diagram



2. UNDERSTANDING THE NEED FOR CBDCS IN THE DIGITAL AGE

A great deal of study and analysis has been done on the necessity of Central Bank Digital Currencies (CBDCs) in the digital era. The need to promote efficient digital payments, improve monetary policy

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