

ABSTRACT

Central Bank Digital Currencies (CBDCs) represent a critical innovation in the era of Industry 4.0, combining the technological advancements of digital currencies with the regulatory oversight of central banks. Despite increasing interest, gaps remain in understanding how technical design choices influence CBDC integration into financial systems. This study addresses this gap by examining key technical characteristics of CBDCs across three critical dimensions through a systematic literature review: Infrastructure and Functionality, Access and Transfer Mechanisms, and Cross-Border Payments. The Infrastructure and Functionality dimension examines architectural models (one-tier vs. two-tier), and the integration of blockchain and Distributed Ledger Technology (DLT), non-DLT, and hybrid systems, with a focus on how these frameworks impact CBDC performance. The Access and Transfer Mechanisms dimension focuses on access models (token-based vs. account-based) and transfer methods (online vs. offline). The Cross-Border Payments dimension explores interoperability through three potential models: Compatible CBDC Systems, Linking Multiple CBDC Systems, and Single Multi-Currency Systems. By synthesizing insights from ongoing global CBDC projects such as Project Garuda, Project Jura, and e-CNY, this research develops a refined taxonomy that categorizes and maps technical design elements of CBDCs. The findings provide a comprehensive transformative mapping of CBDC's technical aspects, supporting policymakers, regulators, and developers to navigate implementation challenges and achieve the goals of Industry 4.0. Future studies could further investigate specific use cases to optimize CBDC frameworks.

Keywords: central bank digital currency, blockchain, central banking, distributed ledger technology, taxonomy, CBDC design