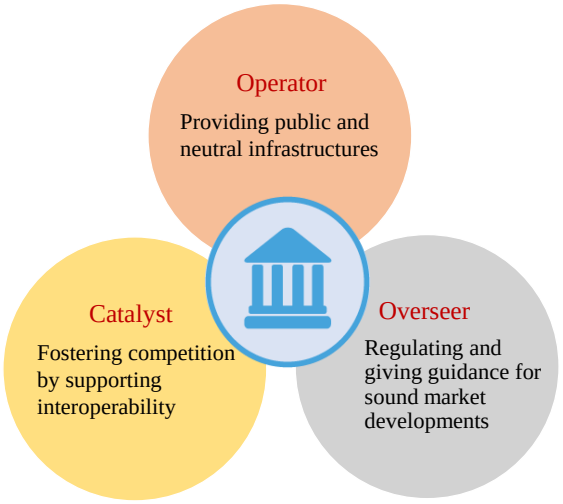
Box 4
Central banks' roles and currency forms in the digital payment era

As the world continues shifting to the digital era, the payment system has become more diverse and the environment more competitive. For the purpose of facilitating a safer and more efficient payment ecosystem, as well as fostering an environment more conducive to innovation, central banks play a pivotal role by ensuring trust in money.[1] Besides this, central banks can take advantage of the opportunities that digital technology opens up to engage in innovations as well. In particular, if experiments confirm its feasibility, the central bank digital currency (CBDC) is expected to serve as a new basis for digital payments in the future.

1. Central banks help construct a sound functioning payment system by playing three key roles

Central banks play a key role in the development of digital payments by promoting a safe and efficient payment ecosystem (Chart B4.1).

Chart B4.1 Central banks' roles in the digital payment era



Source: BIS (2020).

1.1 As an operator to provide public and neutral infrastructures

Most central banks run crucial payment infrastructures in their countries and directly provide public and neutral payment services aimed at maximizing public interest instead of pursuing commercial profits. For instance, physical cash issued by central banks can be used for various small-value retail transactions, while the Real Time Gross Settlement Systems (RTGSs) operated by central banks, which deal with interbank settlements and connect retail clearing systems, serve as a basis for private payment providers to deploy a nationwide network.

1.2 As a catalyst to promote interoperability so as to foster competition

Payment systems are supposed to be scalable in order to accommodate as many users as possible, with the intention of bringing a network effect into full play. Nevertheless, private payment providers tend to offer an independent and closed-loop network, resulting in the phenomenon of fragmented payment markets. Central banks and other authorities can

break down the barriers between payment networks and reduce the obstacles to entry by supporting the development of common standards for payment systems, thereby delivering a more competitive market.

1.3 As an overseer to regulate and guide sound market development

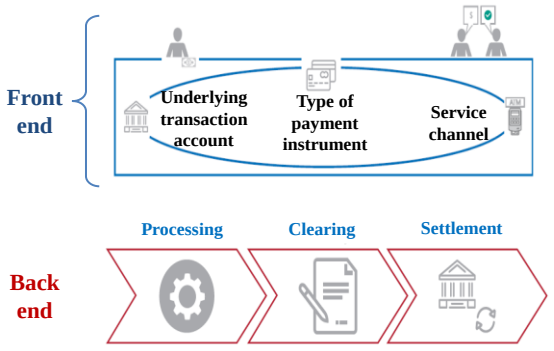
The regulatory approaches launched by central banks and competent authorities are keeping up with the times, especially those guarding against risks lurking around digital innovations to consumer protection and privacy. Furthermore, measures that are increasingly emphasized globally, such as know-your-customer (KYC) and anti-money laundering and combating the financing of terrorism (AML/CFT), also lay down important foundations for sound development in payment markets.

2. Central banks provide the solid foundation for payment systems by underpinning the public's trust in money

Payment systems are usually built upon a two-tier structure operated by central banks together with financial institutions. On one side, the former ensures trust in money, while the latter serves the public and is able to carry out innovations. On the other side, central banks supply the safest systems (e.g., the RTGS) and payment instruments (e.g., physical cash) for settling both wholesale and retail transactions, while financial institutions provide diverse retail electronic payment instruments, meeting the needs of various payment scenarios for the public.

Owing to the latest wave of innovation in digital payments, payment services put into contact with the public have continued to evolve in recent years. A sound payment system is still based on the trust in money ensured by the central bank. Under this condition, financial institutions are able to concentrate on the innovative development of payment services and increase users' willingness to accept such new services as well.

Chart B4.2 Payment infrastructure elements and arrangements



Source: BIS (2020).

3. Digital innovation is radically reshaping the provision of payment services and attemping to change the forms of currency

3.1 Digital innovation is altering customer experience of payment services

Digital innovation has been undergoing a comprehensive change in front-end and back-end services supported by payment systems (Chart B4.2). For the front-end services, a "transaction account" is not limited to those opened at banks but includes electronic payment accounts as well. CBDCs may be used as "payment instruments" in the future. The "service channel" includes not only physical facilities such as automated teller machines (ATMs), point-of-sale (POS) terminals, but also more popular and means that have become the leading trend, namely internet and mobile applications (apps). For the back-end services, arrangements of payment flows, including processing, clearing, and settlement, continue to improve with technological evolution. Moreover, the emergence of distributed ledger technology (DLT) has sparked off discussion on the feasibility of applying decentralized frameworks in clearing and settlement systems.

3.2 Private providers are challenging to change the form of money, while central banks continue upgrading their systems and embracing this innovation

With continuing innovation in payment services, private payment providers also begin to challenge the core foundation of payment systems, attempting to change the existing forms of money. In this view, central banks have been improving and upgrading their payment systems, actively embracing innovations. Those central banks engaging in the study of CBDCs currently account for about 86% of global peers.[2] In October 2020, the Bank for International Settlements (BIS) and seven central banks, including those of the US, the UK, Japan, and the euro area, published the *CBDC: Foundational Principles and Core Features*, which emphasizes that a central bank should not compromise monetary or financial stability by issuing a CBDC and that it should incorporate core features such as convertibility, safety and financial inclusion as a guiding principle of CBDC issuance by national authorities.[3]

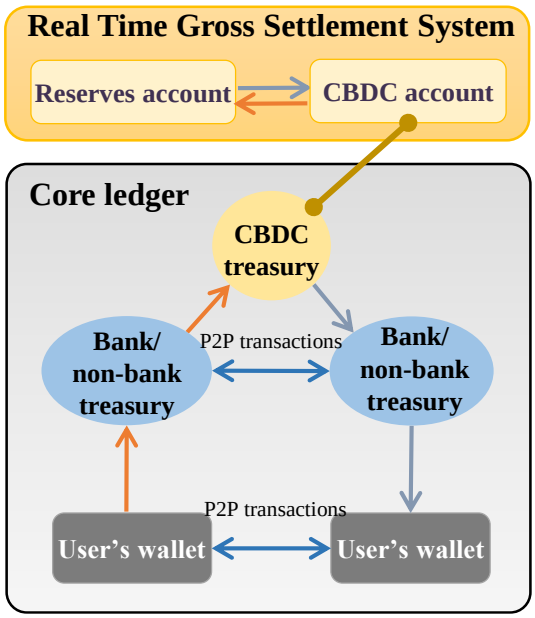
3.3 The Bank has completed research on a wholesale CBDC and proceeded to an experiment on a general purpose CBDC

With its CBDC research keeping pace with international studies, the Bank already completed the first phase program with a technical report on the feasibility of a wholesale CBDC[4] in June 2020. The results showed that DLT has the potential to increase the resilience of systems. However, when applying DLT to the financial front of a CBDC, its efficacy would be affected by the need for additional mechanisms in pursuit of privacy protection and supervision (e.g., AML/CFT).

Starting from September 2020, the Bank moved on to the second phase program on a general purpose CBDC, planning to adopt a two-tier structure under a public-private

partnership between the Bank and financial intermediaries. Its functional process is structured as the following: the Bank issues the CBDC to intermediaries, such as banks, which enables customers to hold the CBDC with these intermediaries. Financial intermediaries and end users are allowed to directly conduct peer-to-peer (P2P) transactions using the CBDC (Chart B4.3).[5] With regard to CBDC design, the Bank would use a "centralized system with partial functions operated through DLT." In other words, the plan is to establish a centralized transaction platform, aiming at achieving efficacy in dealing with large-sum and high-frequency transactions through a general-purpose CBDC while fulfilling the need for privacy and supervision. In addition, the DLT is used to store transaction data with the aim of building operational resilience and avoiding business interruption. The whole program is expected to be completed within two years, and the Bank will continuously reassess the timetable with a rolling review, depending on the progress of the trial and global CBDC development trends. Three main test scenarios preliminarily planned are as follows: (1) large-sum transactions under the delivery versus payment (DvP) mechanism; (2) domestic consumption and transfers; and (3) cross-border outward remittances in small amounts.[6] These scenarios would cover the major application fields of a general purpose CBDC.

Chart B4.3 The concept of the CBC's general purpose CBDC



Note: In the core ledger, the wallets of CBDC treasury, bank/non-bank treasury and user's wallet, which belong to the Bank, intermediaries and customers, respectively, store information about CBDC account balances.

Source: CBC.

Notes: 1. BIS (2020), "Central Banks and Payments in the Digital Era," *BIS Annual Economic Report*, June.

2. Boar, Codruta and Andreas Wehrli (2021), "Ready, Steady, Go? – Results of the Third BIS Survey on Central Bank Digital Currency," *BIS Papers*, No. 114, January.

3. BOC, ECB, BOJ, Riksbank, SNB, BOE, Fed and BIS (2020), "Central Bank Digital Currencies: Foundational Principles and Core Features," October.

4. In comparison to traditional central bank money, which include cash for retail payment use and reserves for wholesale payment use, the CBDC can be split into two categories: general purpose and wholesale. A general purpose CBDC is widely accessible in all payment scenarios, while a wholesale one mainly serves for interbank payments.

5. Money transfers can be directly conducted using a CBDC wallet on a P2P basis, while the RTGS