September 5, 2025
Bank of Japan

Fourth General Meeting of the CBDC Forum

The CBDC Forum held its fourth general meeting on June 26, 2025. The Bank of Japan explained the main considerations of a system for the pilot program, i.e., privacy, process flow for credit transfers, performance, and functional scalability. In addition, the Bank provided updates on progress made by different working groups.

Fourth General Meeting of the CBDC Forum

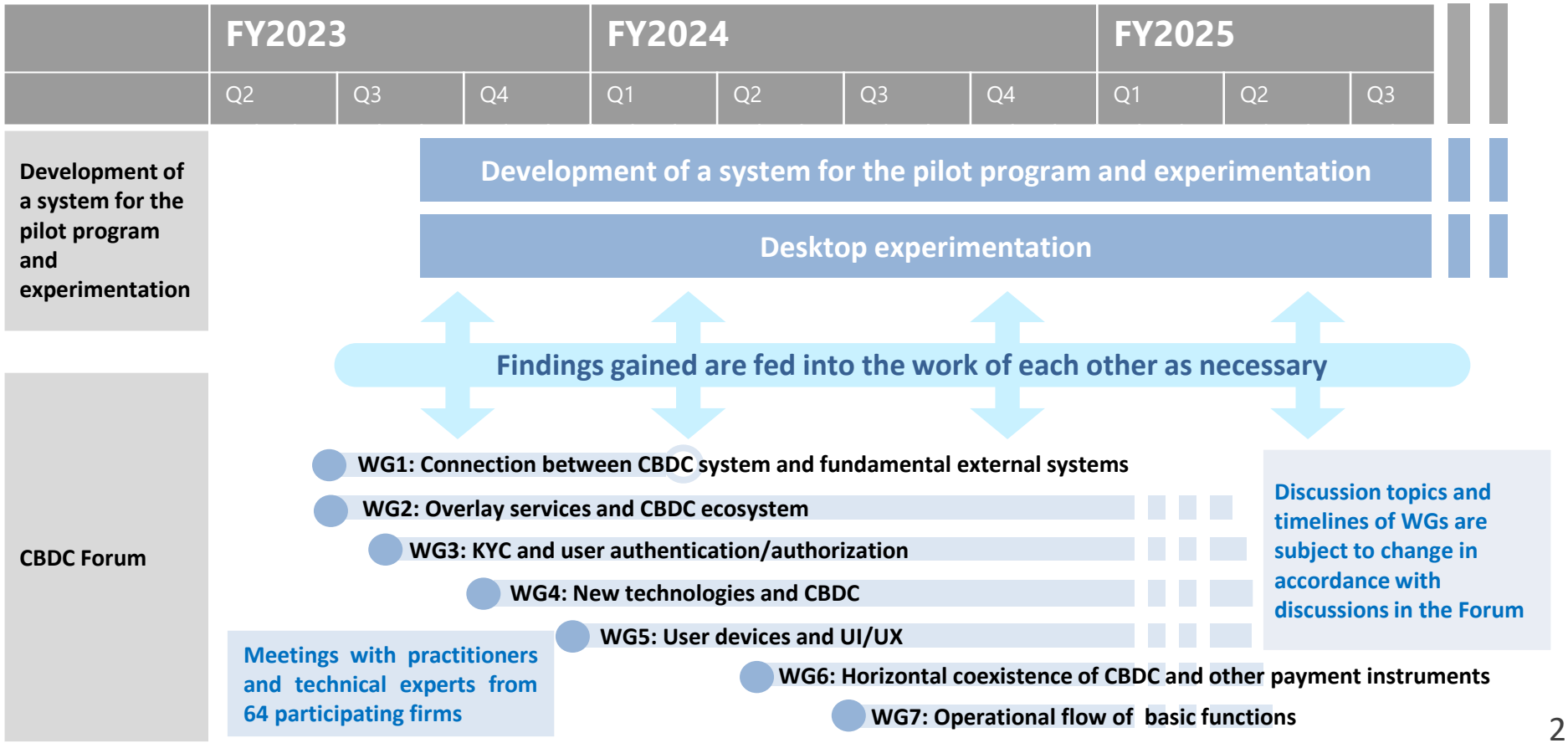
June 2025
Bank of Japan

Ⅰ. Development of a System for the Pilot Program and Experimentation

Overview of the pilot program

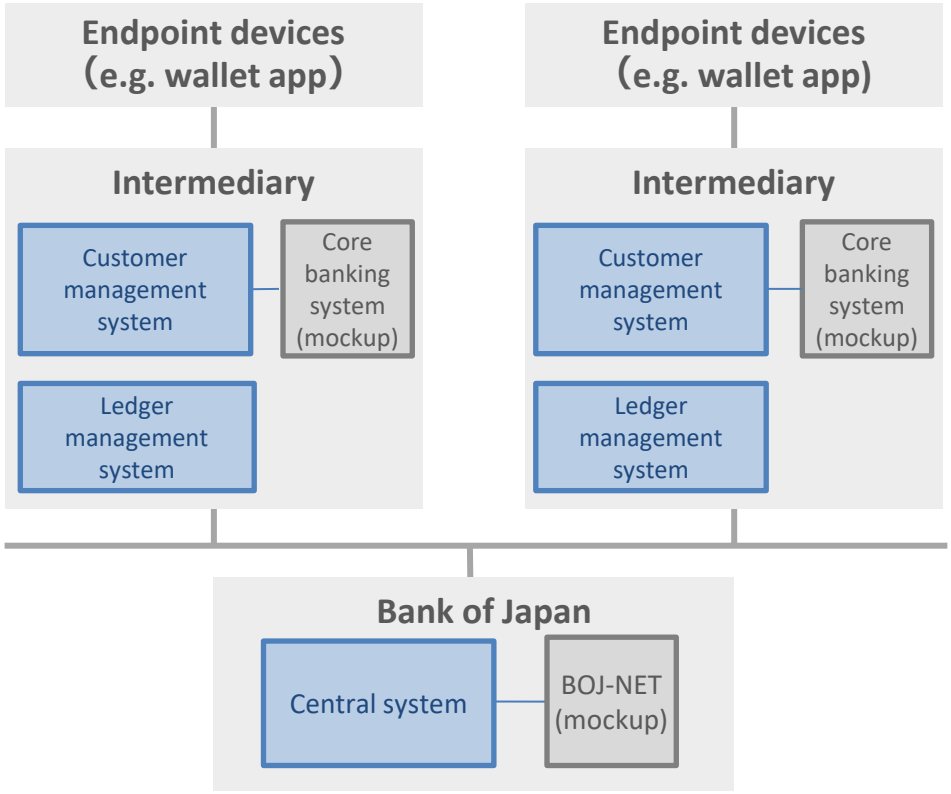
- Regarding the development of a system for the pilot program and experimentation, system design, development, and testing have been completed, and experimental work is in progress. Concurrently, desktop experimentation is being carried out.
- Under the CBDC Forum, discussions are ongoing for 6 working groups (WGs) 2 through 7.

▽ **Overall timeline of the pilot program**



Overview and considerations of a system for the pilot program

System overview



Main considerations

(1) Privacy

- Separated the customer management component, which handles user and transaction data, from the ledger management component, which handles the information necessary for settlement only

(2) Process flow for credit transfers

- Established a new process flow, assuming that multiple entities are involved

(3) Performance (enhancement of parallel processing)

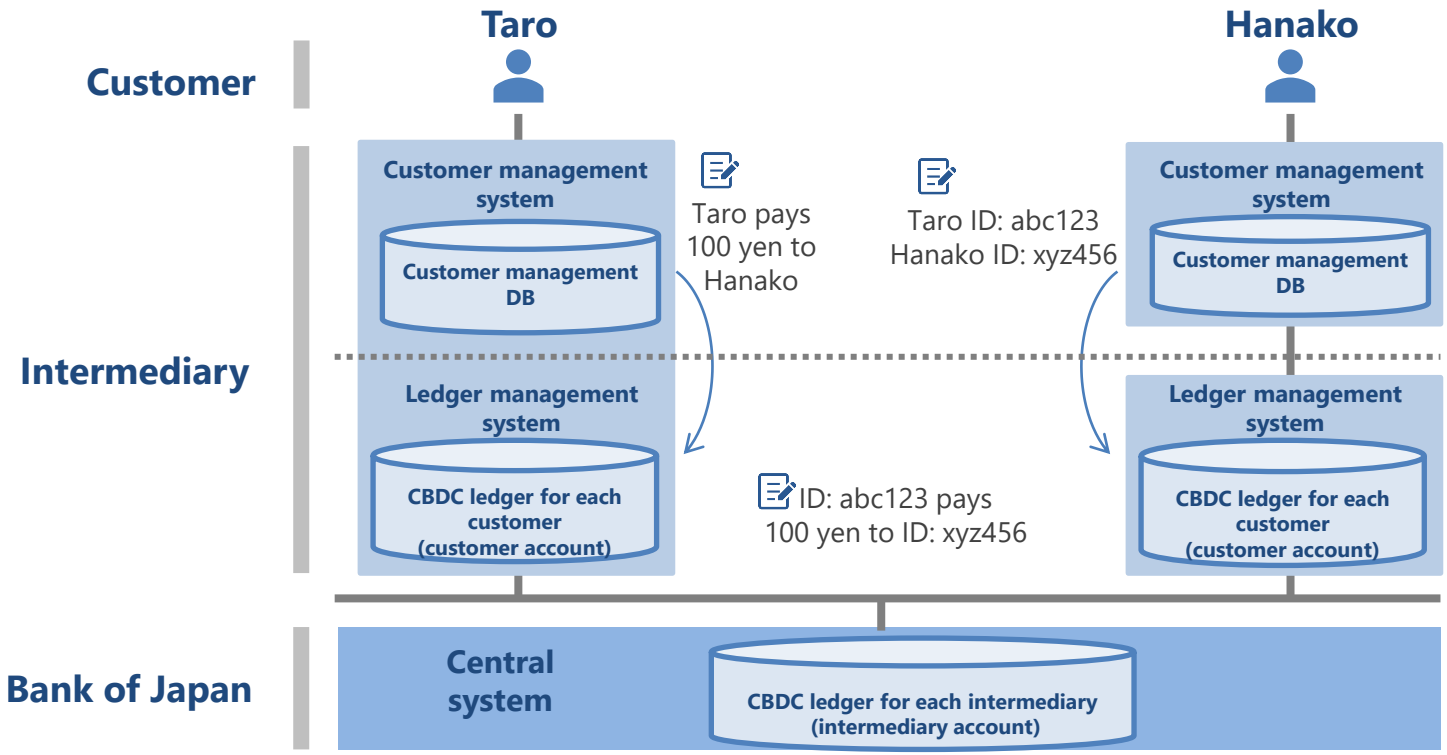
- Enhanced system performance and parallel processing by implementing a mechanism of record splitting

(4) Functional scalability

- Embedded measures in the design phase that make it easier to add functions later, thereby enhancing functional scalability

(1) Privacy

- The customer management system and the ledger management system are separated in the intermediary system.
- The customer management system handles user and transaction data, while the ledger management system handles the information necessary for settlement only.



※The figure on the left (Taro side) illustrates an example where customer management and ledger management are deployed by the same intermediary.

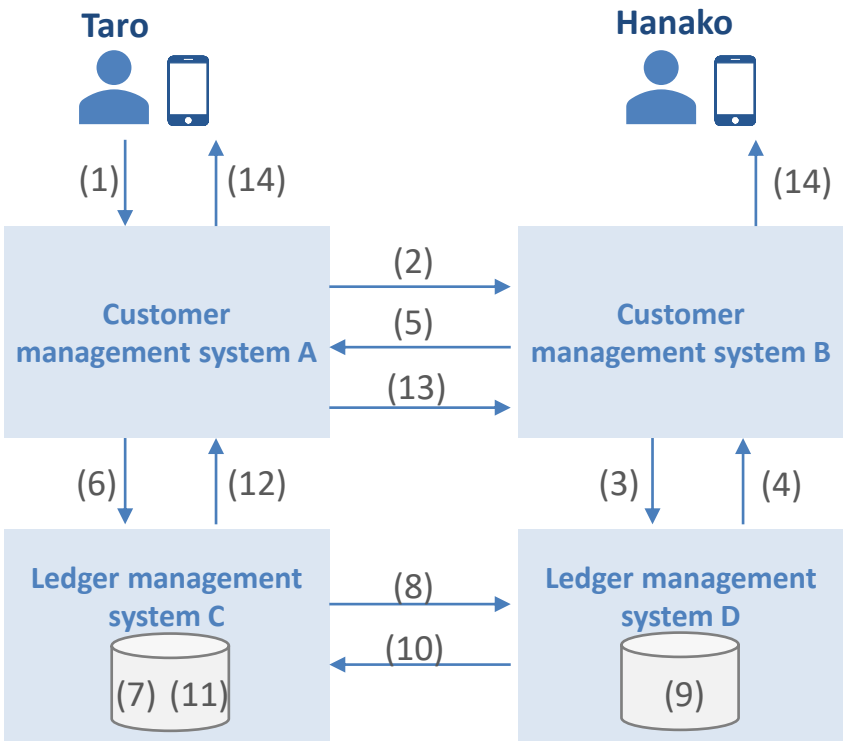
※The figure on the right (Hanako side) illustrates an example where customer management and ledger management are deployed by different intermediaries.

(2) Process flow for credit transfers

- An operational flow has been newly established, assuming that multiple entities are involved.

1. Division of roles

Ledger management systems need instructions from the customer management systems to update the CBDC ledger.



2. Point of finality

The point of finality is set to the timing of completion of ledger update on Hanako's side.

#	Actor	Process
(1)	Taro	Instruct credit transfer to Customer management A
(2)	A	Identify payee (Hanako) and notify Customer management B of incoming transfer
(3)	B	Request issuance of authorization token for ledger update to Ledger management D
(4)	D	Issue and send token for incoming transfer to Customer management B
(5)	B	Reply OK to Customer management A
(6)	A	Instruct transfer to Ledger management C
(7)	C	Reserve Taro's balance for debiting
(8)	C	Instruct Ledger management D to credit Hanako's balance
(9)	D	Verify received token (8) is identical to issued token (3) and credit Hanako's balance (settlement finality granted)
(10)	D	Notify completion of crediting to Ledger management C
(11)	C	Confirm debiting of Taro's balance
(12)	C	Notify transfer completion to Customer management A
(13)	A	Notify transfer completion to Customer management B
(14)	A, B	Notify transfer completion to Taro and Hanako respectively

*Each communication is asynchronous with an aim to enhance resource and process efficiency.

(3) Performance

- The system adopts record splitting mechanisms to enhance performance and parallel processing.

Example: User A, with a 100-yen deposit, withdraws 30 yen

No record splitting

User	Balance
A	100 yen

Withdrawal of 30 yen

User	Balance
A	70 ~~100~~ yen

locked

During the withdrawal, A's record is locked and no transactions can be processed on A's account.

Record splitting (e.g. splitting into two records)

User	Balance
A	50 yen
	50 yen

User	Balance
A	20 ~~50~~ yen
	50 yen

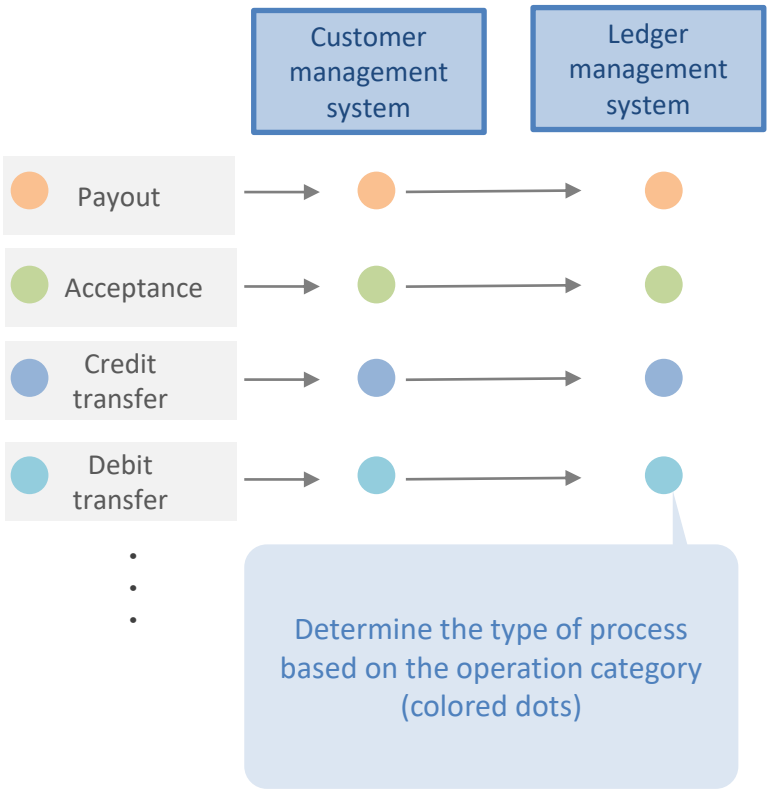
locked

During the withdrawal, A's second record remains unlocked, with which other transactions can be processed on A's account simultaneously.

(4) Functional scalability

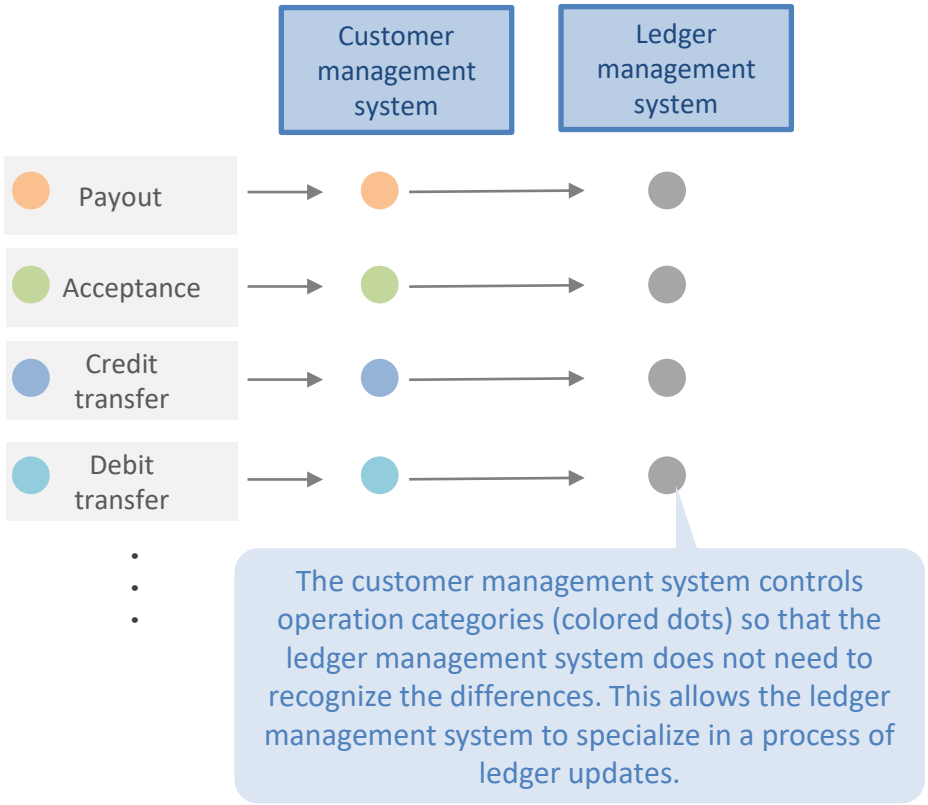
- The system builds in functional scalability by incorporating suitable features (e.g. loose coupling) in the design phase.

Design without loose coupling



Future addition of operation categories is likely to require maintenance of the ledger management system.

Pilot design (Loosely coupled design)



Potential impact on the ledger management system could be minimized even in the event that new operation categories are added.

Experimentation using the system

- In the PoCs, we assumed 100,000 transactions per second as the processing performance in the event of social implementation. This implies that performance requirements for such system would be considerably high to meet that process.

- Meanwhile, the system for the pilot program is built on a smaller scale. To examine technical feasibility for social implementation, the following steps are being taken:

  (1) Examine maximum capacity of the system through the high-load test

  (2) Consider technical issues that may arise in expanding this system to a system for social implementation (assuming the same performance requirements as in the PoCs)

Desktop experimentation

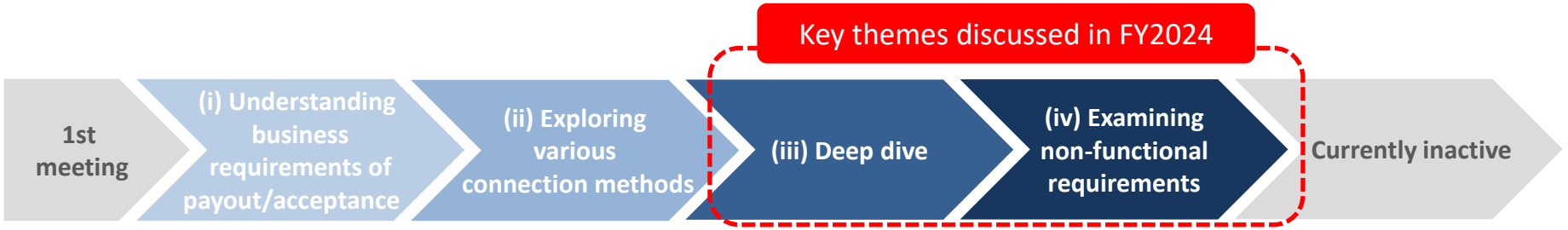
- Desktop experimentation is being carried out, with a focus mainly on functions that are not implemented in the system.

#	Theme	Description
1	**Opening accounts**	• Studying examples of the operational flow for opening CBDC accounts. • While the flow would be similar to the existing flow for opening bank accounts, there are some differences, namely, (1) information that can be handled in the customer management system and the ledger management system differ and (2) the user's bank account and CBDC account need to be linked.
2	**Conversion between CBDC and other forms of money, e.g., bank deposits, and cash**	• Exploring examples of the operational flow for converting various forms of money, such as bank deposits, and cash to CBDC. • When connecting the customer management system and the core banking system, there are some non-functional issues to consider, i.e., differences in processing performance and in operating hours.
3	**CBDC transfers and payments at stores**	• Examining examples of the operational flow for P2P and store payments. • Store payments with a focus on devices can be broken down into two broad categories, namely, (a) reading 2D codes, for example, using digital tools including wallet apps installed on devices such as smartphones, and (b) using physical cards. Of these, (a) consists of two methods: (a-1) the MPM, where the store presents a code, and (a-2) the CPM, where the user presents a code. • All store payments using CBDC consist of the following steps: (i) user authentication, (ii) registration of the account ID of the payee and of the transaction amount, and (iii) instruction on the credit transfer to the payer's customer management system. From (iii) onward, the common process flow for CBDC transfers (cf. slide 5) is invoked to execute transfers. • However, (a-1) MPM and (a-2) CPM / (b) using a physical card differ in terms of the route a message takes to get to the payer's customer management system in step (iii), and in terms of the entities appearing on the route.
4	**Overlay services and API connection**	• Exploring functionalities to be built into the customer management system, for example, and matters requiring attention to make it easier for overlay service providers to provide overlay services. • Various overlay services might be able to be built by combining a few core APIs (read-only APIs and read-and-write APIs). • As-needed standardization of interface specifications is considered desirable for intermediaries and overlay service providers to easily utilize read-only APIs and read-and-write APIs.

Ⅱ. CBDC Forum

WG1: Connection between CBDC system and fundamental external systems

- **WG1** has discussed issues including (i) business requirements of payout and acceptance of CBDC and (ii) connection methods between a CBDC system and core banking systems.
- In addition to themes (i) through (iii) below, which had originally been intended for discussions, WG1 also discussed theme (iv) examining non-functional requirements.



(i) Outline

Referring to the operational flow in existing core banking systems, examine how CBDC payout or acceptance induces changes in the balance sheet of intermediaries

(ii) Outline

Based on business requirements of CBDC, explore various connections between CBDC system and core banking systems

(iii) Outline

Gain insight on technical or operational aspects of each connection method with a view to future-proofing the system

(iv) Outline

Taking into account discussions to date, examine considerations regarding non-functional requirements such as performance and scalability

WG1: Key themes discussed in FY2024

- **WG1** discussed the following in fiscal 2024, bearing in mind the connection method in the CBDC system. Having achieved its objectives to a certain extent, WG1 is currently inactive.

  1. Issues regarding various connection methods

     ✓ Feasibility of payout/acceptance when the management entities of each system are the same or separate

  2. Consideration of non-functional requirements for various connection methods

     ✓ Necessity of reducing the access load on the core banking system

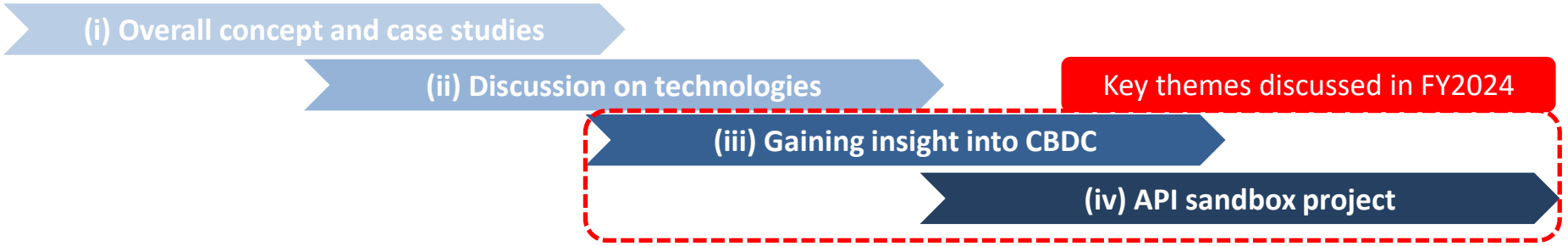
     ✓ Issues in forecasting transaction volume

     ✓ Measures to shorten payment processing time

- WG1 is currently inactive; meanwhile, findings gained through the WG's efforts are being utilized for the development of a system for the pilot program and experimentation.

WG2: Overlay services and CBDC ecosystem

- **WG2** discussed the concept of a CBDC ecosystem, case studies for an ecosystem in the payment landscape, the examination of use cases for overlay services, and the technological characteristics of CBDC as an enabler of services.
- Specifically, members have presented precedents for payment ecosystems in Japan and overseas as well as efforts of WG member firms, and have discussed the ideal CBDC ecosystem.



(i) Agenda

- Concept of CBDC ecosystem
- Survey on precedents in the payment landscape
  - ✓ Overseas CBDC ecosystems
  - ✓ Overseas FPS ecosystem design
  - ✓ Embedded finance, banking APIs
  - ✓ Other payment services
  - ✓ Regional digital currencies

(ii) Agenda

- External coordination of a CBDC system regarding overlay services
  - ✓ Open APIs, SDKs
  - ✓ Sandboxes
  - ✓ Update and maintenance of supporting functions
  - ✓ Developer community
- Overseas experiments exploring API for CBDC
  - ✓ Project Rosalind (BOE, BISIH)
  - ✓ Digital Shekel Challenge (BOI)

(iii) Agenda

- Potential of overlay CBDC services
  - ✓ Classification of use cases
  - ✓ Utilization of data
  - ✓ So-called programmability
- CBDC as an enabler for services
  - ✓ Anticipated features

WG2: Key themes discussed in FY2024

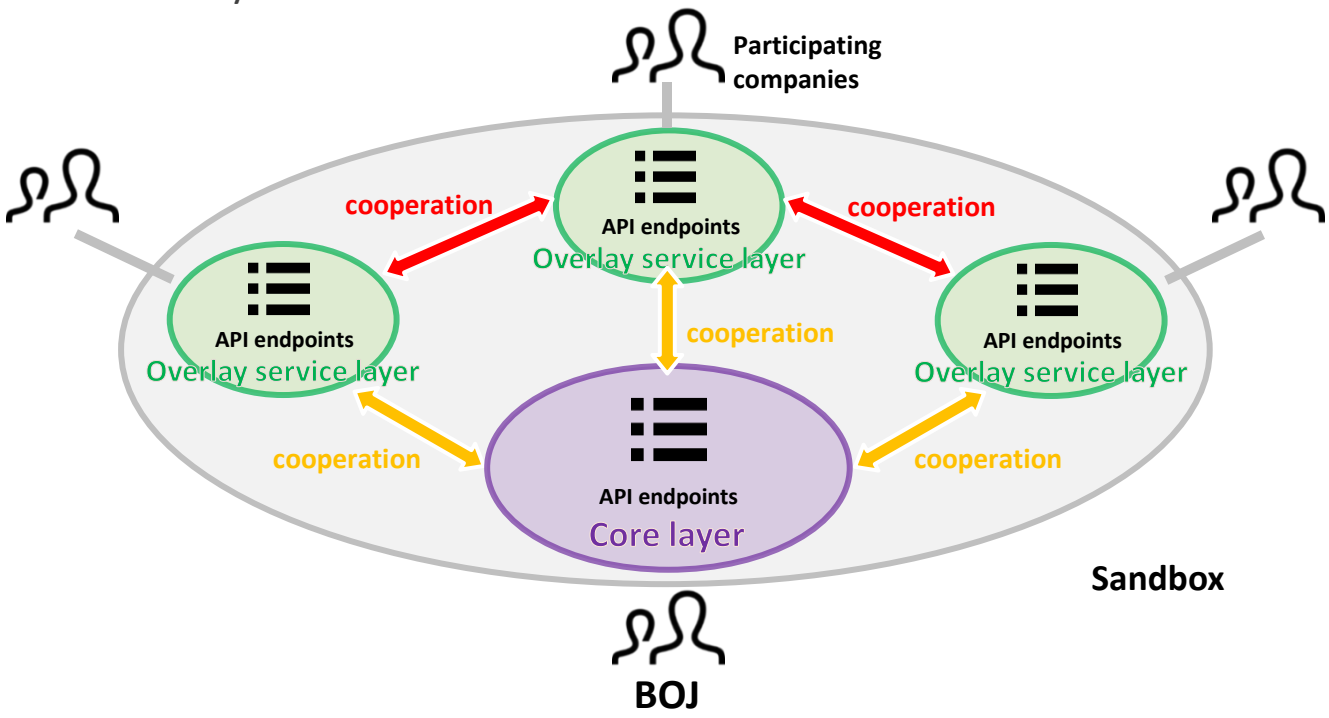
- **WG2** discussed the following in fiscal 2024.

  1. Discussions on ecosystem case studies and use cases
     - ✓ Promoting the adoption of CBDC
     - ✓ Discussions on use cases
     - ✓ Ecosystem sustainability
  2. Discussions on the quality of overlay services and CBDC as a basic payment method
     - ✓ Quality of overlay services
     - ✓ Differentiating overlay services from CBDC as a basic payment method
     - ✓ Service enhancement and associated risks

- WG2 will continue to deepen its understanding of the implications for CBDC by drawing on insights from private businesses regarding case studies on existing payment ecosystems as well as each firm's efforts and technologies underlying overlay services.
- WG2 will also continue discussions with private businesses on how to provide overlay services for CBDC and on the desirable ecosystem design.

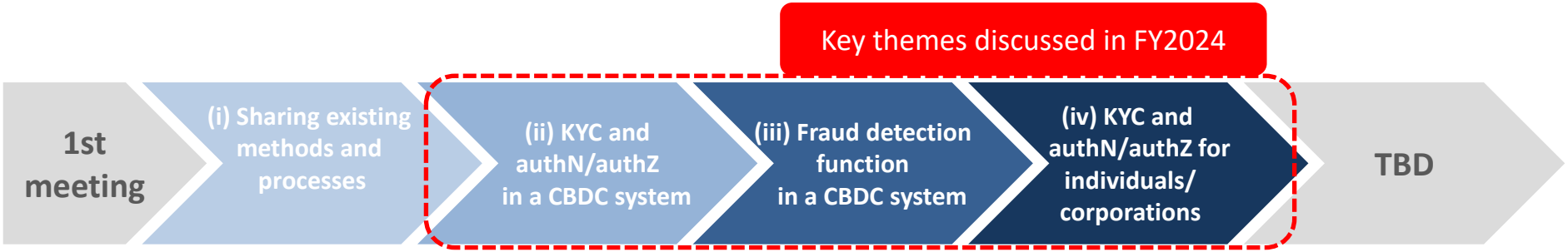
(Reference) API sandbox project

- Since April 2024, in parallel with WG2 discussions, the Bank and volunteer members of WG2 have jointly prepared an experimental environment (sandbox) in the cloud, building various APIs with overlay services in mind.
- Leveraging each organization's expertise, the following functions have been virtually implemented to explore their application to concrete service applications and how to provide overlay services.
  - ✓ Temporary reservation of deposits using a locking function (Hashed TimeLock Contract: HTLC)
  - ✓ Restricting usage based on users' consent
  - ✓ A stablecoin backed by CBDC



WG3: KYC and user authentication/authorization

- **WG3** discussed how to provide KYC, authentication/authorization, and fraud detection functions for the safe and sound use of payment services.
- Members of WG3 explained recent developments and issues in KYC, AML/CFT, fraud detection functions, and authentication/authorization in the existing payment services. The WG then discussed features, issues, and appropriate approaches for the CBDC system.



(i) Outline

Gain an understanding of KYC, AML/CFT, and authentication/authorization processes in existing payment services, explore latest technological developments in the respective fields, and deepen knowledge of necessary processes in a CBDC system

(ii) Outline

Obtain insight into the characteristics of KYC and authentication/authorization in a CBDC system, considering risks and usability in the existing processes

(iii) Outline

Leveraging examples of fraud detection and prevention in existing payment services, explore the characteristics and considerations of the fraud detection function in a CBDC system

(iv) Outline

Organize features, issues, and appropriate approaches for the CBDC system, based on the actual situation, points to be noted, and future direction of KYC and confirmation at the time of transaction for individuals and corporations in the existing payment services

WG3: Key themes discussed in FY2024

- **WG3** discussed the following in fiscal 2024.

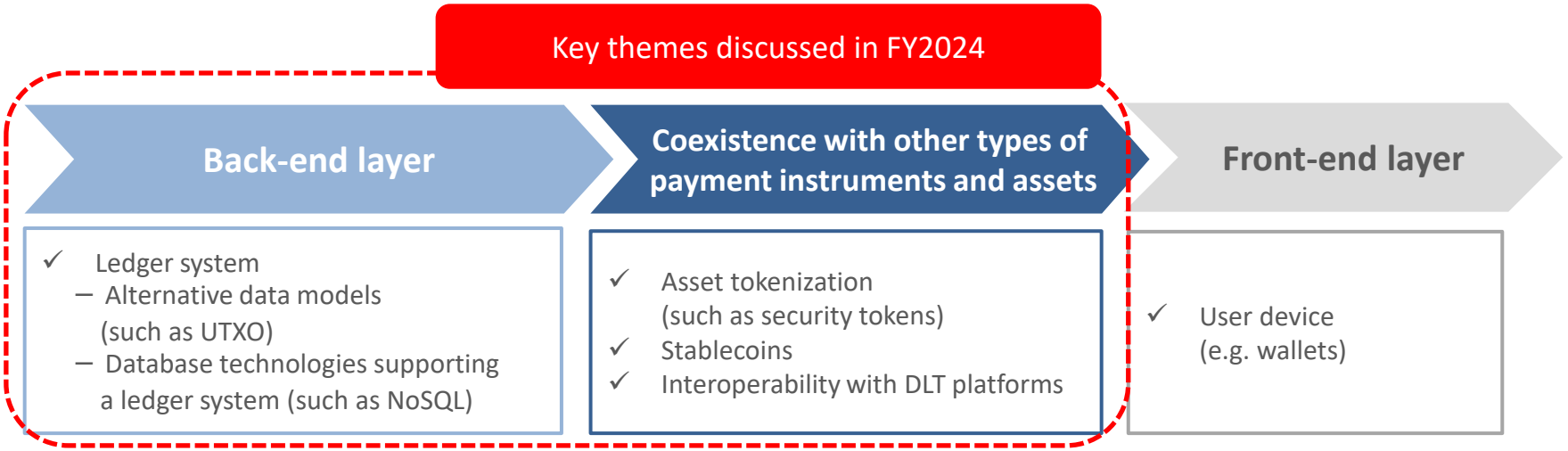
  1. Discussions on KYC and AML/CFT
     - ✓ Methods of identity proofing and the appropriate level of authentication
     - ✓ Challenges of ongoing customer management and efficient implementation
     - ✓ Criteria for opening accounts and restrictions on usage from the perspective of preventing illicit use
     - ✓ Mechanisms to ensure security through fraud detection function
     - ✓ Pros/cons and implementation challenges of system sharing
     - ✓ Incentives for cost compensation when face-to-face service is needed

  2. Discussions on authentication/authorization
     - ✓ Challenges in authentication and room for simplification in low risk use cases
     - ✓ Importance of appropriate implementation and operation of standards and guidelines, and of international coordination

- As next steps, WG3 will expand use cases to corporations, and will delve into different cases involving individuals and additional points of consideration to gain insight into the methods and features of the anticipated KYC and authentication/authorization in the case of CBDC.

WG4: New technologies and CBDC

- **WG4** has been discussing new technologies related to the back-end and front-end layers of the CBDC system and the coexistence of CBDC with other payment instruments and assets. The WG discusses these themes without being constrained by existing technical assumptions and limitations.
- For the back-end layer, the WG has discussed comparisons of data models for ledger systems, and the potential uses and issues of distributed ledger and emerging database technologies. Regarding coexistence with other payment instruments and assets, the WG has discussed approaches to asset tokenization in Japan and overseas as well as stablecoins and interoperability technologies with DLT platforms.



WG4: Key themes discussed in FY2024

- **WG4** discussed the following in fiscal 2024.

  1. Back-end layer
     - ✓ Data model comparisons
       - Account balance models or others (e.g., UTXO models)
     - ✓ Distributed ledger technologies
       - Permissioned/permissionless blockchains
     - ✓ Emerging database technologies
       - NoSQL/NewSQL

  2. Coexistence with other types of payment instruments and assets
     - ✓ Asset tokenization
     - ✓ Stablecoins
     - ✓ Interoperability technologies with DLT platforms

- Going forward, the WG will continue discussions on coexisting with other types of payment instruments and assets while advancing discussions on technologies associated with the front-end layer.

WG5: User devices and UI/UX

- **WG5** has explored areas including devices for individual users and stores as well as offline payments, while considering universal access and UI/UX in the context of CBDC.
- The WG has been discussing how to make CBDC available for anyone to use, wherever necessary, and under various circumstances, with participants sharing insights and case studies based on existing payment environments.

Key themes discussed in FY2024

[Theme 1] Existing payment channels

[Theme 2]
"Available for anyone to use"

・For example, what kind of overall design (devices, apps, networks, etc.) could be used regardless of factors such as IT literacy, age, disability, and access to a smartphone?

・UI/UX will also be considered based on the above.

Devices primarily for individual users

[Theme 3]
"Available wherever necessary"

・For example, what kind of overall design would be suitable for CBDC to be acceptable even in stores without over-the-counter terminals?

・Specifically, the combination of store and user devices will be discussed.

Devices, networks, and gateways primarily in the store

[Theme 4]
"Available under various circumstances"

・For example, what kind of overall design could be used even in times of disaster, poor mobile reception, and system or network failure?

・Specifically, offline payments will be discussed.

[Theme 5] Other issues

・Topics such as e-commerce and P2P transfer will be discussed accordingly.

WG5: Key themes discussed in FY2024

- **WG5** discussed the following in fiscal 2024.

  1. To ensure “available for anyone to use and wherever necessary”
     - ✓ Devices primarily for individual users
     - ✓ Over-the-counter terminals
  2. To ensure “available under various circumstances”
     - ✓ Offline use
     - ✓ Responses to system failures or outages
  3. Other issues
     - ✓ Promoting the use of CBDC
     - ✓ Operations at stores

- While being increasingly aware of the high convenience and scalability, the utilization of existing payment services and infrastructure, and the need to balance safety and instant payment capabilities, the WG will continue to discuss which approach is preferable when designing and enhancing UI/UX while incorporating the latest technologies and security measures.

WG6: Horizontal coexistence of CBDC and other payment instruments

- **WG6** has been discussing issues including the smooth conversion between CBDC and private digital money, coexistence of CBDC with other payment instruments, and motivation for introducing CBDC, while exploring the current state of business related to private digital money.

1st meeting

(i) Key takeaways from other WGs

(ii) Development of business related to private digital money

(iii) Smooth conversion between CBDC and private digital money

Key themes discussed in FY2024

(i) Agenda

- Key takeaways from WG1
  - ✓ Assumptions for discussions
  - ✓ Smooth conversion between CBDC and bank deposits
- Key takeaways from WG2
  - ✓ CBDC ecosystem
  - ✓ API sandbox project

(ii) Tentative agenda

- Customer relationship
- Relationship with funding sources
- UI/UX
  - ✓ Commonality and uniqueness in terms of specification
  - ✓ Choice and/or combination of money issued by fund transfer service providers, prepaid payment instruments, reward points, etc.

(iii) Tentative agenda

- Scope of value convertible to CBDC
- Processing performance
- Technical challenges related to connections with other firms
- UI/UX
- Coexistence of CBDC with other payment instruments

WG6: Key themes discussed in FY2024

- **WG6** discussed the following in fiscal 2024.

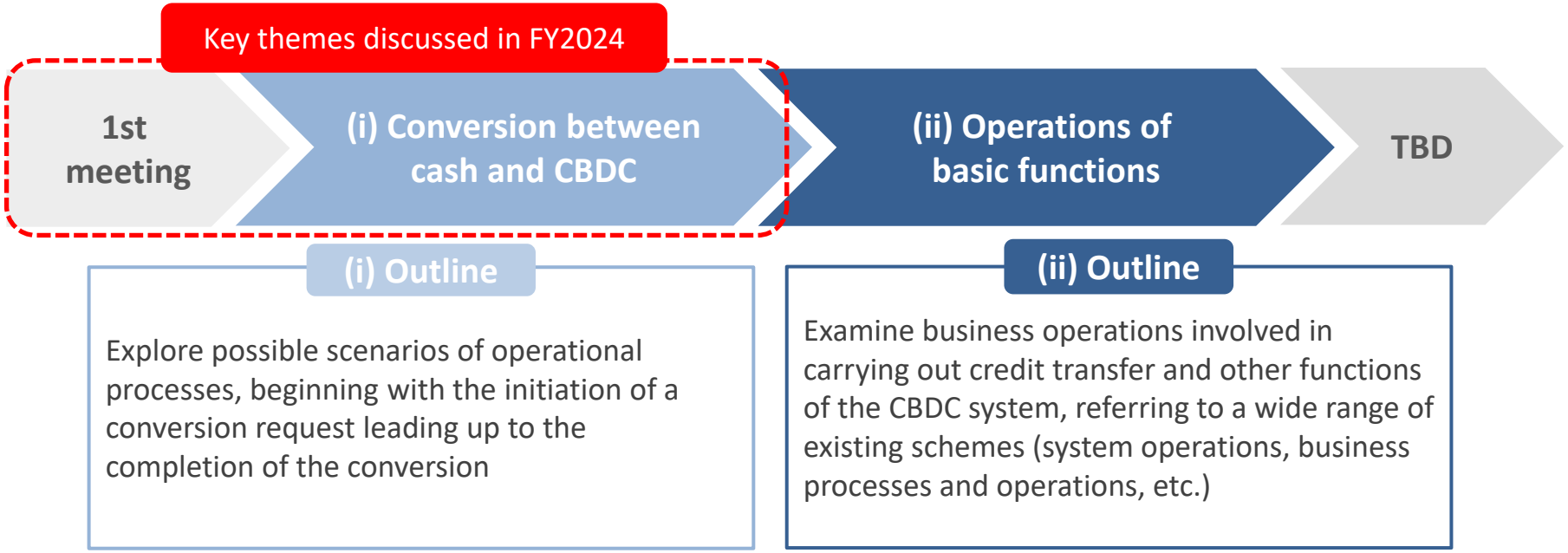
  1. Horizontal coexistence patterns
     - ✓ Smooth conversion between CBDC and private digital money
     - ✓ Coexistence of CBDC with private digital money

  2. Motivation for introducing CBDC
     - ✓ Universal access
     - ✓ Onboarding
     - ✓ Instant payment capabilities
     - ✓ Privacy and data utilization
     - ✓ Possibility of CBDC driving the expansion of cashless payments

- Going forward, the WG will examine the smooth conversion between CBDC and private digital money and the coexistence of CBDC with other payment instruments in cooperation with other WGs while also delving into themes such as the current state of businesses related to private digital money.

WG7: Operational flow of basic functions

- **WG7** has discussed possible operational processes involved in the conversion between cash and CBDC.
- The WG has also been discussing possible operations for the basic functions of the CBDC system, with feedback being provided by the Bank on its development of a system for the pilot program and experimentation.



WG7: Key themes discussed in FY2024

- **WG7** discussed the following in fiscal 2024.

  1. Conversion between cash and CBDC at ATMs

     - ✓ Process flow for conversion
     - ✓ Necessity of conversion channels
     - ✓ Necessity of media in using CBDC
     - ✓ Process flow taking into account the burden to modify existing systems

  2. Operational processes involved in the basic functions

     - ✓ Common process flow for CBDC transfers in the “development of a system for the pilot program and experimentation”

- Going forward, under the theme of operational flows of basic functions, the Bank will continue to explain its findings in the development of a system for the pilot program and experimentation, which is the other pillar of the pilot program, and it will hold discussions with WG members.