HONG KONG MONETARY AUTHORITY
香港金融管理局

Central Bank Digital Currency (CBDC) Research Report
Project Inthanon-LionRock

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Contents

1. Project LionRock (2017)

Background & research focus

- HKMA conducted a study on CBDC in 2017, with a view to better understanding its potential benefits and challenges
- Developed a proof-of-concept (PoC) together with HKICL, the three note-issuing banks in Hong Kong and R3, an enterprise blockchain technology company
- The study focused on evaluating the technical viability of CBDC issuance. It also included an interface to the Central Moneymarkets Unit (CMU) for delivery-versus-payment (DvP) of tokenised debt securities

Key findings & conclusions

- Given the highly efficient and trusted retail and wholesale payment infrastructures in Hong Kong, value of CBDC at both retail and wholesale levels in local market appeared to be limited
- Continue to explore other potential business cases, e.g. cross-border funds transfers at the wholesale level, and study the development and impact of CBDC with other central banks

2. What is Central Bank Digital Currency (CBDC)?

Definition

- A central bank liability
- Denominated in domestic currency
- In digital form

Properties of different forms of money

Form of money	Digital	Widely accessible	Central bank issued
Cash	No	Yes	Yes
Bank deposits	Yes	Yes	No
E-wallets	Yes	Yes	No
CBDC	Yes	Depends*	Yes

* Depends on the design of the CBDC, retail or wholesale

3. Project Inthanon-LionRock (2019)

- In May 2019, the HKMA and the Bank of Thailand (BOT) signed a Memorandum of Understanding (MOU) on fintech collaboration

- Meanwhile, there has been increasing international attention to addressing pain points in cross-border payments

- Thailand is one of Hong Kong's top 10 principal trading partners*

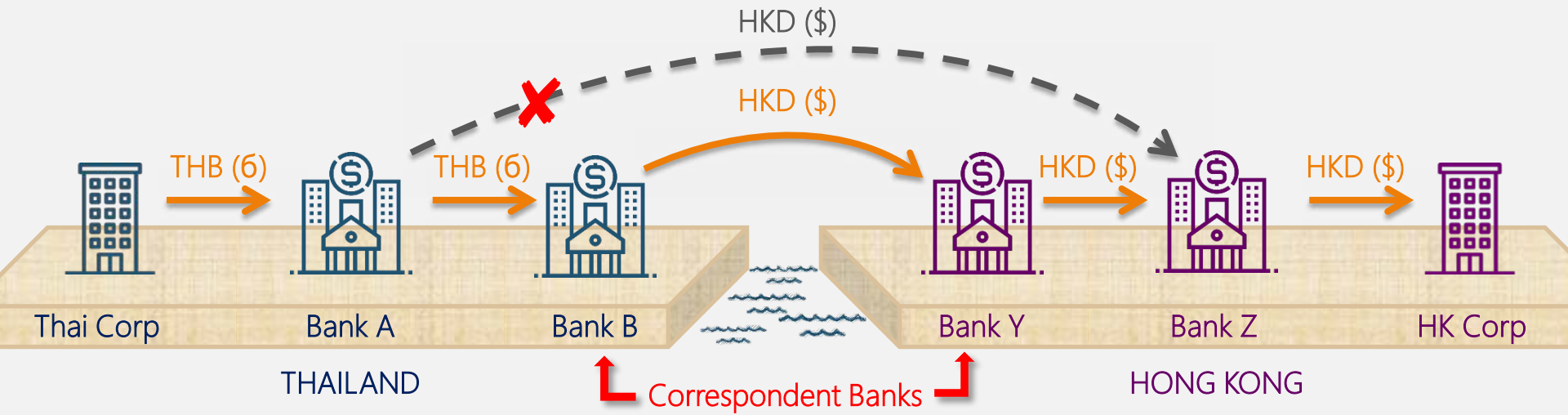
- The scope of the project is to develop a blockchain corridor network to connect the CBDC blockchains of Hong Kong (LionRock) and Thailand (Inthanon) to facilitate cross-border HKD-THB PvP (Payment-versus-Payment) payments at wholesale level (not retail)

- In 3Q 2019, eight Thai banks and two Hong Kong banks joined force with the BOT and the HKMA to develop the cross-border funds transfer PoC

*Trade value totalled HK$ 153 billion in 2018 according to the Trade and Industry Department of Hong Kong https://www.tid.gov.hk/english/aboutus/publications/factsheet/asean.html

4. Existing mode of cross-border funds transfers and its pain points

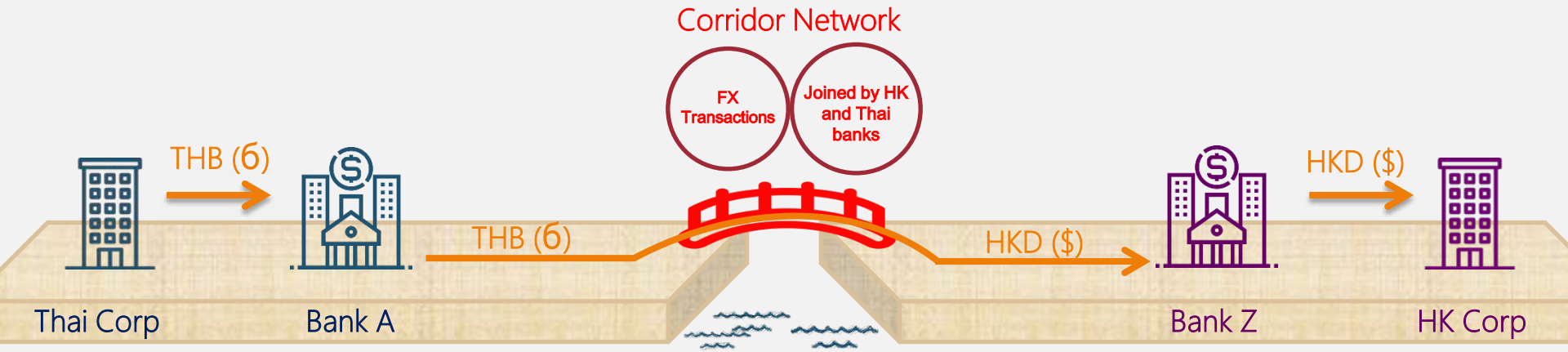
Correspondent bank model



- Costly
- Complex operation
- High FX settlement risk
- Low transparency
- Heavy reporting burden

5. The Inthanon-LionRock CBDC model

CBDC Corridor Network



- Less fees
- Simpler operation
- No FX settlement risk
- Higher transparency
- Lower reporting burden

*Please refer to Slide 13 for a detailed comparison of the 2 models.

6. Strong practical elements of the model

Operational features

Apart from evaluating technological viability, the Inthanon-LionRock CBDC model also examines the feasibility of implementing practical solutions in the blockchains to address common pain points in cross-border payments:

- Access to competitive FX pricing - instead of needing to take the potentially non-competitive FX rate offered by the correspondent bank (in the correspondent bank model), paying banks can have choice over the competitive FX rates quoted by participating banks in the cross-border corridor network

- Liquidity Management and Saving Mechanisms - provides automated tools for liquidity management to smoothen the payment process, such as transaction queueing and netting, conversion (from local CBDC to liquidity for settlement in the corridor) and borrowing arrangement (from other participants in the corridor)

6. Strong practical elements of the model

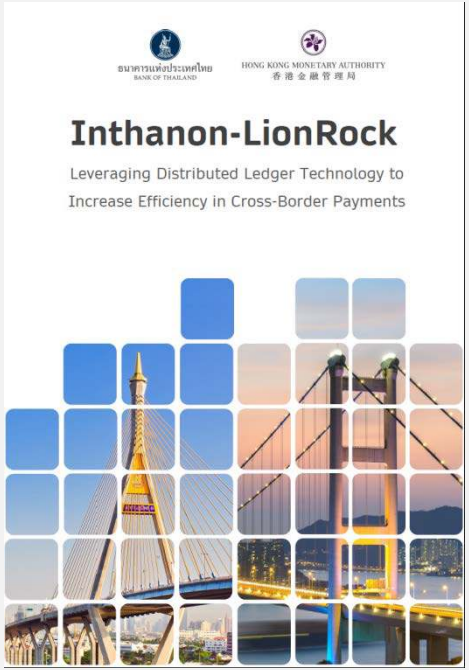
Regulatory features

Another key practical aspect of the PoC is to improve the transparency of transactions occurring in the corridor network to the central banks/authorities, which can help fulfil regulatory compliance and reporting requirements in an efficient manner:

- Monitoring – central banks can real-time monitor cross-border funds transfers and FX transactions
- Regulatory compliance with THB specific regulations – to comply with the relevant regulations, a number of alerts have been built in for monitoring excess to regulatory limits, e.g. daily THB outstanding balance held by Hong Kong banks
- Auto-reduction of Hong Kong Banks' THB outstanding balances – the system is designed to perform automatic reduction from Hong Kong banks' THB accounts at the cut-off time in case any of their aggregated balance of THB exceeds THB 200m.

7. Results of the joint study

- The PoC is successfully completed and confirms the technical feasibility of implementing practical solutions to address key pain points of cross-border payments
- Cross-border funds transfers can occur real-time with fewer intermediaries or settlement layers, therefore, the benefits discussed previously can be achieved, i.e. efficiency is enhanced, cost reduced, settlement risk lowered, transparency and compliance enhanced
- While it only tests a THB-HKD corridor with 10 participating banks from Thailand and Hong Kong, the model is designed to be scalable and can be further extended to other jurisdictions or markets



8. Potential next steps and future considerations

Potential next steps

Identify the **governing, operating and supervising bodies** of the corridor network

Study further the **technical capability** of transacting real pilot trades, e.g. performance, security and resilience, etc.

Address any legal concerns e.g. authority and legal matters related to issue CBDC, settlement finality, etc.

Future considerations

Exploring **expansion and connections to other platforms**, together with banks and other relevant parties

Supplementary notes to Slide 7

Key considerations	Pain points in current correspondent bank model	Project Inthanon-LionRock CBDC model
Cost	High – multiple layers of intermediaries, pre-funded liquidity, non-competitive FX pricing	Low – participating banks can directly transact each other, better management of local currency foreign currency liquidity, FX conversion at FX pricing
Operational process	Complex and slow – different payment message format standards, technology, cut-off times (e.g. time zone differences)	Simple and real-time – real-time settlement clock without the need to go through multiple intermediaries
Settlement risk	High – banks usually need to pre-fund the account with counterparty before the foreign exchange transaction can occur, hence subject to settlement risk due to insolvency or failure of the counterparty	No – foreign exchange transactions settled on a payment-versus-payment (PvP) basis
Transparency	Low – visibility not provided throughout the entire process flow	High – automated end-to-end transaction real-time tracking and reconciliation
Regulatory compliance	Burdensome – banks may need to make multiple reports to different authorities under different regulatory requirements, and implement different controls	Less burdensome – authorities can monitor in the network on a real-time basis, no need for reporting by banks