

Central Bank Digital Currency (CBDC) Aparangi ā Te Pūtea Matua

CBDC Forum Session 3
Wednesday, 30 November 2022



Reserve Bank
of New Zealand
Te Pūtea Matua

Nau mai, haere mai Welcome

Robbie Taylor

Housekeeping

Robbie Taylor



Relationship Charter.

The Reserve Bank aspires to build and maintain the best 'regulator/regulated' supervisory relationships possible, with all the different regulated entities. This Charter represents a mutual undertaking of how the parties will work together to achieve this aspiration. We will regularly measure our performance against the commitments set out in the Charter and share the lessons.

Our mutual commitments

Our behaviours will be

Honest

positions are openly stated, constructively, freely and frankly

Diligent

provide clear expectations and deliver on them

Achievement focused

work together to achieve sound and efficient outcomes

Open-minded

each other's perspective is constructively sought and understood

Professional

disagreements can happen on issues, not people

Our communication will be

Clear

easily understood, with decisions explained

Targeted

made to the right people in governance and management

Consistent

one organisation, one message, one tone

Timely

communication with no surprises

Ground rules

Relationship charter

- Respecting diversity of background, thought and expression
- Encouraging participation and fun
- Chatham House rules

Probity

- No anti-competitive behaviour (price-setting, division of markets, agreements lessening competition, cartels etc), and raise a hand if concerned
- This is a “sales pitch free zone”
- Mis/representing CBDC Forum membership or its work

CBDC Forum members

Name	Organisation	Name	Organisation
Adrian Smith	BlinkPay	Alexandra Sims	University of Auckland
Brian Bonar	ANZ	Conrad Morgan	Worldline
David Corbett	PowerFinance	Fran Strajnar	Techemy
Jane Retimana	Payments NZ	Jennifer Ferreira	Victoria University
Joanne Dacombe	Disabled Persons Assembly	John Warwick	Foodstuffs
Michelle Kitney	Volunteering NZ	Mitchell Pham	FintechNZ
Paul Quickenden	EasyCrypto	Simon Jensen	Buddle Findlay
Andrew Dodd	ASB		



Chair and secretariat

Chair	Robbie Taylor
Secretariat	Sam Kirk-Reeve – liaison
	Navina Soondram – liaison
	Makoto Seta – policy lead
RBNZ Team	Jean-Christopher Somers
	Amber Wadsworth
	Tim Duston

Agenda for today

Time	#	Item	Presenters
10:00am	1.	Welcome & update from Reserve Bank	Robbie Taylor
10:20am	2.	An innovative CBDC – session 1	Amber Wadsworth
11:05am		Break	
11:20am	3.	An innovative CBDC – session 2	Amber Wadsworth
12:05pm		Lunch	
12:50pm	4.	International developments	Tim Duston, JC Somers & Makoto Seta
1:20pm	5.	Member-led session: Distributed Ledger Technology	s 9(2)(g)(i)
2:20pm	6.	Open discussion	
2:50pm	7.	Wrap up	
3:00pm		End	

Item 1:

Update from Reserve Bank

Robbie Taylor

Item 2:

An innovative CBDC (session 1)

How a CBDC can drive efficient, reliable and innovative outcomes in New Zealand?

CBDC objectives and outcomes

Speak to what we want a CBDC to achieve

Our objectives for a CBDC:

To ensure that central money is available to New Zealanders and allow it to be used digitally (Primary)

To contribute to the innovation, efficiency and resilience of New Zealand's money and payments ecosystem (Secondary)

The outcomes we are seeking:

Central bank money continues to remain relevant in the digital age and used by individuals and business

Central bank money supports wider digital financial inclusion and wellbeing

Central bank money continues to provide a stable anchor of value and confidence and convertibility of our money

Enable a money and retail payments ecosystem that is more open, innovative and competitive

Contribute to the development of New Zealand's digital economy

Which contribute to our overriding objective for money and payments:

New Zealand has reliable and efficient money and payments systems that support innovation and inclusion



Innovation and integrity

The CBDC design principles of '**Innovation**' and '**Integrity**' focus on the highlighted aspects of the objectives and outcomes

Our objectives for a CBDC:

To ensure that central money is available to New Zealanders and allow it to be used digitally (Primary)

To contribute to the innovation, efficiency and resilience of New Zealand's money and payments ecosystem (Secondary)

The outcomes we are seeking:

Central bank money continues to remain relevant in the digital age and used by individuals and business

Central bank money supports wider digital financial inclusion and wellbeing

Central bank money continues to provide a stable anchor of value and confidence and convertibility of our money

Enable a money and retail payments ecosystem that is more open, innovative and competitive

Contribute to the development of New Zealand's digital economy

Which contribute to our overriding objective for money and payments:

New Zealand has **reliable and efficient** money and payments systems that support **innovation** and inclusion



Purpose of this work stream

This work stream aims to expand on how a CBDC can be **innovative** and have **integrity** – what does this mean in the NZ context?

To do this we must:

- Understand what we mean by efficiency, reliability and innovation
- Investigate where the opportunities are to improve the efficiency, reliability and innovation of NZ's money and payments
- Consider whether a CBDC can meet these opportunities, or what it means for the design of a CBDC

This work contributes a 'top-down' view to the discussion on whether a CBDC is needed in NZ, and what it should look like.



A note and a disclaimers

- These sessions present preliminary framing and analysis that may be subject to change.
- We are presenting work that is not final because we want your early views and feedback.
- The design principle of 'Cash-like' and 'Managed Issuance' are explored in other works streams. This means, outcomes and benefits related to inclusion and issuance policies are outside the scope of this presentation



Road map for today's sessions

- Seek your views and validation on key analysis and judgements related to the design principles of Innovation and Integrity, and related core outcomes of Efficiency, Reliability and Innovation.
- This includes an assessment of:
 - The current pain points, trends and future opportunities in NZ money and payments
 - Value proposition of CBDC
 - And finally a preliminary evaluation of some key innovation design choices



Timeline

Session 1 (45 mins)

1. Brainstorm – exercise (20 mins)
2. Validate against analysis findings and conclusions – presentation (7 mins)
3. General discussion/comments – discussion (13 mins)

Session 2 (45 mins)

1. Introduce efficiency, resilience and innovation criteria – presentation (15 mins)
2. Evaluate key scenarios with criteria – exercise (15 mins)
3. Report back and general discussion – discuss (15 mins)





Reserve Bank
of New Zealand
Te Pūtea Matua

SESSION 1: CONTEXT AND OPPORTUNITIES

Identifying the 'innovation' value proposition of a CBDC

Exercise – How it works

1. Break into smaller groups to brainstorm two sets of question (10 mins)
 - Groups: one online group, two in-person groups
 - Start on question 1, then move to the next set of questions
 - Write your ideas on the posties and stick them to the posters (in-room) or whiteboard (online)
 - 5 minutes per-question set
2. Categorise your posties into themes by moving them into groups (5mins)
3. Share the themes with the group (5mins)



Questions

Goal: Identify the context and future trends a CBDC would exist in, identify CBDC innovation value proposition

Question 1: Money and payments in NZ

1. What are the opportunities and future trends in money and payments in NZ? i.e. structural, features, functions.
2. What are the pain points in money and payments in NZ? i.e. structural, features, functions.

Question 2: What are the opportunities for a CBDC?

1. What are the opportunities for a CBDC? Efficiency, resilience, innovation?
2. How might an innovative CBDC spur other innovations in NZ?



Themes

Context and opportunities



A vertical decorative bar on the left side of the slide, featuring a teal background with white geometric patterns. The patterns consist of repeating chevron shapes pointing upwards and horizontal lines, creating a textured, layered effect.

How do our themes compare?

A vertical decorative bar on the left side of the slide, featuring a teal background with white geometric patterns. The patterns consist of repeating chevron shapes pointing upwards and horizontal lines, creating a textured, layered effect.

Notes on workshop findings

IN CONFIDENCE

Item 3:

An innovative CBDC (session 2)

CBDC objectives and outcomes

The CBDC design principles that relate to this objective directly are the principles of **Innovation** and **Integrity**.

Our objectives for a CBDC:

To ensure that central money is available to New Zealanders and allow it to be used digitally (Primary)

To contribute to the innovation, efficiency and resilience of New Zealand's money and payments ecosystem (Secondary)

The outcomes we are seeking:

Central bank money continues to remain relevant in the digital age and used by individuals and business

Central bank money supports wider digital financial inclusion and wellbeing

Central bank money continues to provide a stable anchor of value and confidence and convertibility of our money

Enable a money and retail payments ecosystem that is more open, innovative and competitive

Contribute to the development of New Zealand's digital economy

Which contribute to our overriding objective for money and payments:

New Zealand has **reliable and efficient** money and payments systems that support **innovation** and inclusion



Turning our 'Innovation' outcomes into evaluation criteria

Key CBDC outcomes/benefits to NZ money and payments:

1. Improved efficiency
2. Maintained or improved reliability
3. Improved innovation

Competition and **interoperability** are key elements of **efficiency** in NZ landscape and together should result in **innovation**

In a similar vein, **resilience** and **safety** are key elements of **reliability**

Inclusion aspects of CBDC are addressed in a separate work stream



Efficiency, innovation and reliability

Efficiency	Uses least resources to achieve desired outcomes.
Competition	Supports rivalry between businesses to win and retain end users, includes competition at different levels of the money and payments system. Promotes and incentivises access within justified risk tolerances.
Interoperability	The technical, semantic and business compatibility that enables a system to be used in across systems, without participating in multiple systems.
Innovative	Supports the development of value enhancing new or improved forms of money technologies, payment functionality and money and payments systems and services.
Reliable	Consistently good in quality and performance; able to be trusted.
Resilience	The ability to respond to or recover readily from a crisis, disruptive process, or some other form of difficulty. Supports financial-system stability.
Safety	Protects the confidentiality, integrity and availability of the service from cyber threats so that end users feel safe and are protected.



To build a CBDC we need



The asset

1:1 exchange rate with cash, NZD, direct legal claim on the RBNZ



A platform

Core technology layer enabling the issuance and transfer of the asset



An ecosystem

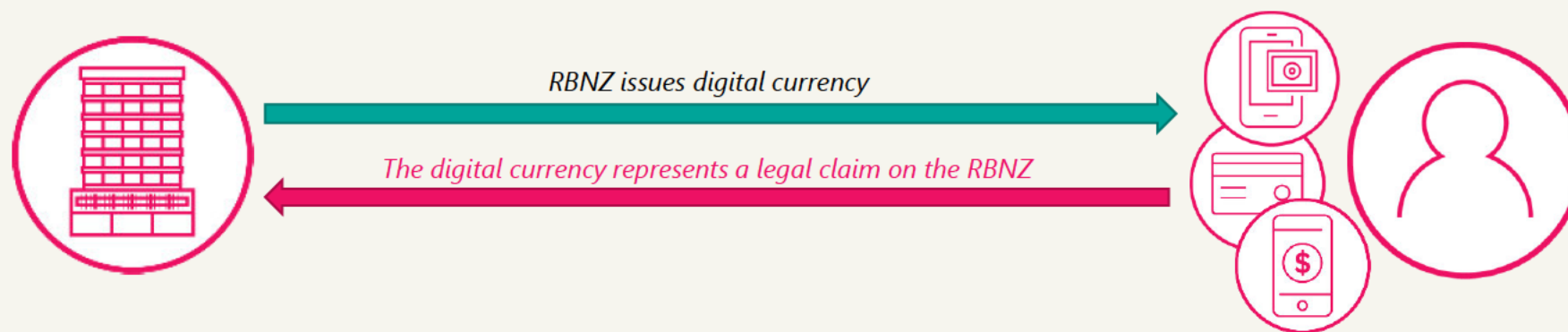
An environment of systems, services, roles, providers and arrangements supporting end-to-end lifecycle and all use cases



The CBDC asset



A direct claim on RBNZ



CBDC features are being designed based on the CBDC principles, policy objectives, end user needs and system requirements



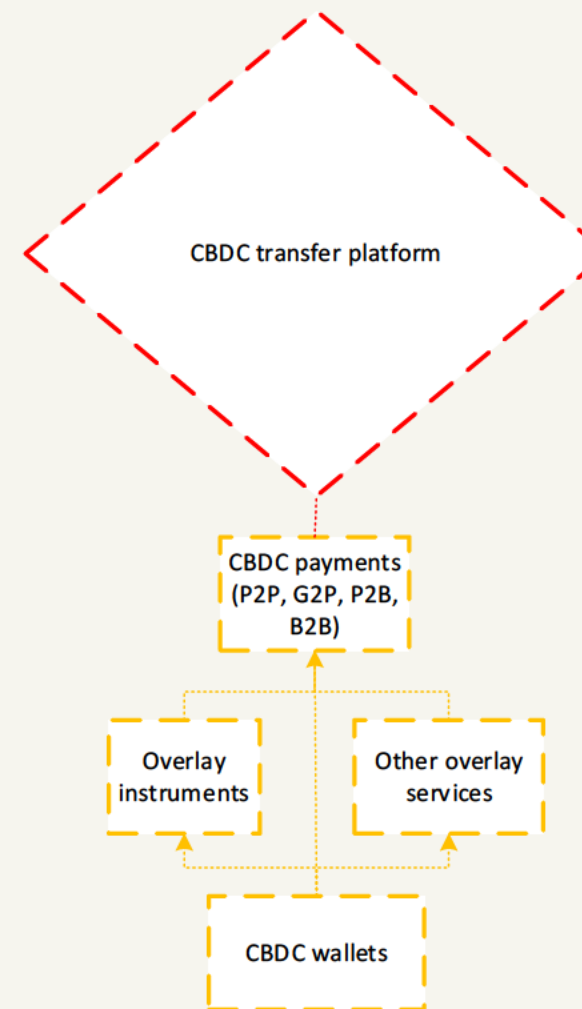
A CBDC platform



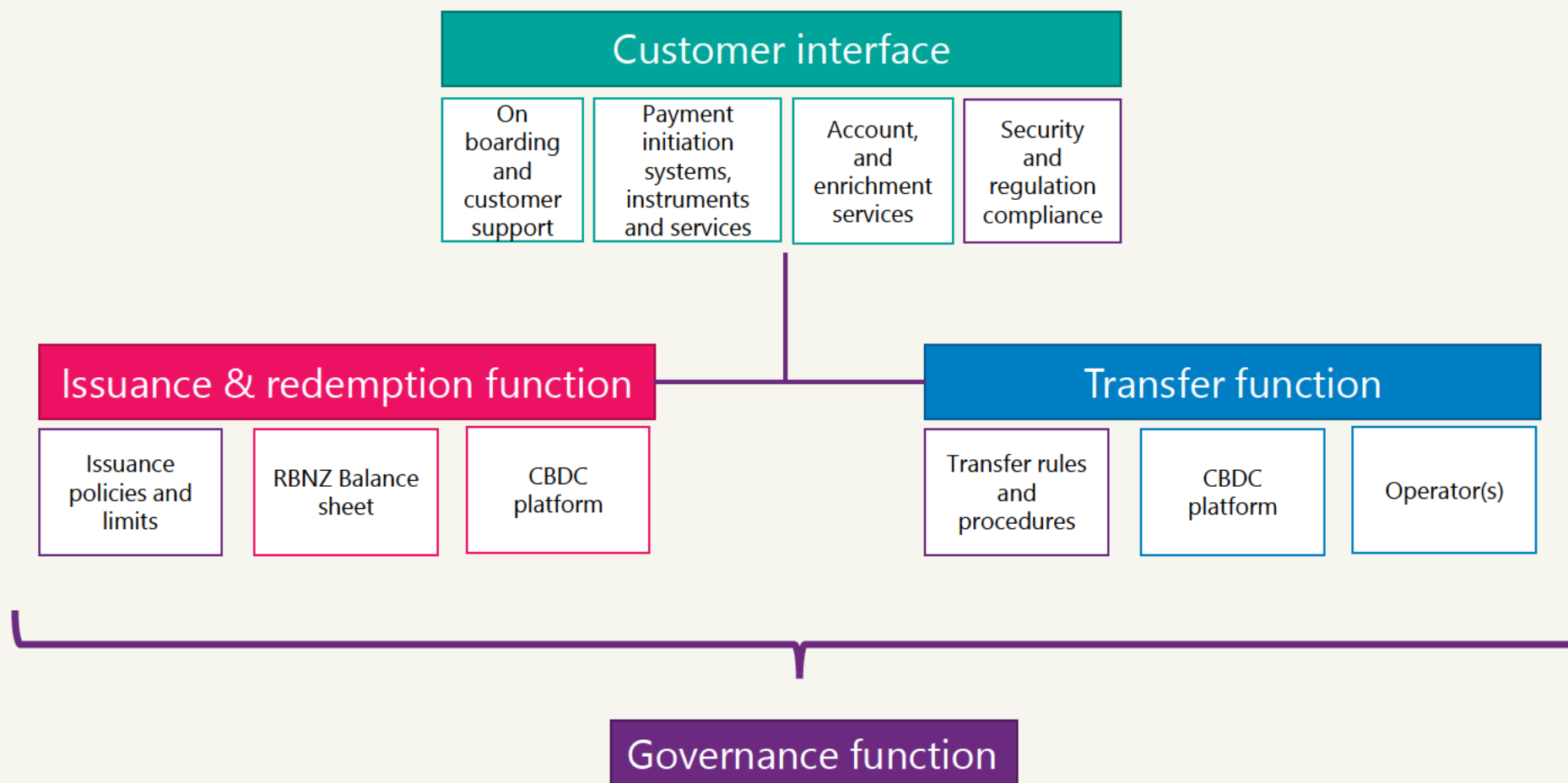
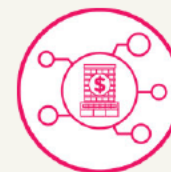
Technology base layer on which primary CBDC functions are built: the issuance, transfer, redemption of the asset

Will likely feature:

- Real time value settlement
- Access by third parties
- High interoperability
- PoS and P2P
- Always on
- Resilient
- Programmable



A CBDC ecosystem



Key choices for innovation outcomes

1. Degree of interoperability between the transfer platform and rest of money and payments ecosystem?
2. Single or multi-tier ecosystem?
3. Use conventional technology or use tokenisation?

Breakout groups will investigate choices 1 and 2

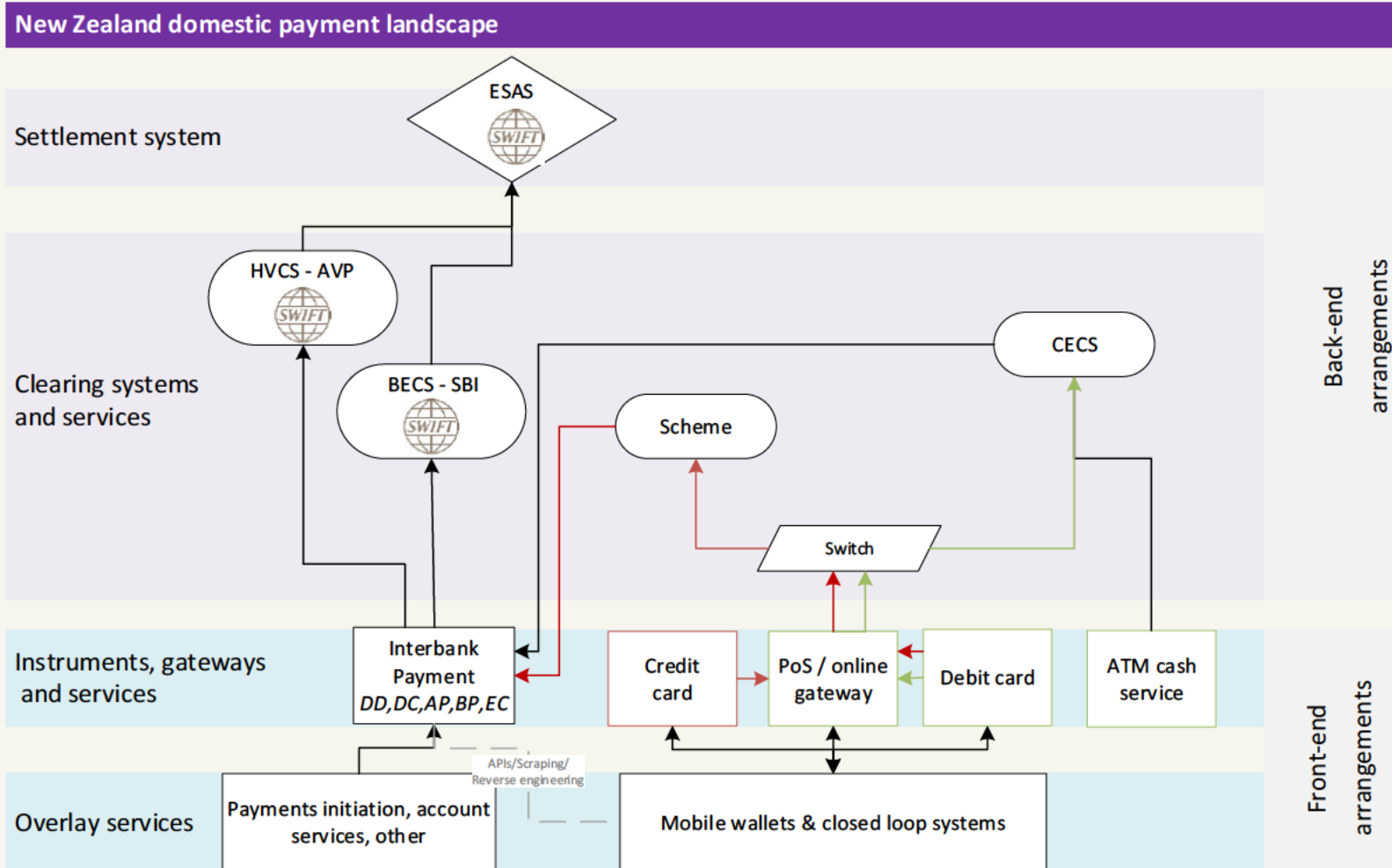


A vertical decorative bar on the left side of the slide, featuring a teal background with white geometric patterns. The patterns include a series of upward-pointing chevrons at the top and bottom, and a series of horizontal lines in the middle.

Interoperability of CBDC platform

Stylised view of NZ payment landscape

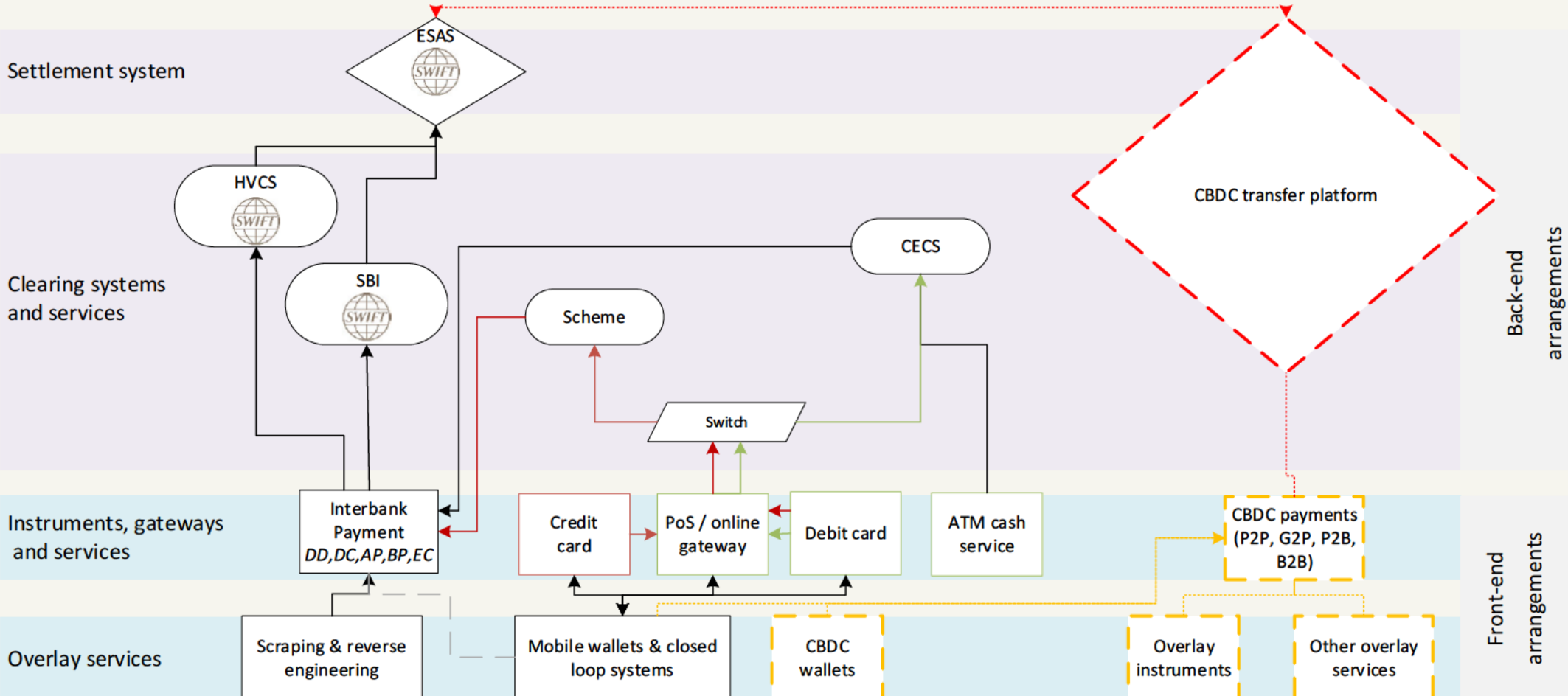
To help us think about how a CBDC platform might fit into this landscape



A CBDC platform: scenario 1



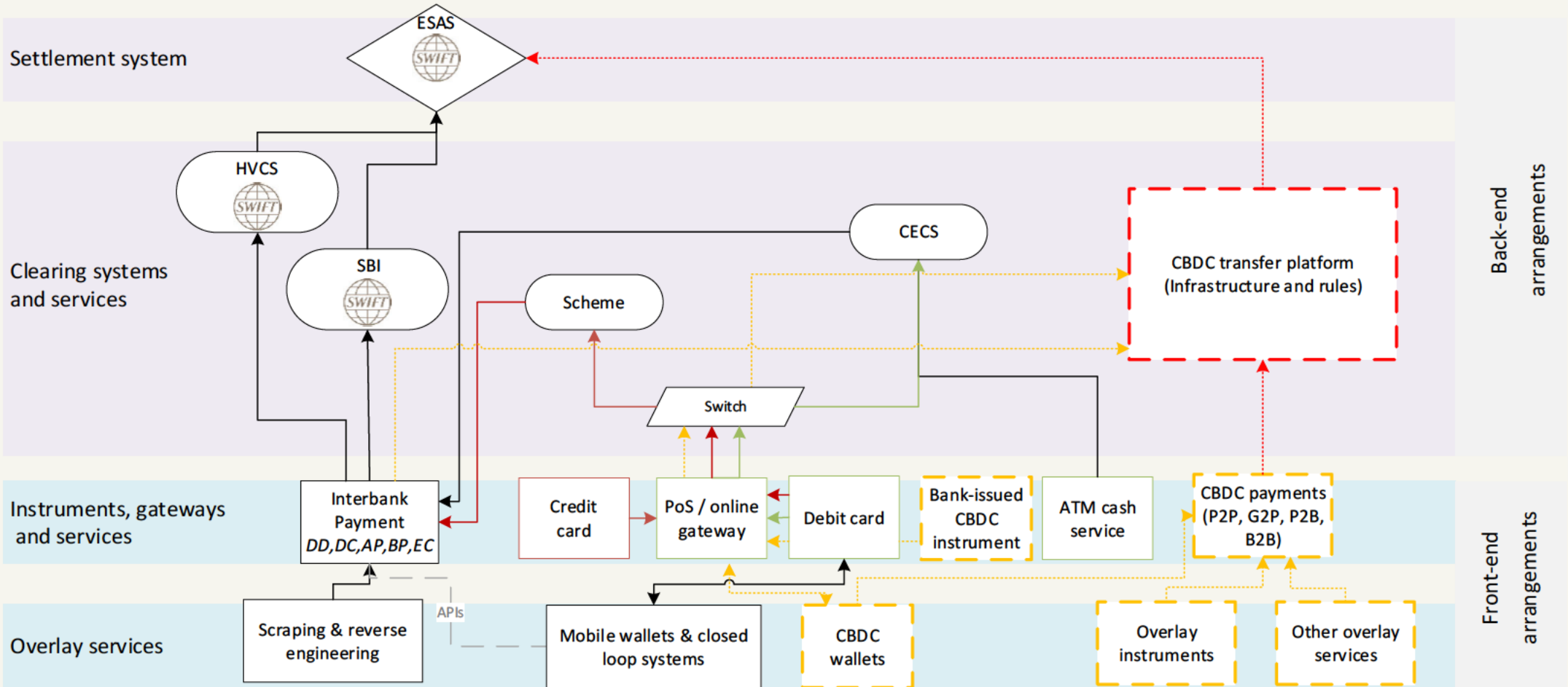
New Zealand payment landscape with low interoperable CBDC



A CBDC platform: scenario 2



New Zealand domestic payment landscape with high interoperable CBDC

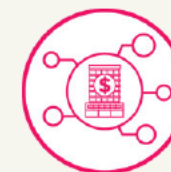


A vertical decorative bar on the left side of the slide, featuring a teal background with white geometric patterns. The patterns consist of repeating chevron shapes pointing upwards and horizontal lines, creating a textured, architectural look.

Partnership within the CBDC ecosystem

IN CONFIDENCE

'Single' tier CBDC ecosystem

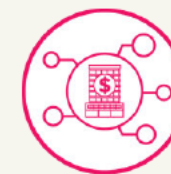


RBNZ provides all services and roles in the CBDC ecosystem

		RBNZ	Banks	Payment service providers	Fintechs
Back-end services	Govern	✓			
	Issue	✓			
	Transfer	✓			
Front-end services	Customer interface	✓			



Multi-tier CBDC ecosystem



The RBNZ provides core functions, and others provide other functions

		RBNZ	Banks	Payment service providers	Fintechs
Back-end services	Govern	✓			
	Issue	✓			
	Transfer		✓	✓	✓
Front-end services	Customer interface		✓	✓	✓



Exercise

1. Consider how certain design scenarios meet the Innovation criteria
 - Group 1 (in-room) - Low interoperable platform
 - Group 2 (in-room) - High interoperable platform
 - Group 3 (online) – Single vs multi-tiered ecosystem
2. Fill in your assessment in the table
 - Write 'High', 'Mid', 'Low' against the criteria
 - 'High' means it achieves it well, 'Low' means it achieves it poorly
3. Report back
4. General discussion



Example

Categories: High, Mid, Low

= the extent to which that benefit is achieved

Single-tier ecosystem	
Efficiency	High
Competition	Low
Interoperability	Low
Innovative	Mid
Reliable	High
Resilience	Mid
Safety	High



Item 4:

International developments

Topics

1. Overview of current CBDC work around the world
2. Case study: PRC's e-CNY
3. Intersection with the cryptoasset regulation
4. Discussion



1. Motivations for exploring a CBDC

Central bank approaches depend on their national context and objectives

Access

Access to Central Bank money

- Ensure citizens have universal access to central bank money
- More likely to be in response to reducing cash usage

Resilience

An additional payment method

- Options. Safety / robustness. Diversification.
- More likely to be in response to customer choice, payments structures and sovereignty

Payments

Increasing payments diversity & efficiency

- Innovation. Supporting digital economy.
- More likely to be in response to enabling innovation, and enhancing competition and efficiency

Inclusion

Financial inclusion

- Un/under banked. Inclusive financial ecosystem
- More likely to feature high cash usage and/or developing countries

Cross Border

Improving cross-border payments

- Reduce friction, improve speed, reduce costs.
- More likely to be major economies and trade hub countries

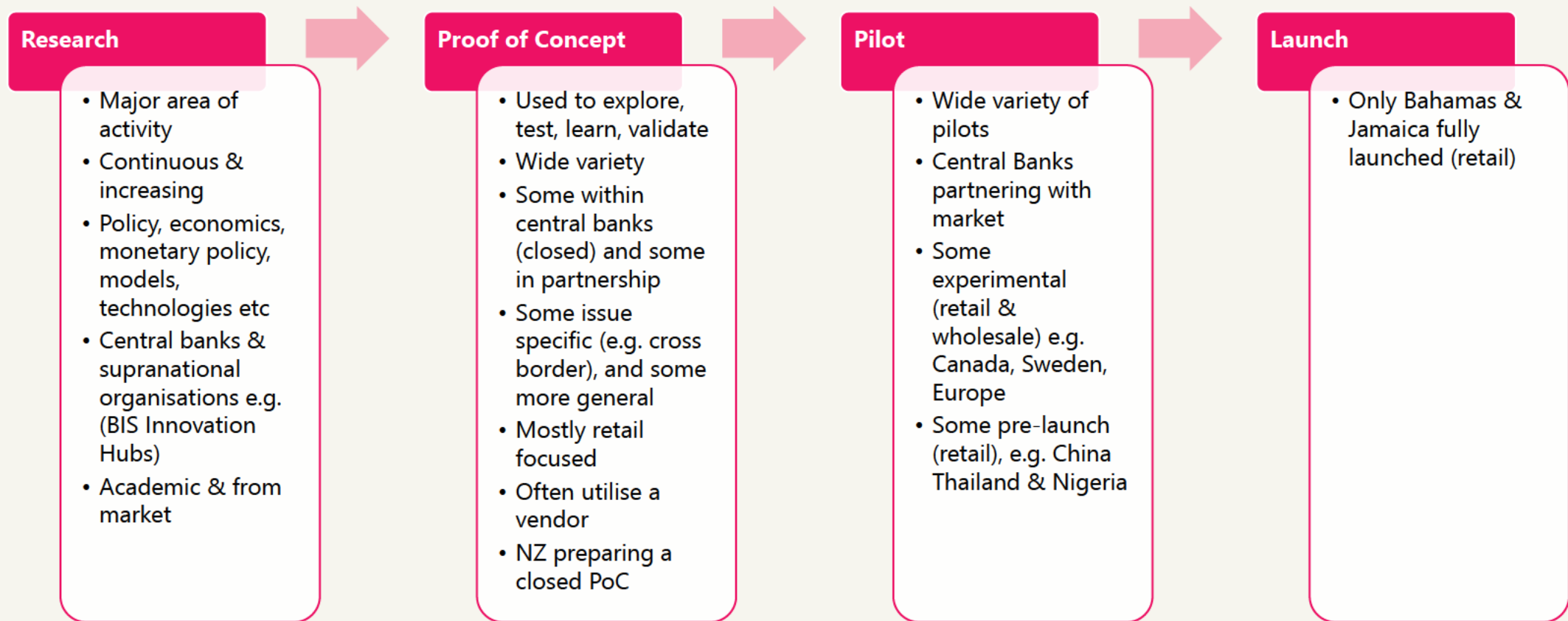
Fiscal / Monetary

Transmission & new forms of money

- Monetary policy implementation. Facilitating fiscal transfers. Rise of cryptocurrencies
- More likely to be focused on macro economic outcomes and in response to crypto currencies / stable coin

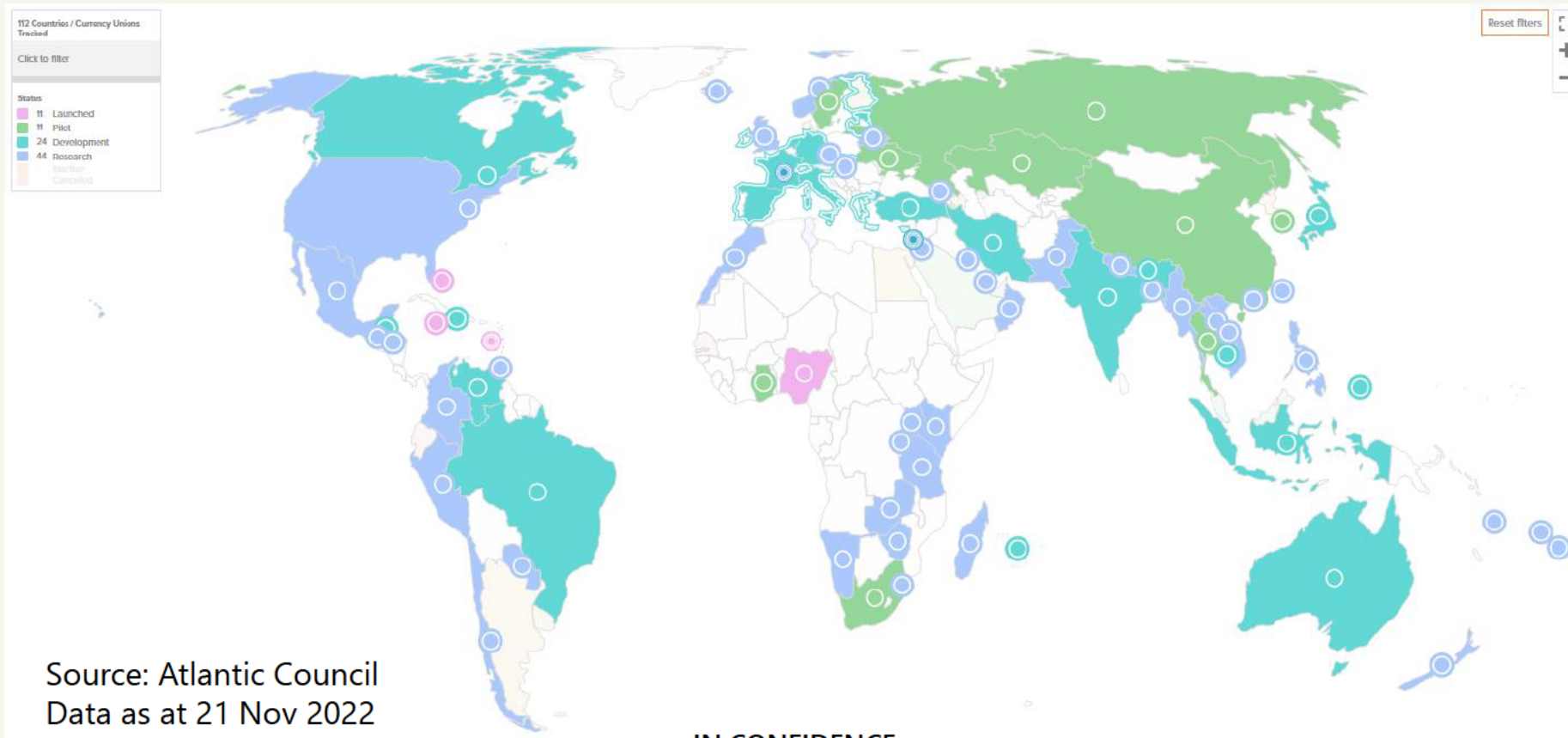


1. Activities: Development stages



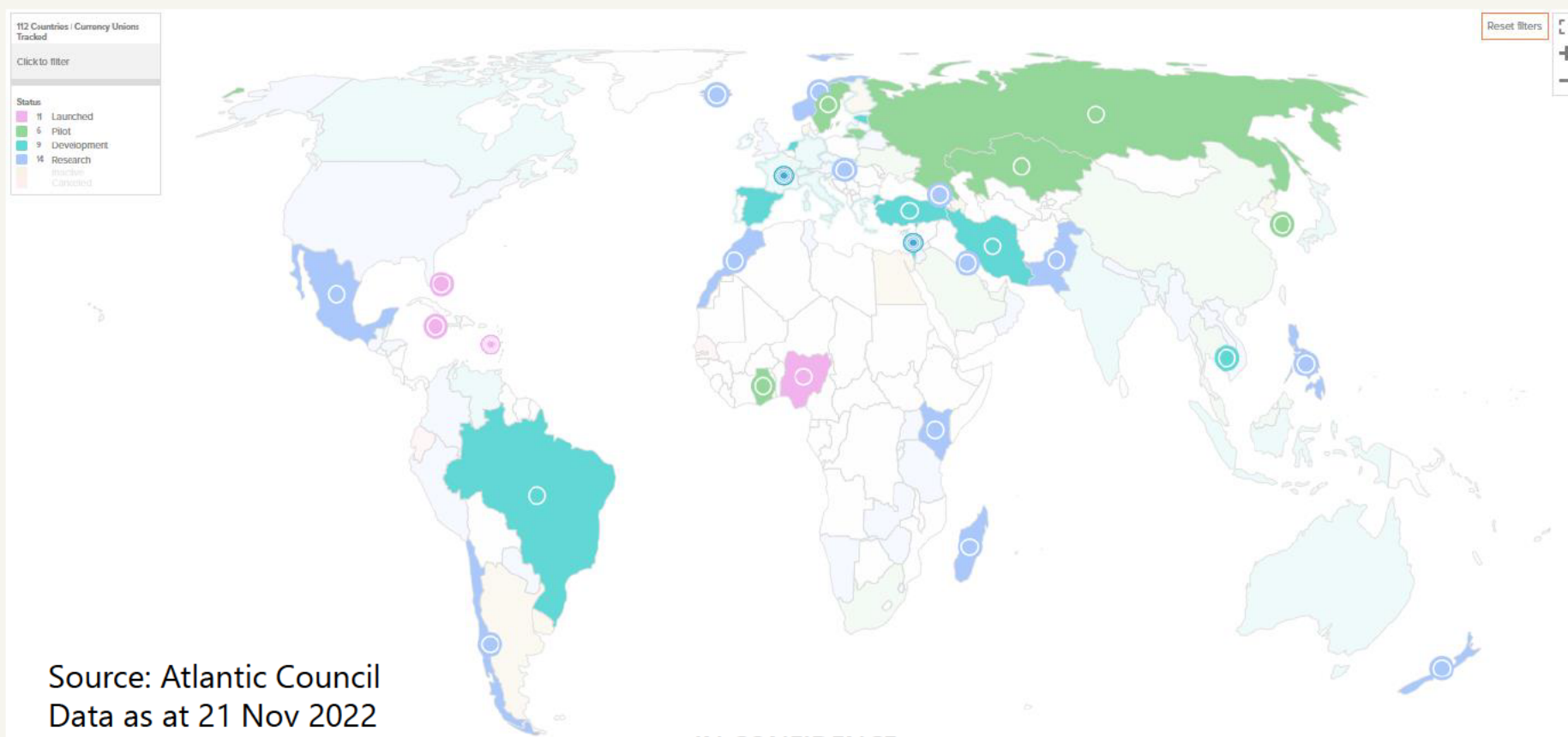
1. Statistics

Of the 112 countries / currency unions tracked by Atlantic Council, currently 90 jurisdictions are exploring a CBDC for retail use in some way



1. Statistics

Of these, 40 jurisdictions, including New Zealand, are focused a retail CBDC



1. Key recent developments

- **China:** Pilot targeting 150m people. Accepted 5.6m outlets. Expanding pilot scope & trial scenarios
- **USA:** Whitehouse led: 5x papers on objectives & design. US Treasury Future of Money and Payments.
- **Sweden:** Progressing work on impact e-Krona on economy, legal, design. Pilots
- **Hong Kong:** "preparing" tech & legal for launch. Research dual wholesale / retail platform (AURUM). Wholesale priority
- **Singapore:** Weak retail case. Laying tech foundations. Markets/wholesale focus
- **Australia:** Use case pilot. Extended application timeframes.
- **Thailand:** Pilot 10k users. Partnering 6 banks.
- **India:** Retail digital cash focus. Dual wholesale/retail platform.
- **E.U.:** Decide Q3 2023 if start 'realisation phase' (would then be +3 yrs launch). Collaborating 5 companies on user interfaces
- **Nigeria:** e-Naira integrated with Instant Payments system so customers transfer eNaira <-> bank account using
- **Supranational Orgs:** e.g. BIS innovation hub, ECB...

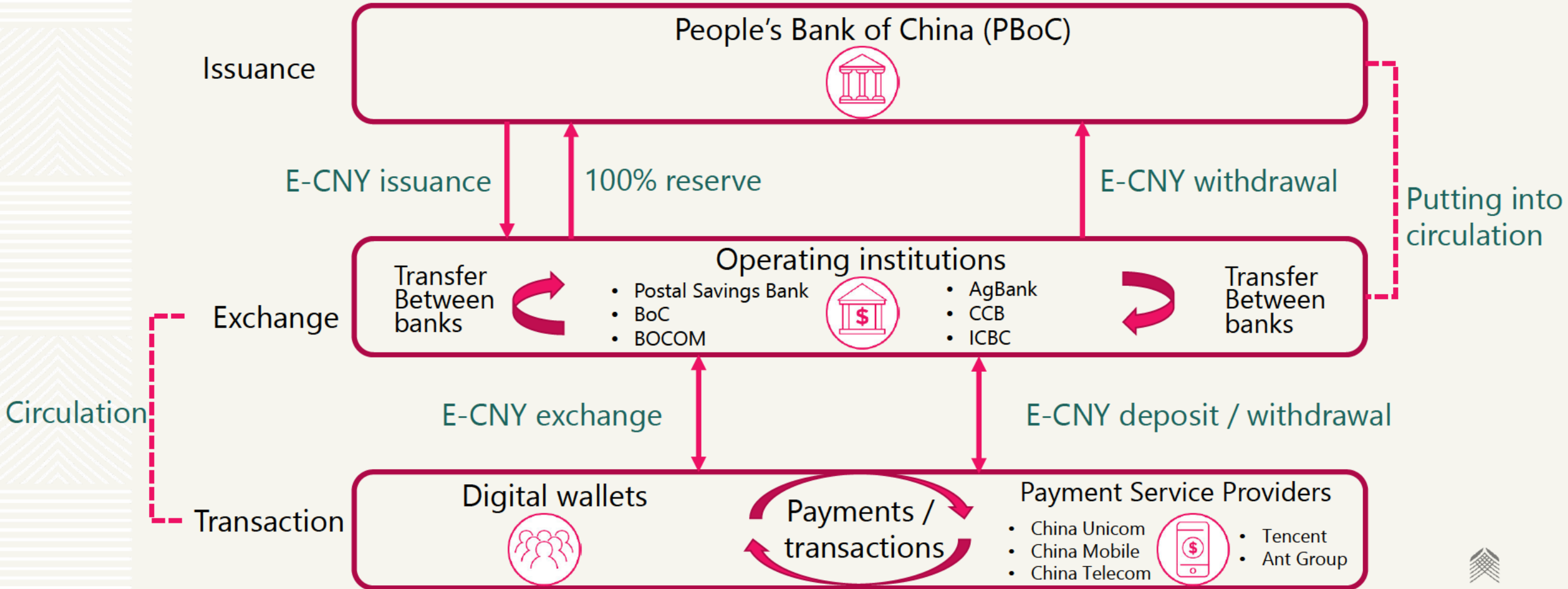


2. Case study: e-CNY

- Among the CBDC projects in the world, e-CNY is at the most advanced stage
- Previously known as Digital Currency Electronic Payment (DCEP)
- DCEP/e-CNY is a project run by PBoC's Digital Currency Research Institute (DCRI) and will constitute a pillar of digital finance
- PRC is considered to have a good basis to set up CBDC given its highly digitized economy, widespread use of private digital payment services, society's self confidence in using digital ID, and a stable governing body
- Its intent is to fully replace paper cash in 10-15 years, and to reduce the use of 'foreign' cryptoassets



2. e-CNY's two-tier operating system



2. e-CNY wallets – matrix system

Dimensions		Type of wallet				
By anonymity categories		Category 1	Category 2	Category 3	Category 4	Category 5
Management of anonymity		Strong	Relatively strong	Relatively weak	Anonymous (real name registration not required)	
Authentication		In person, ID and phone number	Remote, ID and phone number	Remote, ID and phone number	Remote, email or phone number (usually based on real-name registration)	Remote, email or phone number (foreign number permitted, usually based on real-name registration)
Connected account		Yes	Yes	No	No	No
Upper limits (RMB)	Balance	Unlimited	500,000	20,000	10,000	1,000
	Per transaction	Unlimited	50,000	5,000	2,000	500
	Daily	Unlimited	100,000	10,000	5,000	1,000
	Annual	Unlimited	500,000	100,000	50,000	10,000

2. e-CNY Basic requirements

Liquidity: Continuous value movement in economic activities as a means of circulation and payment

Storability: e-CNY is stored securely as electronic data on an institution's or user's electronic device

Offline tradability: When e-CNY is traded using electronic devices, there is no direct connection between the host or the system contact, and no data must be exchanged with other devices or systems

Controllable anonymity: to ensure the anonymity and untraceability of the transaction, no participant must know the owner or the ID information of the previous users, except for the monetary authorities

Forge-proof: The currency cannot be counterfeited through a variety of security technical means

Double-spend proof: the same e-CNY cannot be paid to more than one user or merchant in succession or at the same time

Non-repudiation: transaction parties cannot deny the occurrence of a transaction *ex-post*



3. Intersection with cryptoassets regulation

- Regulations underway/being explored in several key jurisdictions (EU, UK, Japan, Singapore etc./US & Australia)
- Generally targeting the same broad range of risks – monetary policy/sovereignty, financial stability, user protection, competition etc.
- Approaches vary but rarely outright prohibition (e.g. China) – with risks balanced against opportunities
- ‘Same-risks same-regulation’ principle widely accepted – need to establish what it means for money (vis-à-vis speculation/investment)
- The lack of a CBDC increases risks, but CBDC, private bank money and new private money can/should co-exist



4. Discussion – starter questions

Leveraging

RBNZ is well connected and proactive

- How can NZ most effectively leverage international activities that are aligned to our context?

Cryptocurrencies

RBNZ is releasing an issues paper on private innovation in money

- How relevant is the global trend towards regulation of crypto assets to CBDC?

CBDC designs

Setting aside the motives for exploring a CBDC, there are some interesting design considerations

- To inform our CBDC designs thinking further, what examples have you come across that we might explore?





Reserve Bank
of New Zealand
Te Pūtea Matua

Item 5: Member-led session

Distributed Ledger Technology (DLT)

s 9(2)(g)(i)

Item 6: Open discussion

Item 7:
Tākai | Wrap up

Robbie Taylor



NGĀ MIHI.

Distributed Ledger Technology (DLT)

November 2022

The brief for this presentation

- Presentation (and discussion) for participants to:
 - “learn unique benefits DLT may provide, that cannot readily be done by the existing systems that the average user is familiar with

And

- Not be over technical

Outline

General things:

- DLT requires paradigm shifts in thinking
- Key word – “Depends”
- Response to: “We can already do most of the individual things”
- Response to: “But you can do all of this using a centralised database”
- Not all about decentralisation / no trust / cutting out intermediaries etc

More specific:

- Programmable money
- Automating and enforcing business logic
- “Payments” in the metaverse
- Digital Assets
- Ways of structuring/running organisations

DLT requires paradigm shifts in thinking

- Can be difficult for people immersed in an industry way/way of thinking – have been (understandably) conditioned to think that way
 - On the other hand, people in an industry know what the limitations of existing ways of doing things are and where improvements can be made
- Move from expensive (and often useless) ex-post monitoring to ex-ante enforcement





NO ENTRY
Please report
to reception

DLT requires paradigm shifts in thinking

- And not just a case of sticking tech into existing system – if you do you get a bit of improvement but not the full benefits



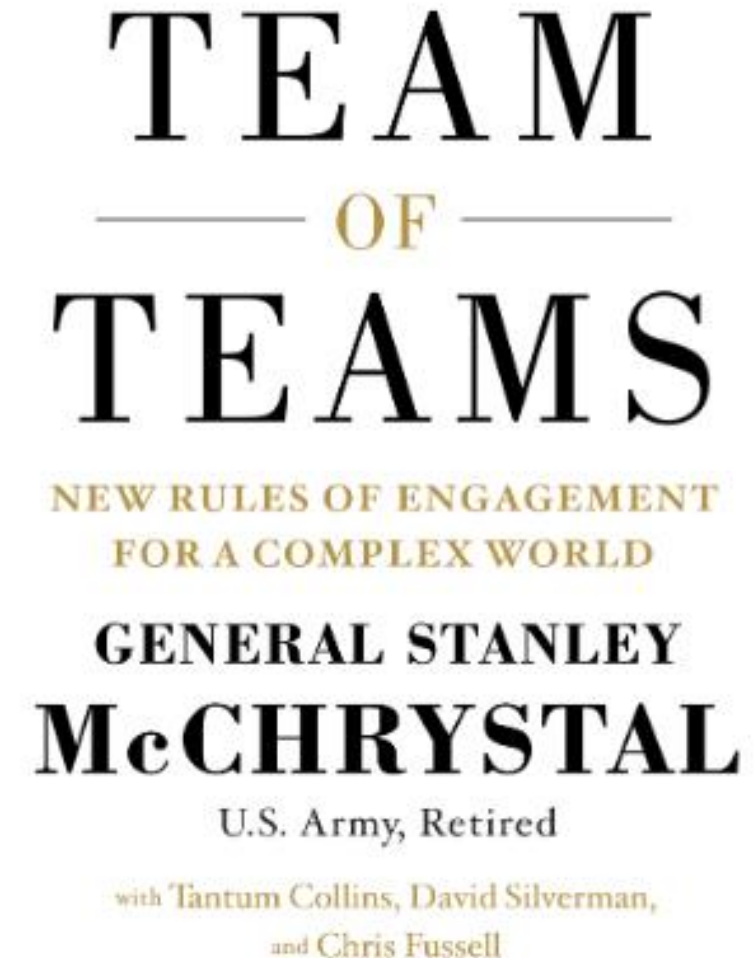
DLT requires paradigm shifts in thinking

- Example of limited use of tech, ie sticking it into old ways of doing/thinking:
- DLT can be used for digital identity and credentials
 - Create more secure forms of ID/credentials - (most current forms of ID documents/credentials (eg uni degrees) are terrible as relatively easy to forge and limited checking of veracity)
- But still the case of organisations (agencies) holding information about individuals:
 - So individuals have no protection about the use of their information
 - Sure there is the law... (but that does nothing to actually protect individuals...
- So to better protect people/increase utility/accuracy etc, DLT being used so that individuals:
 - hold their personal information and grant access to that information on their terms,
 - Including often not revealing the actual information, eg actual date of birth, only that they are above a certain age

DLT requires paradigm shifts in thinking

- We live in an increasingly complex world
- Complexity is not confined to DLT
 - Many/most people here are experts in complicated systems, which are linear
 - If you haven't read this book yet, strongly suggest that you do:

"In addition to being a fascinating and colorful read, this book is an indispensable guide to organizational change." –WALTER ISAACSON, *from the foreword*



Key word – “Depends”

- Almost nothing can be said for certain, lots of different types of DLT, lots of uses etc, so it all depends on what is being talked about

“We can already do most of the individual things”

- Maybe/maybe not:
 - The things that are currently done are not connected within the same system, ie fragmented between organisations/held in silos
 - High transaction costs
 - Limited or no visibility and rarely in real time
 - Security issues (both external and internal)
- The use of DLT enables things that we can't foresee:
 - Most people are currently in the equivalent of 1994/1995 in relation to the internet – ie heard something about DLT, but can't really see the relevance (see video next slide)



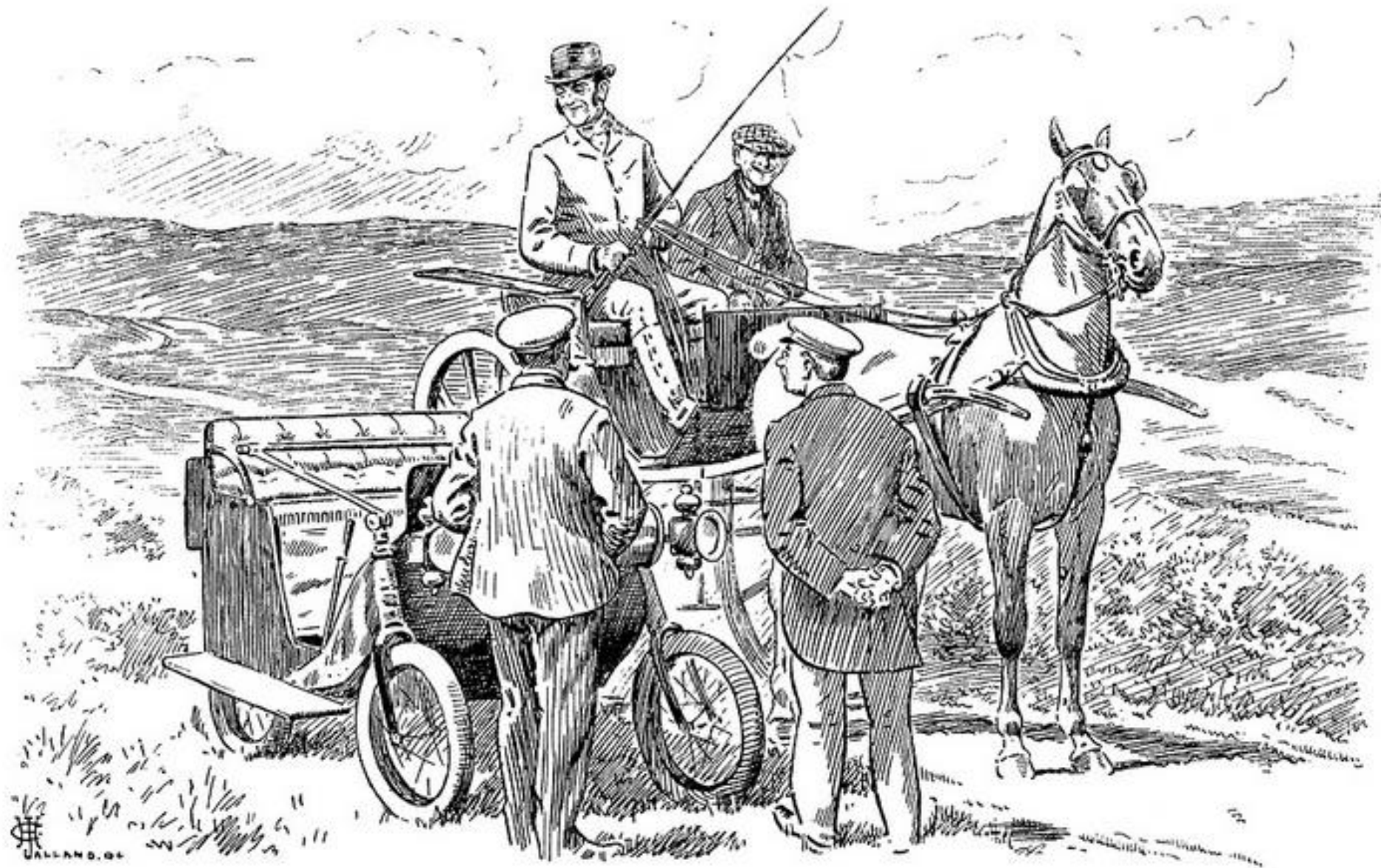
Cryptocurrencies and blockchain [DLT] have been described as the first technology that is:

“just fundamentally difficult for otherwise intelligent and highly capable people to comprehend”

(Radical Technologies)

“But you can do all of this using a centralised database or centralised databases”

- Yes, maybe you can but:
 - It hadn't been thought about before – so DLT opened up new ways of thinking; and
 - Can you really do all of this?
- And, yes centralised databases may be faster/more efficient now, but new tech in the beginning is never as good as the tech it replaces:



THE RIVAL FORCES.

SCENE—*Lonely Yorkshire Moor. Miles from anywhere.*

Passing Horse-dealer (who has been asked for a tow by owners of broken-down Motor-car). "IS IT EASY TO PULL?"
Motorist. "OH, YES. VERY LIGHT INDEED!" *Horse-dealer. "THEN SUPPOSIN' YOU PULL IT YOURSELVES!"* [*Drives off.*]

Not all about decentralisation / no trust / cutting out intermediaries etc

- DLT often used between trusted parties
- And, DLT (and blockchain generally) is better thought of as confidence machine, see [“Blockchain as a confidence machine: The problem of trust & challenges of governance”](#)

More specific

Programmable money

- Examples:
- When parts/components of goods delivered/services provided payments made (through smart contracts):
 - automatically and within seconds – and can include micro transactions:
 - So no going out to the traditional (expensive) payment rails
 - Payments in real time, transparent (to those given access to the information) and can't be altered
 - and it isn't just the payments being made through the one system,
 - can have as much or little visibility of the documentation (which can't be tampered with) on the same system – eg who and how were the parts made etc
- Prevents “wrongdoing”:
 - Can specify who receives the payment, not just that payment, but the money full stop
 - Limitations could be imposed just on the first payment or for a specified time or for all time
 - (And removes the costs of reporting, which again does nothing to stop wrongdoing and is extraordinarily expensive)

Automating and enforcing business logic

- Following on from last slide
- Preventing unauthorised expenditure:
 - Can set it up so that needs say 5 people to (digitally) sign a transaction, one person (or more) can't forge signatures

“Payments” in the metaverse

- Increasingly people are moving their activities to the metaverse – esp young people
 - Businesses are following them, eg [Nike](#), [Adidas](#), [Microsoft](#), [Meta \(Facebook\)](#)
 - As are governments/cities: [South Korea](#), [Dubai](#),
 - And the organisations advising businesses/governments: eg [EY](#), [KMPG](#), [PWC](#),
- How will payments be made in the metaverse?
 - Not through bank accounts!
 - Credit cards/PayPal?
 - Expensive and inefficient
- Other payment mechanisms more likely to be used:
 - Google Pay/Apple Pay
 - Alipay/WeChat
 - Stablecoins
 - Crypto
 - CBDCs

Digital Assets

- Just “payments” is linear thinking
- Increasing use/trade of digital assets/credentials etc, combined with digital identity (and more) =
 - Current payments woefully inadequate – banks continuing with current payment rails in danger of becoming the buggy whip makers

Ways of structuring/running organisations

- And the use of DLT and tokens allows for the creation of:
 - Decentralised Autonomous Organisations (DAOs)
- DAOs are no longer obscure (and the multinational Haier is essentially operating under a DAO like structure):
- DAOs (while early in their development) are controlling billions of dollars in assets (see eg DeepDAO)
 - Australian Government working on changing its corporations law to accommodate DAOs
 - UK Law Commission (this month) released a call for evidence for DAOs as it has begun work on aligning UK law to accommodate DAOs:
"Our work will aim to build consensus on the best ways of describing the constituent elements of DAOs and to highlight ways in which the law of England and Wales might foster their development."

<https://www.afr.com/companies/financial-services/dao-consultation-will-involve-thorny-questions-on-responsibility-20220324-p5a7l>

<https://www.lawcom.gov.uk/project/decentralised-autonomous-organisations-daos/>

<https://news.bitcoin.com/uk-law-commission-seeks-evidence-on-daos-expert-says-new-legal-forms-are-required/>

Summary

Subject	CBDC Forum 3
Meeting Date	30 November 2022
Meeting Time	10:00am
Venue	RBNZ and Microsoft Teams
Attendees	Members: Adrian Smith, Alexandra Sims, Andrew Dodd, Conrad Morgan, David Corbett, Jane Retimana, Jennifer Ferreira, Joanne Dacombe, Mitchell Pham, Paul Quickenden, Simon Jensen, Brian Bonar, John Warwick. Reserve Bank: Amber Wadsworth (AW), Makoto Seta (MS), Robbie Taylor (RT), Samuel Kirk-Reeve, Tim Duston (TD), Navina Soondram, Andrew McCallin, JC Somers (JCS).
Apologies	Fran Strajnar, Michelle Kitney.

1. Welcome & update from the Reserve Bank

RT welcomed the in-person and online members to the third meeting of the CBDC Forum. Andrew McCallin and Navina Soondram from the RBNZ, both of whom have recently joined the team working on CBDC, were introduced. Forum member Steve Mander from BNZ is no longer available to participate so the RBNZ have gone back to those who had expressed interest, with new members Mitesh Mistry (Kiwibank) and Lee Timutimu (Arataki Systems) joining the Forum from 2023.

RT then provided an update on the Reserve Bank's CBDC work programme. The team are currently still at Stage 2 'define' of the programme. Some in-user research is about to be commissioned in order to get a better understanding of what users want. The findings of this will be published later in 2023. Additionally, work is ongoing to look at the necessary building blocks to design a successful CBDC platform and ecosystem. This in turn will help inform what will be tested in the Proof of Concept (PoC) work. The PoC Request for Proposal (RFP) was released to market last week, with responses due early in the New Year. Once a preferred vendor has been found and the work has started, the Forum will be given a briefing on this, with the opportunity to engage on issues that the PoC explores.

Proactive engagement with key stakeholders is continuing, with regular sessions with the Retail Payment System Act team at the Commerce Commission. A successful workshop was also held last week with payment service providers. There is a private innovation in money issues paper being published on 7 December, which is open for feedback until April 2023.

One Forum member asked if it would be possible to get a draft timeline for 2023/2024 to help them understand the timings of the various streams of work.

2. An Innovative CBDC: Session One

AW presented the topics of innovation and integrity (refer to the slides of this session).

AW talked through the innovation aspects of CBDC and the need to define what it means to enable innovation. The overall policy goal is to be able to formulate a set of guidelines with a focus on innovation and integrity. She advised that while this session is focusing on these two aspects, there are a myriad of other aspects that are not being covered today. In addition, what is being shared today is RBNZ's current findings and thoughts as at this point in time, all of which are subject to change as we move forward.

Exercise one: Respond to the below questions:

Set 1: Money and Payments NZ

- a. What are the opportunities and future trends in money and payments in NZ? i.e. structural, features, functions.
- b. What are the pain points in money and payments in NZ? i.e. structural, features, functions.

Set 2: What are the opportunities for a CBDC?

- c. What the opportunities for a CBDC? Efficiency, resilience, innovation?
- d. How might an innovative CBDC spur other innovations in NZ?

The following themes were raised by members.

Context and opportunities:

- Stack of use cases – payments to smart scenarios – are opportunities to address pain points. These opportunities and pain points are two sides of the same coin.
- Opportunity to open up/allow service provider to provide services without relying on other parties.
- Market dynamics, balance between actors and competition.
- Cross border efficiency.
- Improved settlement and hours of opportunity.
- Risk and regulatory safety.
- Data-enabled opportunities.
- Innovation in products and services.
- Enabling digital economy, financial innovation, data etc.
- Opportunity to provide lower cost payments
- Online reach to all of NZ – resilience, offline mode.

General thoughts from the group following this session:

- One member felt that what was presented today was too subjective and there may not be clear evidence to back up the claims mentioned in the presentation. They would appreciate the group being asked for their feedback and if they do in fact agree with findings that are shown.
- One member asked whether RBNZ has an issue with Payments NZ, and if so, would appreciate a clear policy directive because many of the issues raised in the CBDC project have not been raised before by RBNZ. AW reiterated that nothing being presented today reflects RBNZ policy.

Rather the points made are conversation starters in order to engage with Forum members to gauge their thoughts.

- Efficiency needs to be looked at from a NZ perspective. A CBDC needs to look to the future, and future focused trends.
- Might be better to use the wording of 'themes' instead of 'pain points' Where does CBDC fit in the mix of all these things happening, i.e. DLT, stable coin. etc.?
- Open banking – while this is not progressing as fast as one would like, one member stated that there is substantive progress and partnering with banks is beginning to occur.

3. An Innovative CBDC: Considering Innovative Designs Session Two

AW spoke to her presentation for this session (refer to the slides). The Forum considered whether a single- or multi-tier system would be more appropriate. A single-tier system would be one where the RBNZ would provide all the roles and services versus a multi-tier system where the RBNZ would provide the core functions but allow intermediaries to provide other functions. In terms of a payment system, to be efficient you need a scalable and efficient network where people and businesses want to both use and accept it. As well as that, an area to explore is whether government entities would accept CBDC, which would increase usage?

For the exercise, the following were the trends that people saw for the scenarios given:

- Highly interoperable platform:
Overall view – low to medium efficiency gains. Using an existing infrastructure. Just adding a payment type in the current ecosystem. Generally adding to existing, which won't make things more efficient. Points of failure need to be reduced.
- Low interoperable platform:
Competition is low. Interoperability very low. Innovative mid to low. Resilience mid as it would allow people to use CBDC if other payment systems went down. Safety mid to high. Would be lower if it were a better asset. Question remains of how do you design the asset itself?
- Multi-tier ecosystem:
Organisation between the platform and the end user. Efficiency is considered to be low-medium if there is a lot of duplication. Multi-tier may not drive efficiency but does enable competition. The CBDC platform should be more of an open platform. Interoperability is considered to be medium-high. Innovation high.

Efficiency comments were mainly concerned with the extent of duplicating similar infrastructures and functionalities.

4. A member commented on banks and innovation, and how they may respond to the risk of disintermediation. An integrator and/or interoperability between all of the customer's CBDC wallets (should there be multiple ones) would be a useful service. **International Developments**

Overview of international CBDC activity

The RBNZ team presented that to understand global CBDC, it is important to take into account the starting context and the underlying drivers of each country, and how this shapes their CBDC explorations. This shapes whether a country, for example, is focused on cross border payment use cases, financial inclusion, innovation in payments, etc.

The second thing to note is where we are in the overall maturity cycle – very few central banks have issued a CBDC. Most of the global activity remains in the research and proof of concept/testing stages.

A snapshot of retail activity in CBDC globally:

- There has been a surge of activity in the last six months,
- The USA who have published their thinking through the White House.
- Sweden is continuing pilot work and technology exploration. They are an interesting jurisdiction due to their highly banked population, digital penetration and modern payments system.
- Hong Kong and Singapore are focusing on wholesale CBDC, which reflects their focus on being trading hubs.
- Australia has an interesting pilot process with a stronger market response demand than expected.
- India have a dual platform and their representation of money is in digital notes, a fairly different tack.

Members asked about the use case for wholesale in HK and Singapore. TD noted it is an adjunct to trade finance. AW noted wholesale payments systems allow tokenisation of securities that support delivery versus payment wholesale use cases. Members queried the purpose, and AW suggested it is efficiency gains as well as potential liquidity benefits.

Members query if the use cases in Australia could be shared to inform the Forum's discussion of CBDC relevance - RBNZ noted it is too early to know at this stage.

Members asked about the UK approach. MS noted that CBDC is not as necessary due to the innovation in that jurisdiction. AW noted that the Bank of England was one of the first to discuss the technology behind a potential CBDC. They renewed the focus after Libra, with advanced economies establishing work programs for that.

MS noted that half of the 40 jurisdictions are considering an intermediated model for a retail CBDC.

The case study of e-CNY

This is a state led initiative since 2014, and their current five year plan is to develop CBDC, part of a supply-side reform program. There are billions of yuan currently in transaction. The People's Bank of China (PBoC) has a research institute called Digital Currency Research Institute. It runs 24/7 online and offline. They have loose coupling of bank accounts with e-CNY.

The public motivation is the reduction of costs, preventing illegal use, financial inclusion and responding to a market duopoly in digital money.

They take a conventional two-tier system using the six state-owned banks, as well as two digital banks (Alipay and TenPay) as operating institutions, referred to as Tier 2 institutions. Transactions are managed by banks and PSPs, referred collectively as Tier 2.5 institutions.

MS outlined two main points

1. Five levels of anonymity (the so-called managed anonymity) is one feature embedded in their product
2. They use a hybrid architecture, not entirely using DLT or a traditional architecture

Managed anonymity – there are tiers of anonymity with more anonymity reducing the amount and frequency of transactions allowed. This could enable low value transaction use cases for foreign

tourists without the stringent identity documents or bank account requirements. PBoC is prohibited from divulging information to other ministries, unless the law allows them to - this may limit the genuine nature of the anonymity.

Two parties are allowed to be offline and transact, which is part of the inclusion agenda. They have credit card-sized cards with chips to help exchange through the system.

Members questioned the use case of e-CNY. Their goal is not to use cash at all. Members speculate that the blockchain capability for smart contracts etc. to be tied together.

MS noted the government mandating and incentivising the use of the e-CNY to drive uptake. The number of individual wallets increased from 123 million in Oct 2021 to 261 million over the course of the 2022 Olympics . However, the actual average transaction amount is roughly \$50.

Members noted the geopolitical aims of the cryptocurrency for international exporters. MS noted the similar motivation for Nigeria in exploring their own CBDC, to counter the dollarization (by both fiat currencies and cryptos) of its economy .

Cryptoassets and regulation

There is a clear trend of consideration of regulatory frameworks for crypto assets. Most countries are taking a 'same risk, same regulation' approach. However, because regulation cuts across money and consumer protection, it is important to talk about what crypto can mean for money. Finally, the risk of stablecoin or cryptoassets increases if there is no competition from CBDC. The RBNZ is open to competition and the instruments coexisting for the benefit of consumers.

Members asked whether the regulatory definitions have been explored. For example, legal tender is not defined by statute.

Members also noted that from a business emergence perspective they want a one-stop shop rather than many options to connect with.

Members also asked about next steps after the consultation. RT noted the issues raised are system issues and it is important to start the conversation even when other agencies need to be engaged. We have our own priors on monetary sovereignty but there are other essential elements such as consumer protection.

Members asked what 'fostering choice' means. RT noted the issues paper requests feedback on all these questions, but that innovation should be fostered where it can be done safely. JCS noted that there are ways of making these elements balance.

Members noted that too many integrational layers can be challenging but as a retailer you want choice of what payment types one accepts. In terms of crypto, is that one payment type or multiple payment types?

Members noted the availability for choice but with rules e.g. credit risk, 1:1 backing, and positive/negative interest.

Another member noted that they can only be regulated where it is on a permissioned blockchain in NZ.

Members asked if there is a practical way to stop the use of an overseas CBDC in NZ. A viable alternative is the easiest option. One must lose confidence in the NZ currency for other currencies to be accepted. One member outlined that a risk is that a large company experiences mercantilism where they have benefits when they are paid by a particular currency.

5. Member-led session: Distributed Ledger Technology

s 9(2)(g)(i) led the discussion by outlining that distributed ledger technology (DLT) requires a paradigm shift in thinking. It can be difficult for people immersed in the industrial era thinking, conditioned to think in a certain way to achieve an objective. On the other hand, people in the industry do know what the limitations are of the existing ways of doing things and where improvements can be made. Analogies: An architecture can be used to support a rule not to go somewhere, and DLT operates as a physical wall to prevent someone going where one shouldn't. The advent of steam engines ushered the move towards having one large motor that is more efficient than many small steam engines, but if broken down, it is more problematic. The trains with engines on each were the ones to survive.

Even with existing identity information, our information is digitised and held, leaving little protection for the individual. The law is useless once the information is already gone. DLT allows a person to hold their own personal information and then allow access to some. A current process where ID is used in this way is when a driver's licence is shown to a shopkeeper to buy alcohol.

When people say they can already do most of the things DLT allows, it depends. The things that are currently done are not connected within the same system, which can mean: high transaction costs, limited visibility and infrequently in real-time, and security issues.

s 9(2)(g)(i) responded to a question on centralised databases. They may be faster and more efficient now, but that is the case of all new technology just starting up. It is after something reaches its height (like the commercial banks are now), then it will start to decline. Industries do not survive innovation.

s 9(2)(g)(i) discussed programmable money. Examples of this are when parts or components of goods are delivered (or services provided) and payments, through smart contracts, are made automatically and within seconds (can include micro transactions). One can specify who receives the payments, thereby preventing wrong doing the associated cost of reporting wrong doing.

On digital assets –the member highlighted how Roblox is being used to buy certain skins in video games. What will happen in years to come is that the older, original skins will be highly sought after, which will in turn create a market for them.

s 9(2)(g)(i) also noted that for banks, there is a fine line between business as usual and also trying to move forward with innovation. There isn't enough money available for innovation when there is so much being spent on regulation. The member also discussed decentralised autonomous organisations (DAO). For example, someone setting up an online gaming system could do it the traditional corporate way or as a DAO. Governments around the world are changing their laws to accommodate these.

We don't know where the innovation will happen and we cannot predict what will win in the end. From the the RBNZ's perspective, one needs to look at what are we doing to allow others to take advantage of current trends for the betterment of New Zealanders.

Digital ID in NZ can be an enabler for solving a lot of problems. Blockchain DLTs are general purpose technology, which are very powerful.

6. Open discussion

Robbie asked the group if there were any particular themes people wanted to talk about or reflect on.

- Issue of fraud. Need to keep this in front of mind when thinking about the design of a CBDC. Whether digital IDs identify or authenticate their customers. Example was made about real-time fraud detection and the amount of time and money spent on this in the UK.

- How do you authorize spending? This is on the list of issues that the RBNZ is looking at. Confirmation of Payee in the UK. Centralised database, would validate the payee with the correct account number.
- There is so much in the fraud world. It is just an element, but comes down to who is issuing and how does it work? Need to have layers of defence available to combat fraud.
- If a CBDC were to have a level of anonymity, could it be used in a wallet without having your data stored or collected? If there is money available, maybe start piloting and then you would be able to start answering questions that you currently have. Hard to stay in a theoretical position for a long time. PoC is going out and this will help us do more pilot-related work, and allow one to interact with stakeholders and play with real money. For the PoC, need to have a starting point and think about what is it that you want.
- Monetary sovereignty is important to have. People will be more comfortable using a digital currency that suits their values. There are real choices to be made here. If you don't own it, you can't control it.

7. Wrap up

RT updated the group of the dates for the next Forum to be sent out next week or so, with the first meeting to occur late February or early March. We will have a POC provider by then and talk about this a bit more. We will also have s 9(2)(g)(i) talk to us about accessibility issues. Dates will also be sent out for the subsequent session during the first half of next year.

A member asked whether the Forum could have a compressed timeline going forward, with less time spent in the sessions. They also requested that a more thorough pack be sent out as some of the presented slides were not included in the pack. Another member asked if we could compress the timeline of the session – i.e. reduce the time spent in these sessions. They said that it would be good to have the pack pre-read beforehand and then talk to the main points. One member suggested having two full days in person where everyone talks everything over. This would have to be towards the second half of next year when there could be a bigger package of information available to share. Need to make sure that it's a good use of everyone's time. Would like to have this forum brought to them before going out publicly. Nothing is being withheld, gaps are genuine. There will be a big coming together of the work in which case it would be good to have everyone decide.

How could this Forum help compress the timelines? What practical constraints are there? Legal? Designs? The Forum discussed RBNZ setting 'homework' for some representatives on the Forum that takes advantage of their respective expertise, and have this feed back to the Forum.

2024 is when there will be an opportunity for acceleration. At this stage, we will ask homework of forum members.

RT thanked everyone for attending.