



**MONETARY AND
CAPITAL MARKETS**

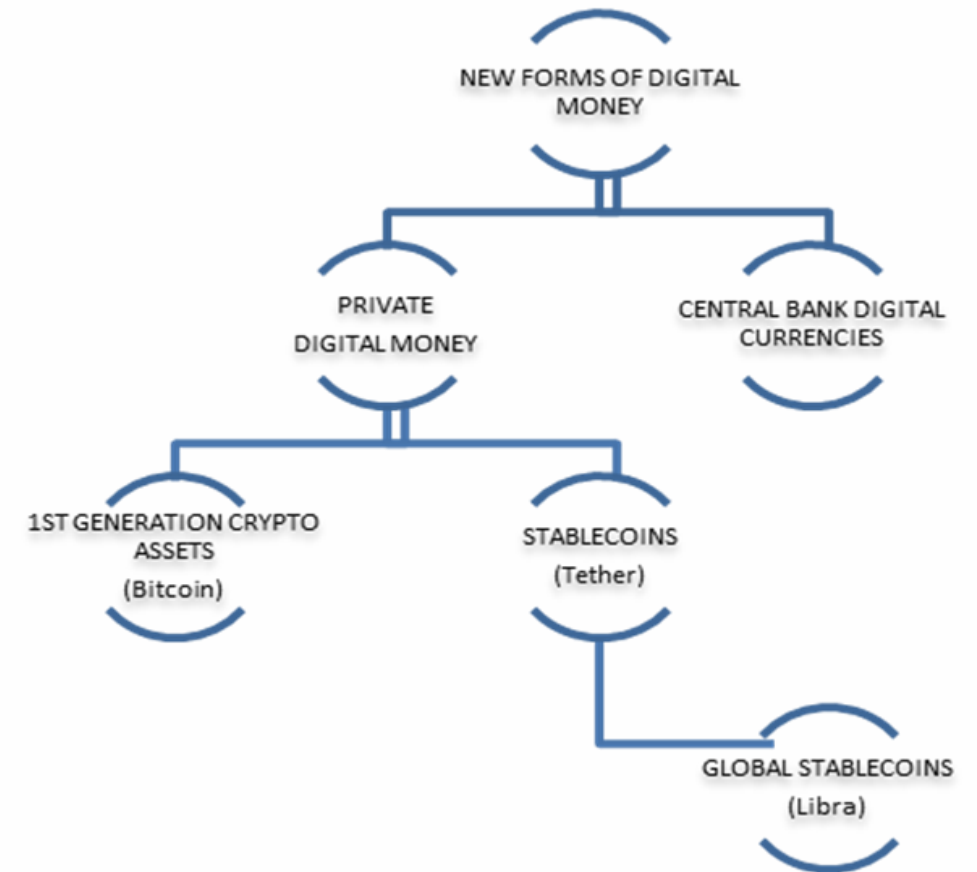
Central Bank Digital Currency (CBDC): Concept & Considerations

DECEMBER 15, 2021

**ARIF ISMAIL
Deputy Division Chief**



Rapid progress in digital technology creates new forms of digital money



Agenda

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CBDC: What is it?

2

Progress: Who is issuing it & how extensively?

3

Motivation: Why issue it?

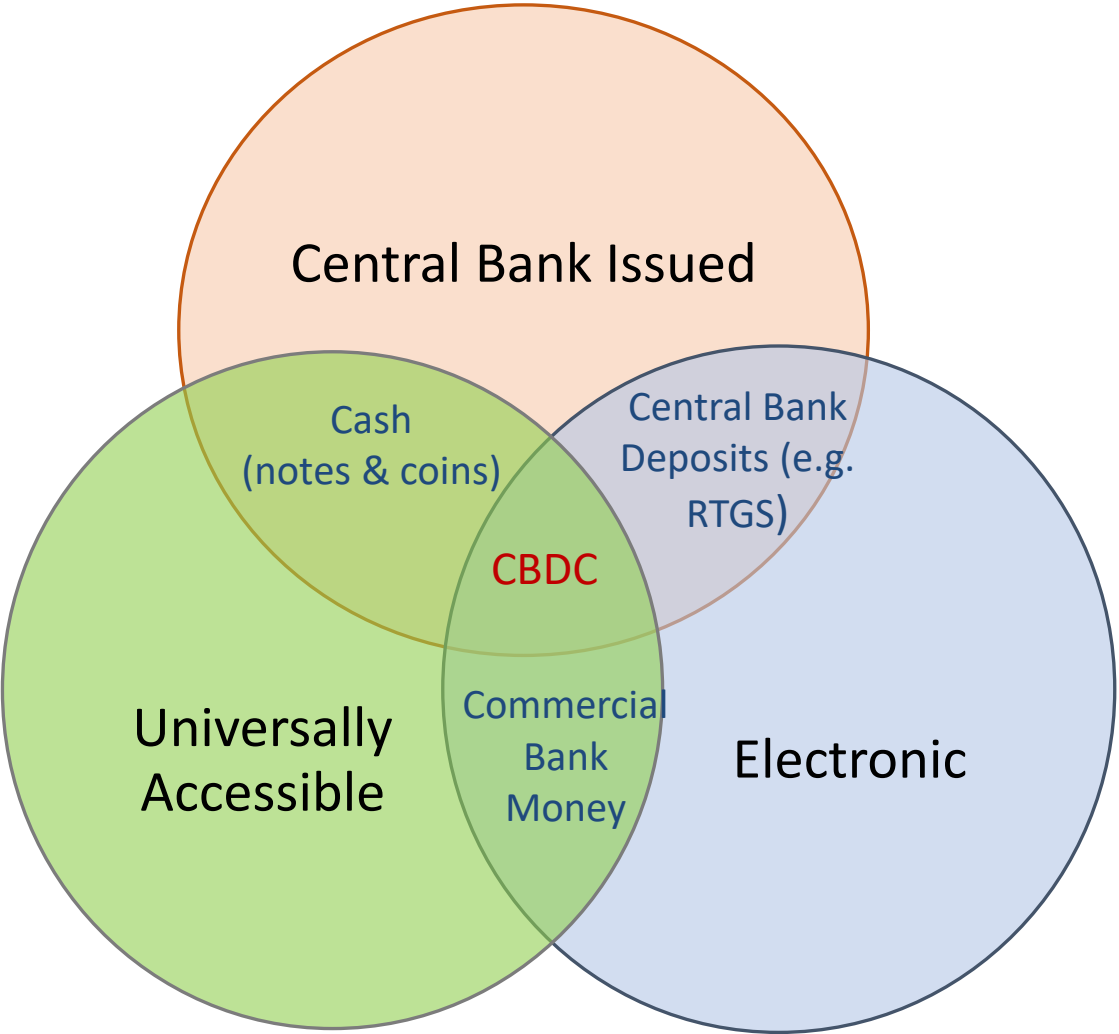
4

Design considerations & (unintended) consequences

5

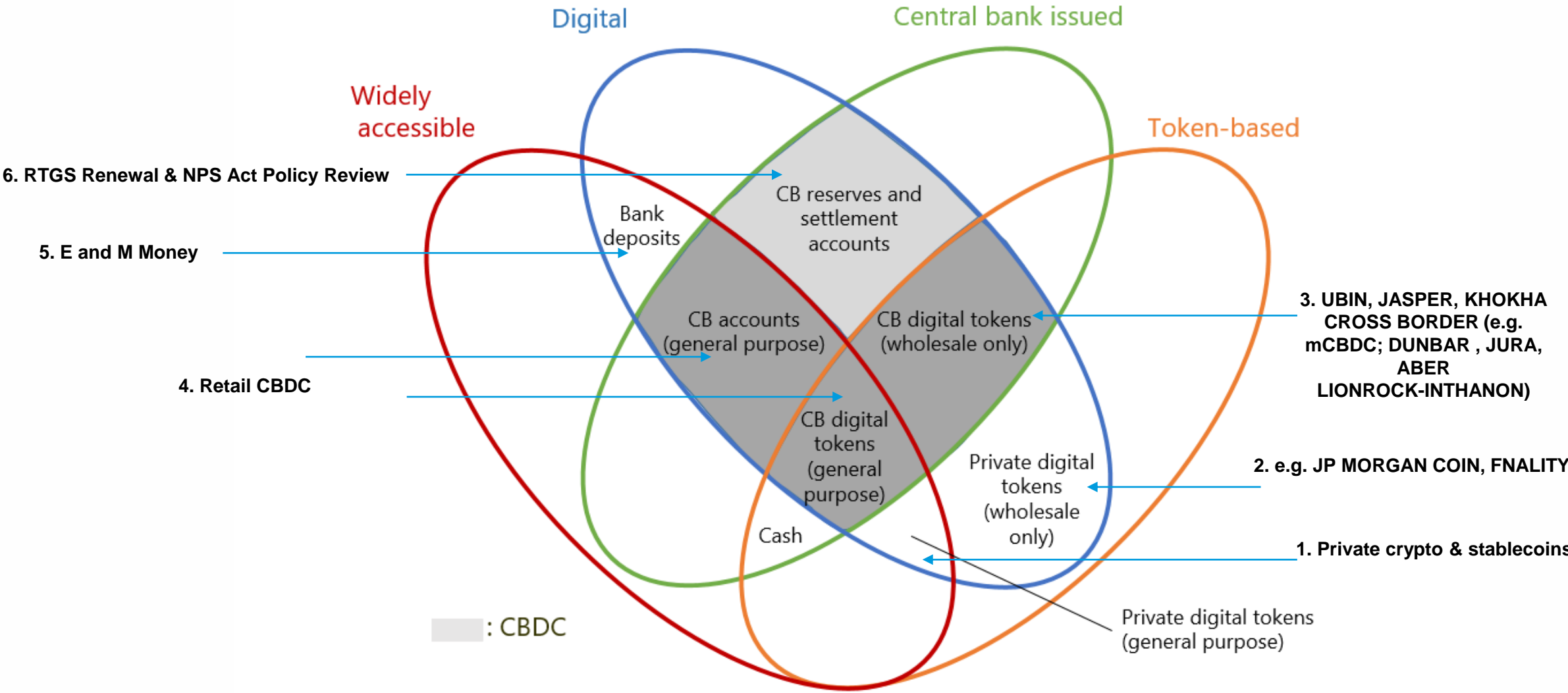
Final thoughts: explore... AND handle with care!

CBDC is official, fiat money – just digital...



Source: Bjerg, 2017

Examples of initiatives related to new stores of value...



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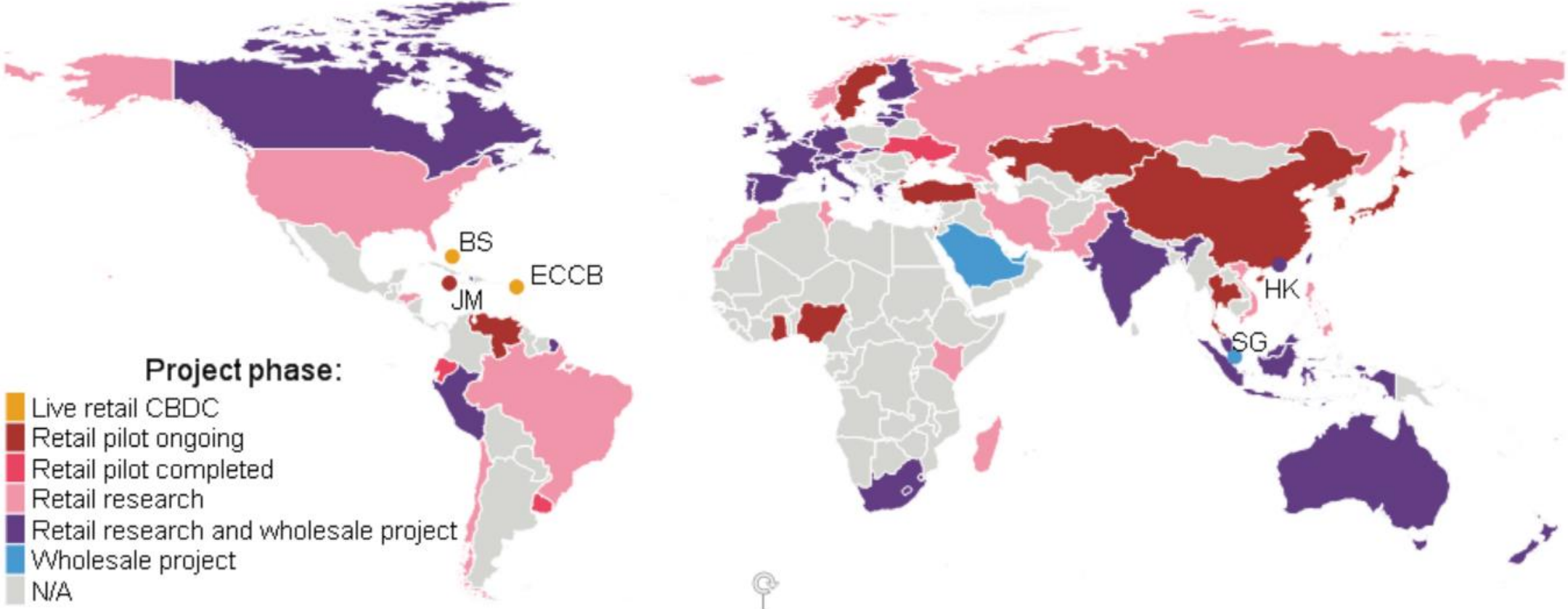
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Many central banks are researching into or conducting pilot experiments to issue CBDCs...



Source: BIS & Deutsche Bank Research

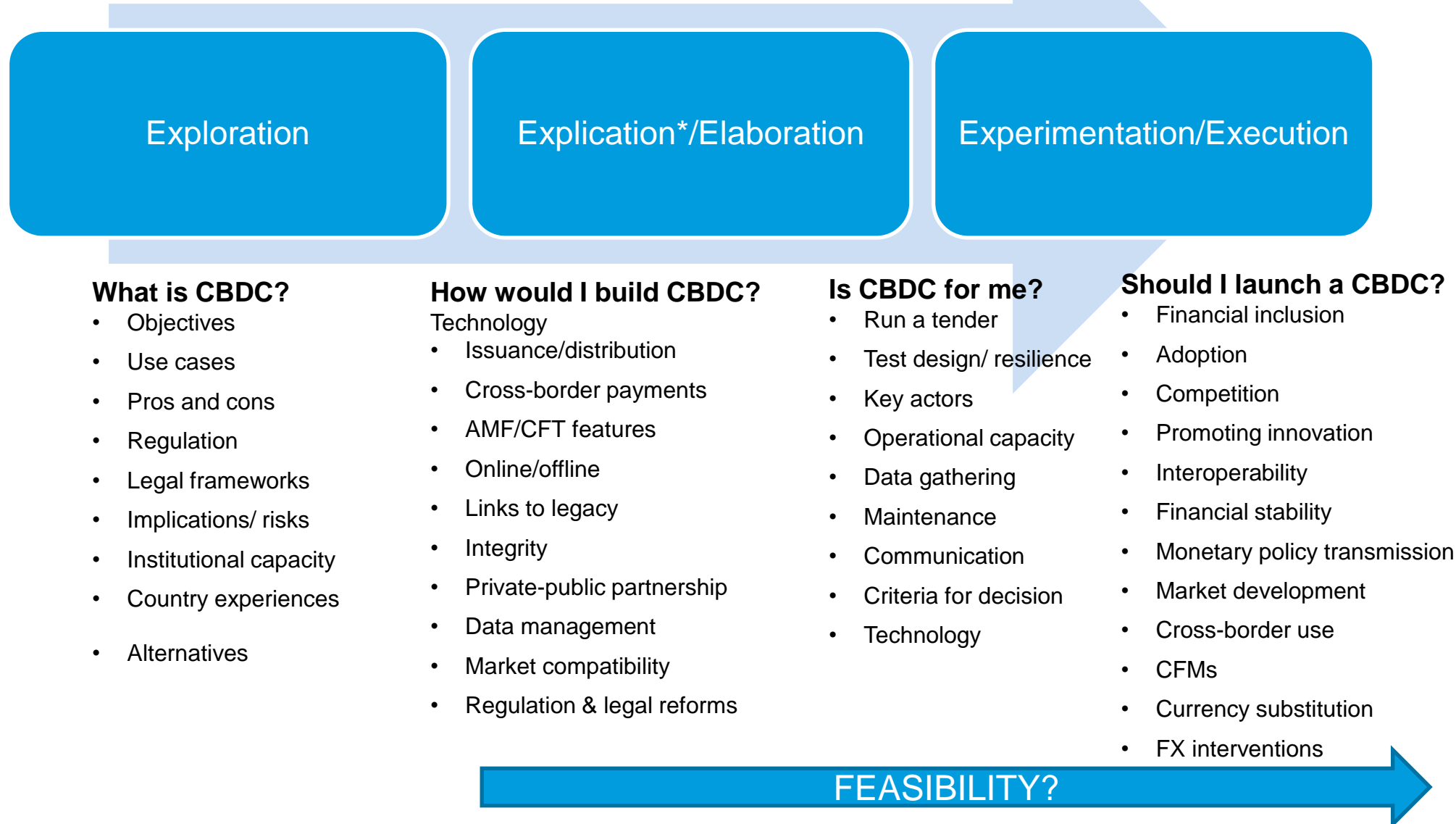
Jurisdictions Where Retail CBDC Is Being Explored (as of November 18, 2021)		
Where central banks have launched or piloted (or soon will)		
Bahamas (launched)	Eastern Caribbean (launched)	Nigeria (pilot launched)
China (pilot launched)	Jamaica (pilot launch imminent)	Uruguay (pilot completed)
Where central banks have done proofs of concepts (or soon will)		
Bhutan (proof of concept planned)	Ghana (update)	Sweden (proof of concept underway)
Japan (proof of concept started)	Korea (proof of concept started)	Ukraine (proof of concept done)
Where central banks are in advanced stages of research and development		
Canada (update)	Norway	United Kingdom
Euro Area	Russia (latest report)(update)	United States
Mauritius (update)	Thailand	
Where central banks are still in the exploratory stages (with year of last update)		
Australia (2021)	Iceland (2018)	Pakistan (2021)
Brazil (2021)(update, 2021)	India (2021)(update; 2021)	Peru (2019)(update; 2021)
Chile (2021)	Indonesia (2020)(update; 2021)	Philippines (2020)
Curaçao en Sint Maarten (2019)	Israel (2021)(update; 2021)	Singapore (2021)
Czech Republic (2021)	Kazakhstan (2021)	South Africa (2021)
Denmark (2017)	Kenya (2020)	Switzerland (2019)
Eswatini (2020)	Kuwait (2019)	Taiwan (2020)
Georgia (2021)(update; 2021)	Madagascar (2021)	Trinidad and Tobago (2021)
Haiti (Bitkòb) (2021)	Malaysia (2021)	Tunisia (2018)
Hong Kong SAR (2021)	Morocco (2019)(update; 2021)	Turkey (2021)
Hungary (2021)	New Zealand (2021)	
Where central banks have explored or are exploring issuing retail CBDC (according to reputable news sources)		
Bahrain (2018)	Iran (2018)	Palestine (2021)
Egypt (2018)	Laos (2021)	Rwanda (2021)
Guatemala (2021)	Lebanon (2020)	United Arab Emirates (2021)
Honduras (2021)	Macau (2021)	Vietnam (2021)
Where central banks have launched and discontinued		
Ecuador (2014-2018)	Finland (1992-2006)	

And....CBDC Bilateral TA Requests increasing...



Status	MCD	WHD	APD	AFR	EUR	Total
Immediate	4	2				6
Ongoing	4	3	1	1		9
Pending	1	3	6	3	1	14
Total	9	8	7	4	1	29

...phases & questions differ...



*The process of analyzing and developing an idea or principle in detail

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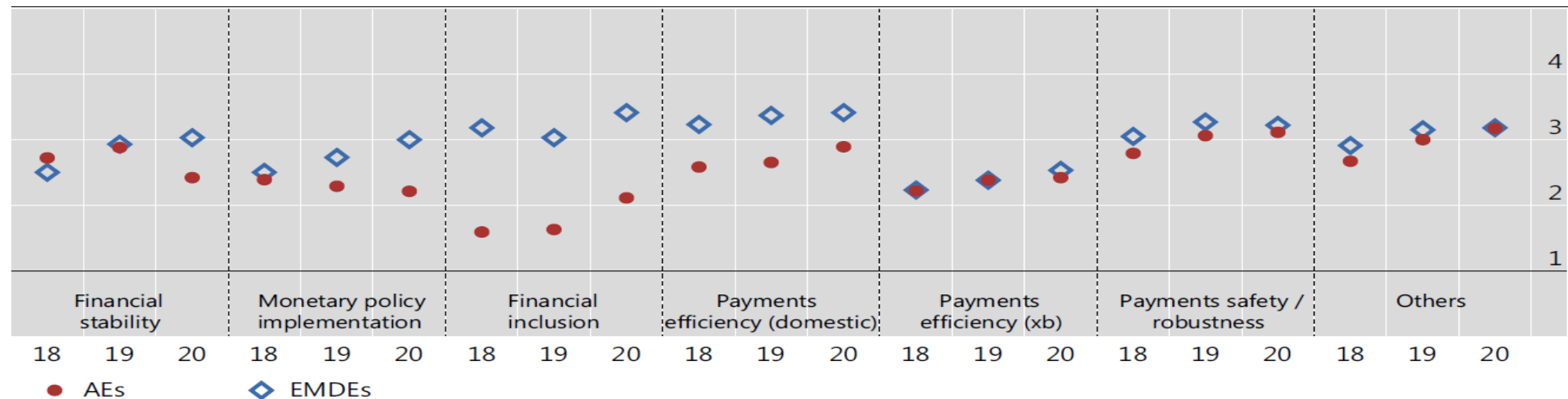
Motivations for considering CBDCs vary across countries, reflecting differences in the challenges countries face

In EMDEs, CBDCs are mostly motivated by need to enhance financial inclusion and improve efficiency of payments while AEs are driven by the declining role of cash, emergence of new monetary and payment systems and geo-political factors

Motivations for issuing a retail CBDC

Average importance

Graph 3



(1) = "Not so important"; (2) = "Somewhat important"; (3) = "Important"; (4) = "Very important".

Source: BIS central bank survey on CBDCs.

...glimpse at objectives...

Comparison of Advanced Retail CBDC Explorers					
Jurisdiction (Project name)	Status	Date of launch	Objectives	Offline payments	Technology provider (Technology)
The Bahamas (Sand Dollar)	Fully Launched	2020 (October)	Payment system efficiency and resilience, financial inclusion, fighting illicit activities	X	NZIA Limited (NZIA Cortex DLT)
Eastern Caribbean Currency Union (DCash)	Pilot launched (in 4 of the 8 member countries of the currency union)	2021 (March)	Reducing the costs/risks of physical cash management, financial inclusion	X	Bitt (Hyperledger Fabric DLT)
China (e-CNY)	Pilot launched (selected participants)	2020 (April)	Monetary sovereignty, reducing monopoly distortions, payment system resilience, financial inclusion	✓	Proprietary
Uruguay (e-Peso)	Pilot conducted (6-month pilot in 2017-2018)	2017 (November)	Reducing the costs/risks of physical cash management, digitalization, fighting illicit activities	X	Roberto Giori Company
Nigeria (eNaira)	Pilot launched	2021 (October)	Monetary sovereignty, reducing costs and risks of physical cash management, financial inclusion, payment system resilience, G2P payments, tax collection, cross-border payments	X	Bitt (HyperLedger Fabric DLT)
Jamaica (?)	Pilot launch imminent	2021 (November?)	Reducing the costs/risks of physical cash management, financial inclusion	X	eCurrency (DSC3 Digital Bearer Instrument)

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Retail CBDCs can assume various designs... that can be combined to match policy objectives

1. Distribution Architecture

Direct CBDC
or
Intermediated CBDC (2-tier)

2. Ledger Designs

Centralized
or
Decentralized Distributed
Ledger Technology (DLT)

3. Access Model

Account based
&/or
Token based

4. Interlinkages with other PS & markets

Retail CBDC can be linked with
wholesale markets and cross
border payments

5. Remuneration

Interest bearing or non-interest
bearing

6. Limits or caps on how much wallets can hold

7. Functionality On-line vs off-line or both

8. Degree of Anonymity

Anonymous, pseudonymous or
non-anonymous

9. Other

Cost structure and fees charged to
participants and end
users.
Include non-banks
Interoperability

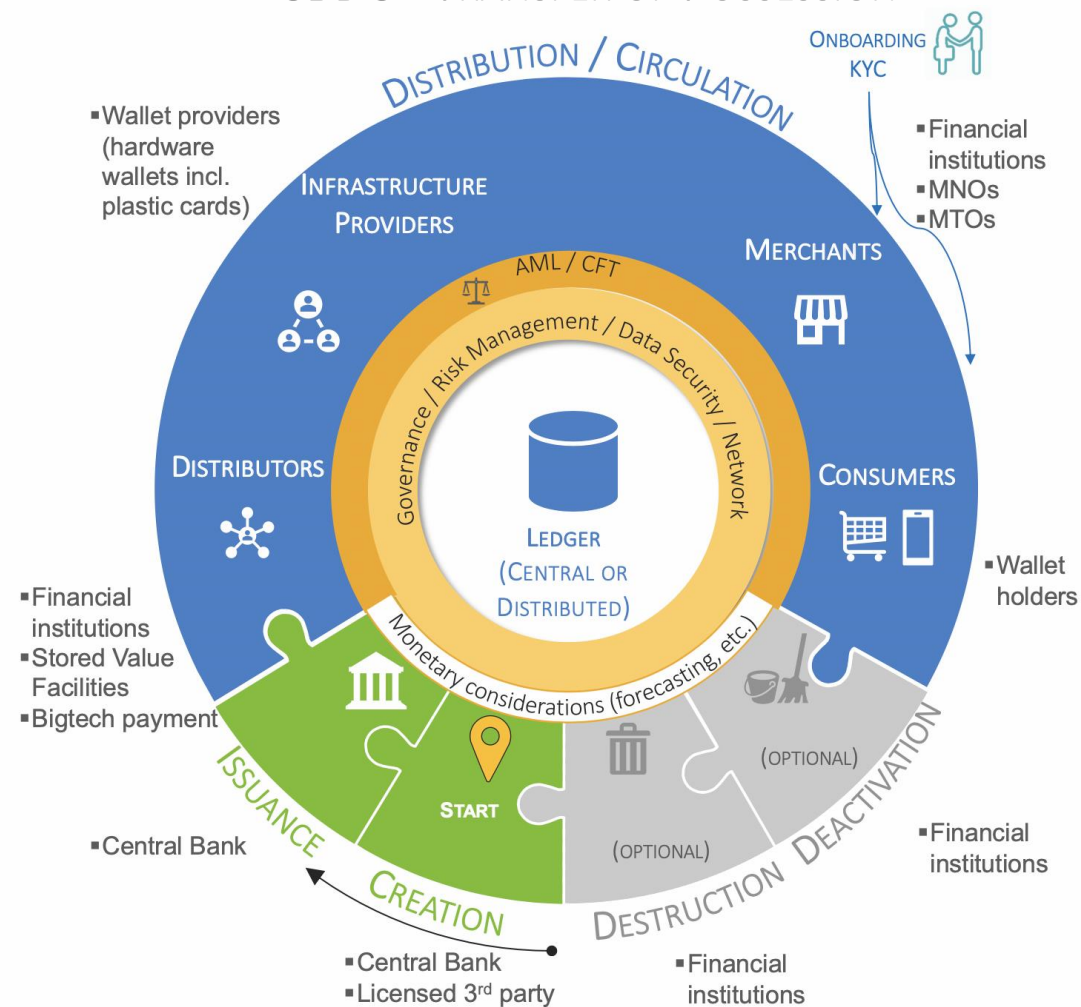
Cash Versus CBDC Circles of Life

From a high level, the actual work of issuing CBDC is quite like that involved in the management of physical cash

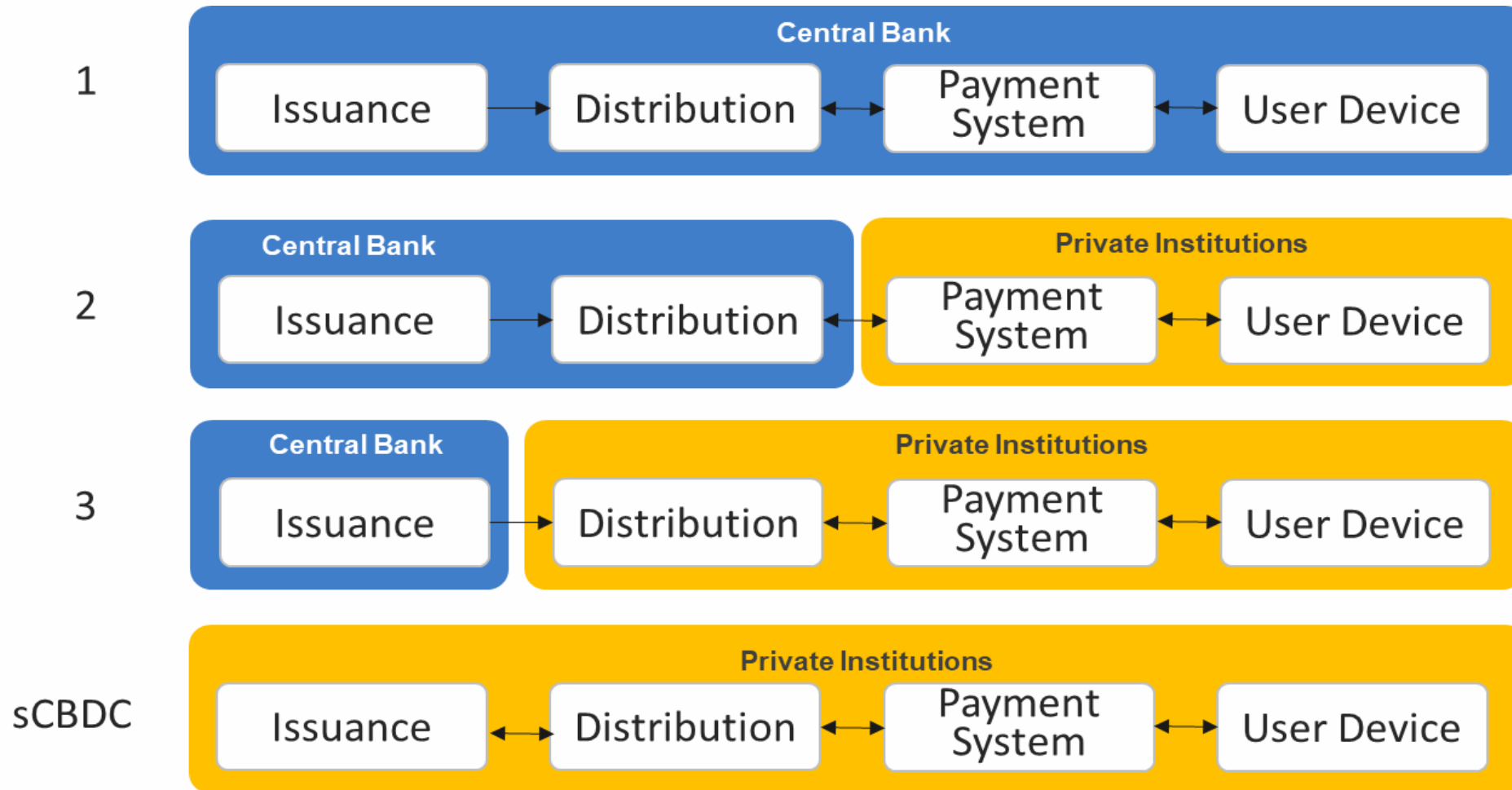
CASH CURRENCY - TRANSFER OF POSSESSION



CBDC - TRANSFER OF POSSESSION



Key Design Choice: Single vs Multi-Tier Operating Model



Source: Roberto Giori Company

Key challenge is in user interaction: need to be user friendly, dynamic, but also comply with Know Your Customer (KYC) and Anti-Money Laundering / Combating the Financing of Terrorism (AML/CFT) provisions

...glimpse at design features...

Key Design Features of Launched/Piloted Retail CBDCs

	Central Bank of the Bahamas Sand Dollar	Eastern Caribbean Central Bank DCash	Central Bank of Uruguay e-Peso	Central Bank of Nigeria eNaira	People's Bank of China eCNY	Bank of Jamaica
Launch Dates	Pilot started on December 27, 2019, and fully launched on October 21, 2020	Pilot started on March 31, 2021, still ongoing	Pilot started on November 3, 2017 and ended on April 30, 2018	Pilot started on October 25, still ongoing	Series of pilots started April 2020, and still ongoing.	Pilot slated to start in November 2021.
Transaction fees?	Initially no, but maybe yes later	None during pilot	None during pilot	None during first 90 days of the pilot.	?	None
Interest bearing?	No	No	No	No	No	No
Access	Smartphone & smart card	Smartphone only?	Smartphones and any GSM phone that uses the USSD protocol	Smartphone but users can also dial a USSD short code and follow the required steps to perform transactions.	A broad array of devices, including dedicated universal access devices	Smartphones only?
Offline?	Users can make a pre-set dollar value of payments when communications access to the Sand Dollar Network is disrupted. Wallets would update against the network once communications were re-established.	The party initiating the transfer (sender) must have an internet connection. If the receiver is offline the payment will still be processed, and they will see the change in their balance as soon as they are back online.	Can use a USSD mobile network for instant settlement without an internet connection.	The party initiating the transfer (sender) must have an internet connection. If the receiver is offline the payment will still be processed, and they will see the change in their balance as soon as they are back online.	The PBOC is piloting offline universal access devices	?
Programmable?	No, but smart contracts could be used for point-of-sale tax payments, integration with physical devices or IoT applications, or automate distribution of economic relief based on specific demographic or other characteristics.					
Cross-border?	Not directly	No	No	?	No	No
Platform Vendor and Type	NZIA Limited (NZIA Cortex DLT private permissioned)	Bitt (Hyperledger Fabric DLT private permissioned)	Roberto Giori Company (Centralized ledger)	Bitt (Hyperledger Fabric DLT private permissioned)	?	eCurrency (DSC3 Digital Bearer Instrument)

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7 Pros of CBDC

Dimension	Pros
1. Nature of the instrument	<ul style="list-style-type: none">• Issued by central bank, “safe money” – liability of central bank, no credit risk. Trusted “brand”
2. Competition	<ul style="list-style-type: none">• May stimulate competition in the payments market. Introduces a new instrument into the payments mix.• May enable new entrants into the scheme (e.g. fintechs, MNOs)
3. Sovereignty & Monetary Policy?	<ul style="list-style-type: none">• May counter emergence of private money & “cryptoization”• May strengthen the transmission of monetary policy if large take-up (& interest bearing?)
4. Operational resilience	<ul style="list-style-type: none">• May strengthen resilience of payments ecosystem (new infrastructure e.g. DLT)
5. Efficiency	<ul style="list-style-type: none">• Potentially much cheaper alternative to cash (lowered cost of production, distribution)
6. Financial Inclusion	<ul style="list-style-type: none">• Has potential to address financial inclusion (no account requirements, no minimum balance, reduced pricing, lowered costs?, immediate payments)• Could be introduced as legal tender (for widespread adoption)• May introduce a domestic scheme that supports social grant payouts
7. New functionality & Cross Border	<ul style="list-style-type: none">• Introduces programmability, offline payments, & could be considered for CB payments

Benefits are highly dependent on the design choices & “business model”

7 Cons of CBDC

Dimension	Cons
1. Outside central bank core competence & mandate	<ul style="list-style-type: none"> • New territory for CBs; Usually intervene with payment instruments if significant market failure. Aligned with core central bank mandate?
2. Capacity & Governance	<ul style="list-style-type: none"> • CBs may not have the skills, knowledge & resourcing capacity in managing retail payment scheme • Proper governance required to oversee the CBCD scheme (should be independent/distinct from regulatory, supervisory & oversight functions)
3. Legal & Political support	<ul style="list-style-type: none"> • May require complex changes to legal framework to accommodate general purpose digital instrument (which may take time & effort to effect changes) • Will require support from government and Treasury; may draw “political noise” • Will compete with existing payment instruments & schemes minimizing support from incumbents
4. Financial stability & Disintermediation	<ul style="list-style-type: none"> • If attractive (e.g. positively remunerated or lowered cost) may disintermediate commercial bank deposits; significant consequences; May increase “bank runs” • May create massive “closed loop” system
5. Monetary Policy	<ul style="list-style-type: none"> • Positive or negative remuneration may “complicate” monetary policy processes
6. Strategic & Operational risks	<ul style="list-style-type: none"> • Unknown business model & business case (sustainable?) • May be overly dependent on technology vendors • New technologies, largely untested for scale and resilience • May be open to new forms of cyber attacks
7. Reputational risks	<ul style="list-style-type: none"> • Irrespective of design (e.g. two-tiered model; CB reputation at risk for any CBDC related issues)

Risks must be carefully weighed against the benefits & is context dependent

But... to realize the benefits central banks need to carefully design the CBDC and its implementation...

No off-the-shelf CBDC solution - different design choices for a CBDC instrument and underlying system that have a bearing on each other - making a coherent choice is critical for a smooth functioning of the system

A **comprehensive and balanced policy-oriented assessment of the challenges** of a CBDC and its **potential relative to alternative options is necessary** before issuance of a CBDC is decided

Policy trade offs should be carefully balanced, including maximizing the benefits of technology for financial systems while preserving citizens privacy

Differing stakeholder views (financial institutions, citizens and FinTechs) **provide valuable input to feasibility assessments**, including through public consultations

Iterative practical experimentation is necessary to test functional design options and explore technical feasibility as well as the ability to satisfy prospective users



- Staff Discussion Note: [Virtual Currencies and Beyond: Initial Considerations](#), January 2016.
- Staff Discussion Note: [Fintech and Financial Services: Initial Considerations](#), June 2017.
- Staff Discussion Note: [Casting Light on Central Bank Digital Currencies](#), November 2018.
- Fintech Note: [The Rise of Digital Money](#), July 2019.
- IMF Policy Paper: [Digital Money Across Borders: Macro-Financial Implications](#), October 2020.
- IMF Policy Paper: [The Rise of Digital Money – A Strategic Plan to Continue Delivering on the IMF’s Mandate](#), July 2021