



FINTECH

NOTES

Towards Central Bank Digital Currencies in Asia and the Pacific

Results of a Regional Survey

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Sarwat Jahan, Elena Loukoianova, Evan Papageorgiou, Natasha Che, Ankita Goel, Mike Li, Umang Rawat, and Yong Sarah Zhou

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**Towards Central Bank Digital Currencies in Asia and the Pacific:
Results of a Regional Survey**

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Sarwat Jahan, Elena Loukoianova, Evan Papageorgiou, Natasha Che, Ankita Goel, Mike Li,
Umang Rawat, and Yong Sarah Zhou*

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List of Acronyms

AE.....	Advanced economy	EM.....	Emerging market
AML/CFT ...	Anti-money laundering/Combating the financing of terrorism	HKMA.....	Hong Kong Monetary Authority
API.....	Application programming interface	KYC.....	Know your customer
ASEAN	Association of Southeast Asian Nations	LIC	Low-income country
BI	Bank Indonesia	MAS	Monetary Authority of Singapore
BNM	Bank Negara Malaysia (the central bank of Malaysia)	PBoC.....	People's Bank of China
BoJ	Bank of Japan	PIC	Pacific Island country
BoK.....	Bank of Korea	PSP	Payment service provider
BOT	Bank of Thailand	PvP	Payment versus payment
BSP	Bangko Sentral ng Pilipinas (the central bank of the Philippines)	QRIS	Quick response code Indonesian standard
CBDC	Central bank digital currency	R&D	Research and development
DLT.....	Distributed ledger technology	RBA.....	Reserve Bank of Australia
		RBI	Reserve Bank of India
		RBNZ	Reserve Bank of New Zealand

Introduction

The rise of central bank digital currencies (CBDCs) is a global phenomenon. As of August 2022, two central banks have formally launched a CBDC: the Central Bank of the Bahamas (Sand Dollar), and the Central Bank of Nigeria (e-Naira), while two others are in advanced pilots.¹ The interest in CBDCs, however, goes far beyond these countries. Out of the 109 countries tracked by the Atlantic Council (2022), 105 countries, representing more than 95 percent of global GDP, are exploring CBDCs in some form. This is a significant increase from the 35 countries that were considering CBDCs in May 2020. Similarly, the Bank for International Settlements (BIS 2022a) found that about 90 percent of the 81 central banks in their survey (representing 94 percent of global economic output), are exploring CBDCs with more than half developing or running concrete pilot projects.

Interest and work toward CBDCs by countries in the Asia-Pacific region has been gaining momentum for some time. The Asia-Pacific region covers countries in a wide spectrum of income groups and stages of financial development; thus, it is not surprising that there is great heterogeneity in their progress toward developing CBDCs. The interest in CBDCs has significantly grown in recent years, as captured by the number of times CBDCs are mentioned in speeches (Figure 1, left panel). The rapid increase in considering a CBDC in the Asia-Pacific region is not limited to the more advanced economies with developed financial markets. While China has been at the global forefront of experimenting with CBDCs, emerging markets, such as India and Thailand have made rapid progress, and several low-income countries (LICs) and Pacific Island Countries (PICs), such as Nepal and the Marshall Islands, are looking into research and development.

The surge in crypto assets in 2020–21 accelerated many central banks' interest in CBDCs in an attempt to provide an alternative means of payment and counteract the volatile nature of unbacked private crypto assets and contain their risks to the financial system. Asian economies participated strongly in the crypto rally, but also in the eventual bust in 2022. As in other regions, 2021 was characterized by a strong growth of the crypto asset transactions and volumes. In August 2021, the total volume of crypto assets had grown by 230 percent year over year in Asian emerging market economies and by more than 300 percent year over year in advanced Asian economies (Figure 1, right panel).² The crypto bust and ensuing “crypto winter” in 2022 have reduced volumes in Asia like in the rest of the world, but the interest of policymakers to safeguard the payment system and provide consumer protection has now accelerated, including the search for a consistent regulatory treatment of crypto assets and potential integration with CBDCs in some cases.

CBDC development is also at the forefront of discussions in other international forums like the Executives' Meeting of East Asia Pacific Central Banks (EMEAP).³ EMEAP members are taking

¹ The Bank of Jamaica (JAM-DEX) and the Eastern Caribbean Central Bank (DCash - the CBDC of a currency union) are in advanced pilot stages.

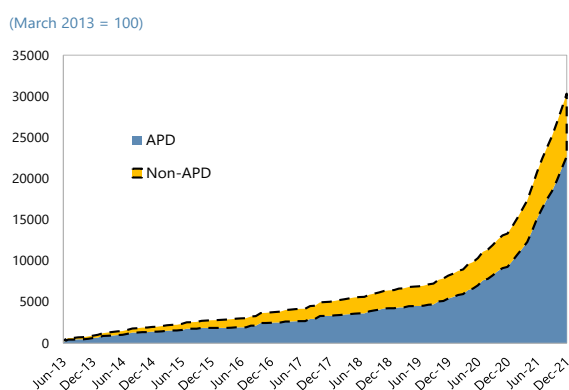
² Note that these are nominal volume growth denominated in US dollars. Thus, the appreciation of crypto assets against US dollars in recent periods partly accounts for the increase.

³ EMEAP comprises 11 member central banks as follows: Reserve Bank of Australia (RBA), People's Bank of China (PBoC), Hong Kong Monetary Authority (HKMA), Bank Indonesia (BI), Bank of Japan (BoJ), Bank of Korea (BoK), Bank Negara Malaysia (BNM), Bangko Sentral ng Pilipinas (BSP), Monetary Authority of Singapore (MAS), Bank of Thailand (BOT), and Reserve Bank of New Zealand (RBNZ).

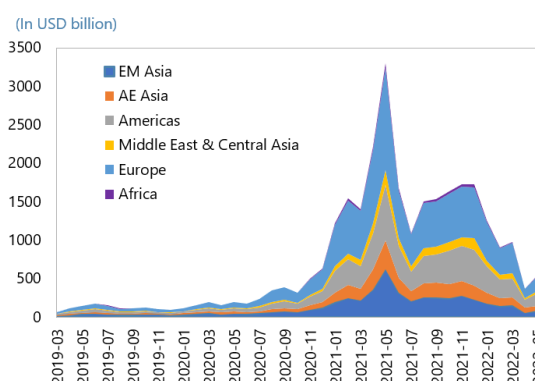
into consideration the implications of CBDCs for monetary policy operations and central bank balance sheets, and their interoperability with other forms of payment. Members are still at various stages of development, and each has different design considerations specific to their respective markets and policy requirements.

Figure 1. Prominence of CBDCs and Crypto in the Asia-Pacific Region

References to the keyword “CBDC” in speeches



Total crypto asset volume received by region



Sources: BIS (2020); and IMF staff calculations.

Sources: Chainalysis; and IMF staff calculations.

Note: Asia-Pacific countries include Australia, China, India Indonesia, Korea, Japan, Lao P.D.R., Malaysia, New Zealand, the Philippines, Singapore, Thailand, and Vietnam.

This note puts Asia-Pacific countries in the spotlight. In early 2022, the IMF conducted a survey of IMF country teams and country authorities in the Asia-Pacific region, covering 36 Asian economies: 7 advanced economies, 10 emerging market economies, 8 LICs, and 11 PICs.⁴ The survey responses for the PICs are reported separately as their characteristics are different from other Asian economies, though both country groups share common challenges. Additionally, the note covers 14 case studies to provide more granular details on the CBDC landscape in the Asia-Pacific region.

Asia-Pacific countries have been at the forefront of digital innovation, and their interest in CBDCs is a natural next step. There are many reasons behind Asia's interest in CBDCs (see Fact VI below). Some countries, including, for example, India and the Philippines, have built very successful payments systems, yet financial innovation in the form of a CBDC could let countries improve their current frameworks by lowering transaction costs and increasing efficiency. Promotion of financial inclusion and financial stability are among other motivating factors for countries across the region, especially in middle-income countries. Since safeguarding macro-financial stability is at the core of the IMF's functions, it is imperative for the IMF to be fully informed of these developments to support its surveillance and capacity building activities.

The definition of CBDCs and crypto assets used in this note is commonly used throughout the literature. A CBDC is a central bank-issued digital money denominated in the national unit of account and represents a liability of the central bank (see IMF 2018). If the CBDC is intended for use by the

⁴ See Annex I for country coverage.

general public, it is referred to as a “general purpose” or *retail* CBDC. It offers a new option to the general public for storing value and making payments, quite similar to cash or electronic forms of traditional currency. A *wholesale* CBDC targets a different group of end users, mainly financial institutions (BIS 2018). Crypto assets are a type of privately-issued digital assets that depend primarily on cryptography and distributed ledger technology (DLT) for record keeping. Some have their own unit of account, such as Bitcoin and Ether. Crypto assets do not represent a claim on a central bank, making them different from CBDCs (IMF 2018 and IMF 2021). A stablecoin is a type of a crypto asset whose value is tied to another asset, such as the US dollar, and uses various mechanisms or reserves to stabilize its price and maintain convertibility.⁵

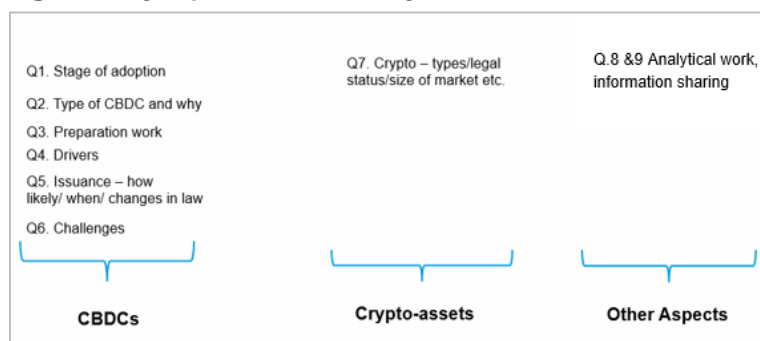
The structure of this note is as follows. First, it describes the design of the current survey and reviews how it differs in focus and coverage from other surveys. The note then turns to the key results and tries to augment the findings from a review of selected country case studies. Next, the note distills some key lessons for others in their journey in this area. It concludes by providing some insights and considerations for the way forward.

⁵ See IMF (2021), Chapter 2 and online annex for more detailed definitions of crypto assets and the crypto ecosystem.

I. Survey Design and Comparison with Others

The survey questions were targeted to get a better understanding of the CBDC ecosystem, which required covering not only CBDCs but also crypto assets. The structure of the survey is summarized in Figure 2 and the complete set of survey questions is shown in Annex III. The first set of six questions focused exclusively on the CBDC landscape, ranging from documenting the current stage of adoption to more analytical questions, such as the drivers of CBDC adoption or the challenges economies are facing on the path to adoption. Each question had several follow-up questions. For example, once economies identified the type of CBDC they might issue, the survey tried to glean more information on why a particular form of the CBDC was chosen. Since the relevance of other types of digital money may influence choices about CBDCs, the survey also covered crypto assets. Finally, the survey also asked about the type of analytical work that would help economies make more informed decisions with regard to CBDCs.

Figure 2. Synopsis of the Survey



This survey has the widest country coverage in the Asia-Pacific region, compared to existing surveys. The BIS has been conducting surveys since 2017 and has now produced five reports documenting the momentum in central banks' interest in CBDCs. Their latest report (BIS 2022a) covers 81 central banks of which 16 are from the Asia-Pacific region.⁶ By contrast, this survey covers 36 jurisdictions in the Asia-Pacific region. This survey also provides more information about the preparatory work, drivers, and challenges of adopting CBDCs, while the BIS survey covers more ground on the role of the private sector in a CBDC ecosystem as well as the potential for crypto assets or stable coins to become widely used and accepted as a means of payment in the future.

There are other reports that track the status of adopting CBDCs, though they do not provide more granular supplementary information. The Atlantic Council, for example, currently tracks 109 economies on their status of adopting CBDCs.⁷ The status of the countries can also be grouped

⁶ Asian central banks covered in the 2021 BIS survey include Australia, Brunei, China, Chinese Taipei, Fiji, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, Maldives, Mongolia, the Philippines, Singapore, and Sri Lanka.

⁷ Asia-Pacific economies covered by the Atlantic Council tracker include Australia, Bhutan, Cambodia, China, Hong Kong SAR, India, Indonesia, Japan, Korea Lao P.D.R., Macao SAR, Malaysia, Myanmar, Nepal, New Zealand, the Philippines, Singapore,

according to their purpose, architecture, infrastructure, access, cross-border projects, and technology partnerships. The tracker, however, does not go beyond the broad categories to provide additional insights into the choices made by the various central banks.

Other studies have documented progress on adopting CBDCs by providing in-depth analysis of specific countries or groups of countries. The IMF, for example, has distilled lessons from six advanced CBDC projects, drawing on collaboration and exchanges with the respective central banks (Soderberg and others 2022).⁸ The World Bank has produced a package consisting of three notes on CBDCs, which draws on case studies to reflect the payments perspective, technical background, and cross-border payments. The Asian Development Bank (ADB) has analyzed the PICs to explore issues they need to address to realize the benefits of CBDCs in overcoming their physical remoteness and other challenges, and to expand financial inclusion (ADB 2021).

The current survey is a combination of the two approaches. It has complemented its survey questions with in-depth analysis of 14 individual case studies, two regional multi-country CBDC platforms, and the PICs as a group (see Annex II for details). In doing so, the results presented in this note augment the survey responses with more granular insights into the context of the response, which helps to provide lessons for countries looking to navigate the path to adopting CBDCs.

Taiwan Province of China, Thailand, and Vietnam. Pacific Island countries include Fiji, the Marshall Islands, Micronesia, Palau, Tonga, and Vanuatu.

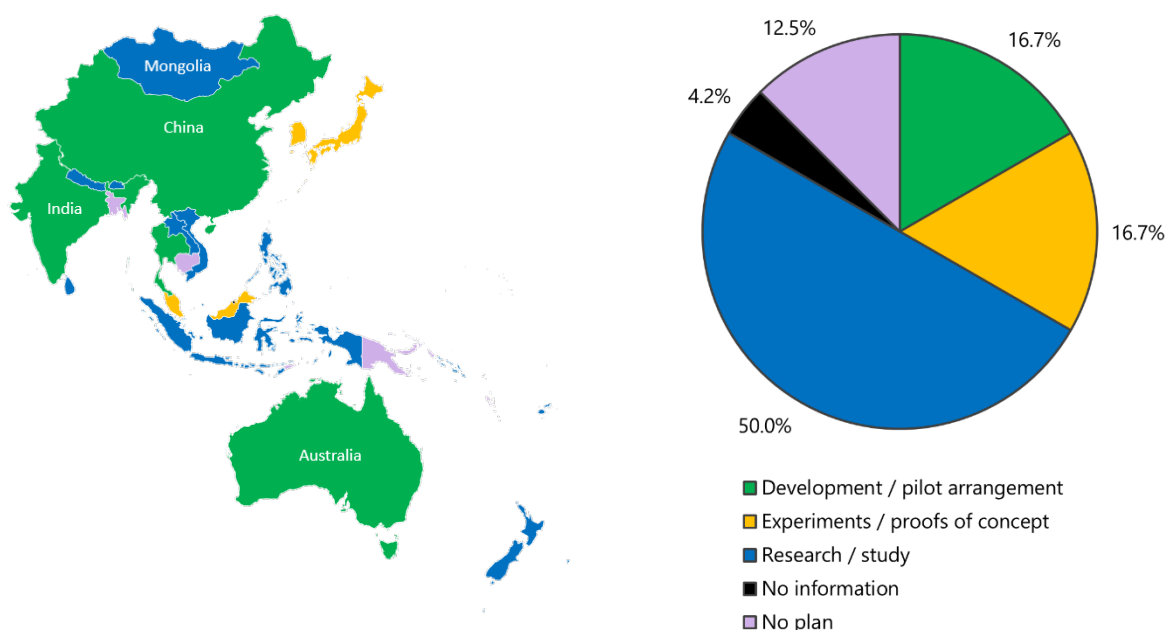
⁸ The six central banks covered in the paper include the Central Bank of Barbados (Sand Dollar), Bank of Canada, People's Bank of China (e-CNY), Eastern Caribbean Central Bank (DCash), Sveriges Riksbank, (e-krona), and Banco Central de Uruguay (e-peso).

II. Results of the Survey

Fact I. The Asia-Pacific region is at the forefront of CBDC exploration

China already launched its pilot e-CNY digital currency in 2019, while India and Thailand are at advanced stages of their CBDC development, aiming to launch pilots in the near term. Australia announced a limited scale CBDC pilot in August 2022. Korea, Japan, Malaysia, and Singapore have started experiments or proofs-of-concept, and another 12 Asian economies are currently at the research and development (R&D) stage (Figure 3). Even countries that currently have not shown interest in R&D for CBDC adoption, for example Bangladesh and Maldives, are still interested in CBDC developments and learnings from peers. Although Cambodia does not see the need for a CBDC per se, it has leveraged related technologies such as blockchains and DLTs to boost mobile payments. The wide spectrum of countries on the path to adoption reflects many factors, including different motivations and concerns, which are discussed further in this paper.

Figure 3. Status of CBDC Projects in Asia-Pacific Region (excluding Pacific Islands)



Source: IMF Survey on CBDC and crypto assets.

Note: The pie-chart excludes Pacific Island Countries.

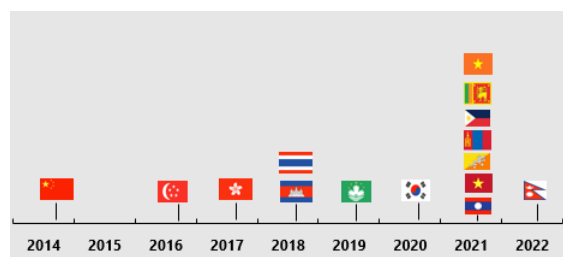
Fact II. Interest in CBDC development has clearly been on the rise in Asia-Pacific

China, Singapore, and Hong Kong SAR have been the frontrunners even in a global context, thanks to their technological advantage and relatively mature private sector digital payment platforms. China's retail CBDC project, for example, dates back to 2014, when digital currency was still a novel concept. Singapore and Hong Kong SAR started their CBDC projects in 2016 and 2017, respectively, focusing not only on retail but also wholesale CBDCs given their unique role of financial hubs (Figure 4, left panel).

This was followed by a number of Asian economies flocking to the CBDC arena during 2018–22, as the global initiatives on digital currencies accelerated (both private and public ones). Several countries have made significant tangible progress through experiments and proofs-of-concept, including Japan and Korea. However, fewer economies are ready to launch, and only those that have reached a relatively advanced experimentation stage have concrete timelines (Figure 4, right panel).

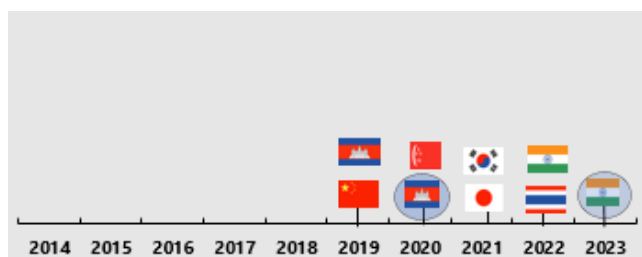
Figure 4. Timeline of Stages in CBDC Adoption

Start date of initiating CBDC R&D or implementing dedicated units



Source: IMF survey on CBDC and crypto assets.

Start date of launching CBDC pilots/experiments



Source: IMF survey on CBDC and crypto assets.

Note: The blue circle denotes launch. For Cambodia, the blue circle denotes the launch of Project Bakong—a blockchain-based nationwide payment system (though not a CBDC, per se) launched by the National Bank of Cambodia. India expects to launch in 2023.

Fact III. Central banks in Asia are interested both in wholesale and retail CBDCs

- The motivation for developing wholesale CBDCs focuses on enhancing payment system efficiency and security, particularly for cross-border transactions, while reducing transaction costs. This is also reflected in the latest BIS survey on CBDCs wherein cross-border payment system efficiency has become the dominant motivation for wholesale CBDCs over the years (BIS 2022a). Indeed, various wholesale CBDC projects, including in the region, have specifically focused on cross-border payments. A recent example is Project Dunbar, which jointly explores the use of CBDCs for international settlements, by the central banks of Australia, Malaysia, Singapore, and South Africa, together with the BIS Innovation Hub (BISIH). Similarly, early results from the multiple CBDC mBridge Project (comprising China, Hong Kong SAR, Thailand, and the United Arab Emirates; in collaboration with BISIH) show promising results in terms of time and cost efficiency.
- On the other hand, interest in retail CBDCs stems from central banks' desire to fulfill demand for digital cash or digital payments and provides an alternative to private crypto assets. Countries are increasingly also concerned about potential financial stability risks from crypto assets and the impact they may have on monetary policy effectiveness, particularly in emerging market and developing economies. For example, Thailand banned the use of crypto assets as a means of payment (effective April 2022) to prevent risks of currency substitution, weakened monetary policy effectiveness, and consumer protection concerns, such as volatile value. These concerns have been further aggravated by the recent turmoil in crypto asset values.

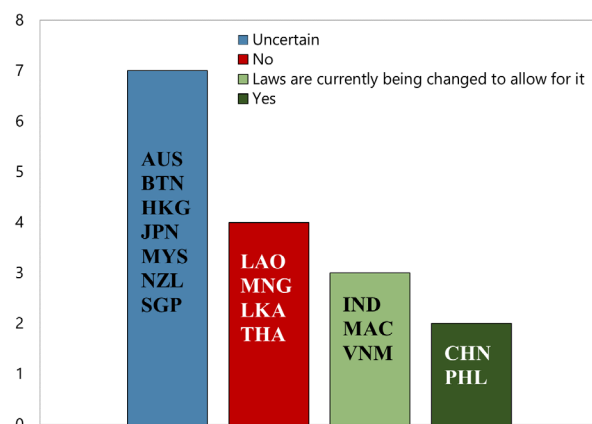
Figure 5. Interest in CBDCs*Number of economies that responded to the survey*

Australia China Hong Kong SAR India Indonesia Japan Macao SAR Nepal Thailand Both, 9	Bhutan Malaysia Mongolia Philippines Singapore Vietnam Wholesale, 6	Korea New Zealand Sri Lanka Retail, 3
		Bangladesh Cambodia Maldives No Response, 3
		Lao P.D.R. Uncertain, 1

Source: IMF survey on CBDC and crypto assets.

Fact IV. Only a few countries currently have the legal authority to issue a CBDC, while others are contemplating legal reforms

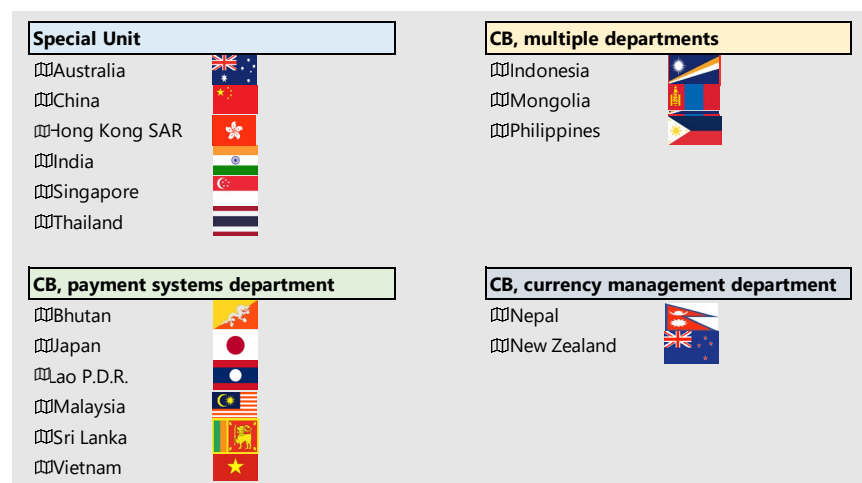
The issuance of CBDCs requires a legal framework where central banks have the authority to do so. In most cases, this would require the power, within the central bank or other applicable law, to issue both fiat and digital currency. Currently, only two countries in the Asia-Pacific region have the legal authority to issue CBDCs. This includes China, where the law was revised to allow for the issuance of CBDCs. The other is the Philippines, where the central bank has the authority to own and operate a payment system, and the authorities believe this may be used as the legal framework for issuing a wholesale CBDC, whereas the legal framework cannot accommodate the issuance of a retail CBDC. In India, Macao SAR, and Vietnam, laws are being changed to grant central banks this authority. In addition, three countries (Korea, Sri Lanka, and Thailand) have plans underway to provide the legal authority for CBDC issuance to central banks. Still, a significant number of countries are uncertain about whether the existing laws will have to be amended to provide the legal authority for CBDC issuance, and some are already exploring this further (Figure 6).

Figure 6. Legal Authority to Issue CBDC*Number of countries that responded to the survey*

Source: IMF survey on CBDC and crypto assets.

Fact V. Organizational arrangements vary among different CBDC projects in Asia-Pacific

Countries at the most advanced development stages have assigned a special unit to spearhead their CBDC projects, including China, India, and Thailand (Figure 7). Such arrangements may reflect the need to manage more complex projects. A large number of economies have chosen a specific central bank department (for example, payment systems, currency management) to oversee their CBDC projects, in line with their motivation for exploring CBDCs, for example, as a way to enhance payment system efficiency or improve management of their currency. The rest opted for a joint taskforce based on cooperation across different central bank departments, as they preferred to also focus on some cross-cutting areas where CBDC could play a role, such as growth, financial inclusion, and financial stability.

Figure 7. Organizational Arrangements

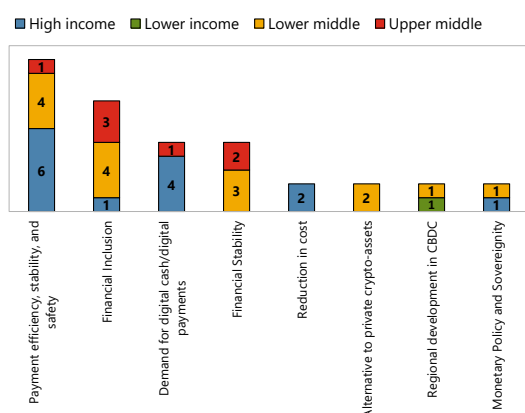
Source: IMF survey on CBDC and crypto assets.

Fact VI. The key drivers for countries' interest in CBDCs differ by income group

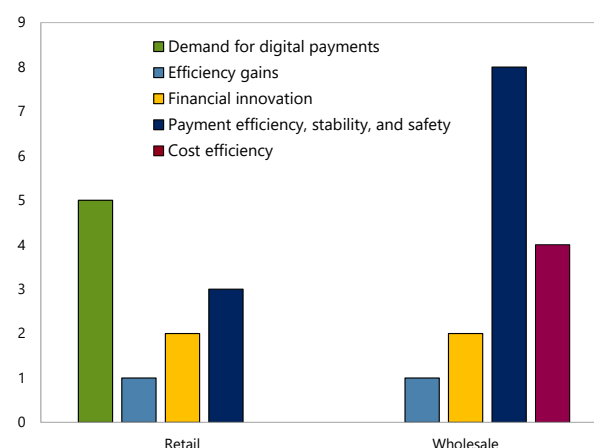
High-income countries are generally more interested in the ability of CBDCs to enhance the efficiency and safety of the payment system as well as to satisfy the growing demand for digital cash/payments (Figure 8).⁹ For middle-income countries, apart from payment system efficiency, promoting financial inclusion and financial stability are also important drivers. Regional development was a key driver in countries such as Lao P.D.R. and Nepal, while maintaining monetary sovereignty was important for India. Some drivers are closely interrelated with others: for example, payment stability is integral to financial stability, and demand for digital cash is related to the need to create alternatives for crypto assets. The survey also looked at drivers by type of CBDC. Not surprisingly, the interest in wholesale CBDCs is driven predominantly by the potential of payment system efficiency and stability and cost efficiency gains, while interest in retail CBDCs is usually driven by the demand for digital payments. Central banks see the need to encourage financial innovation as being important for issuing either retail or wholesale CBDCs.

Figure 8. Drivers of Considering CBDC Issuance

By Income Group (number of countries that responded to the survey)



By Type of CBDC (number of countries that responded to the survey)



Source: IMF survey on CBDC and crypto assets.

Note: Income groups are based on World Bank classification, which classifies economies into four income groups: low, lower-middle, upper-middle, and high income using gross national income (GNI) per capita data in US dollars.

Fact VII. While there is a significant interest in CBDCs, very few countries are likely to issue CBDCs in the near to medium term

Most countries in the region have shown interest in CBDCs with work ranging from research and development to live pilots. However, very few are ready to issue.

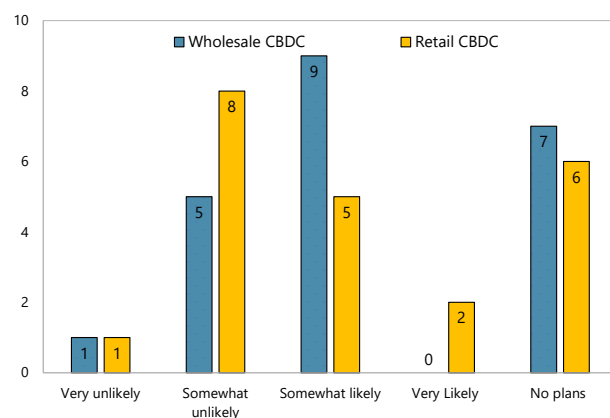
- Based on the survey responses, only two countries in the region—India and China—are very likely to issue retail CBDC in the near term. Since 2019, the People's Bank of China (PBoC) has started pilot tests of the e-CNY, which have been expanded to cover 23 cities and areas in 2022. A technical test of the cross-border use of e-CNY is also being conducted in Hong Kong SAR. India has announced

⁹ While multiple answers were possible, there was no scaling or intensity measure.

plans to issue a retail CBDC in 2023. Thailand plans to launch a pilot in the fourth quarter of 2022, but a full launch is unlikely in the near term. The decision of planned issuance or piloting of retail CBDCs in these countries is driven, in part, by the digitalization of payments as well as the emergence of crypto assets—a trend that accelerated during the COVID-19 pandemic.

- By contrast, no country is committed to issuing a wholesale CBDC in the near to medium term. Furthermore, nine central banks are reported as somewhat likely to issue wholesale CBDCs, while only five are likely to issue retail CBDCs in the near to medium term (Figure 9). This contrasts with the 2021 BIS survey where a higher proportion of respondents self-reported as likely to issue retail CBDC (68 percent) as compared to wholesale CBDC (54 percent).

Figure 9. Likelihood of CBDC Issuance by Type
Number of countries that responded to the survey



Source: IMF survey on CBDC and crypto assets

Fact VIII. Although there is a plethora of technology and design choices, countries at more advanced stages in Asia seem to adopt common features

The impact of CBDC introduction will hinge on its design and country-specific characteristics. While more information on country specific choices is provided in Annex II, China and Thailand are used as illustrative examples to showcase the commonalities.

- On the operational model, there is a preference for CBDC architecture to take a hybrid or two-tier form, wherein the central bank is the issuer, and the private sector is the distributor. The hybrid system could leverage the advantages and professional experiences of authorized operators to keep technology up-to-date by promoting technological competition and avoiding the concentration of systemic operational risk. There is a preference for a combination of centralized and distributed ledger design to enhance the resilience and expansibility of the system.
- In terms of design features for CBDCs, there is a preference for the instruments to be non-interest bearing, with limits on individual holdings, to prevent adverse financial stability implications. In particular, these design choices are intended to reduce the competition of CBDCs with bank deposits and prevent bank run risks during stress episodes.

- And finally, there is an emphasis on interoperability with existing payment networks as well as with other CBDCs (and open source blockchain networks). For example, the ongoing e-CNY technical test in Hong Kong SAR aims to achieve interoperability with the Faster Payment System in Hong Kong SAR (a local payment system connecting banks and digital wallet operators). The PBoC has also proposed three general principles for cross-border use of CBDCs, which include interoperability between different CBDC systems as well as between CBDCs and traditional payment systems. The retail CBDC in Thailand is intended to be interoperable with the existing payment system through bridge or application programming interface (API) gateways. Although Thailand is working toward connecting its CBDC to other countries at the wholesale level through Project mBridge, the decision to connect at the retail level or to public blockchains is still under consideration.

Table 1. Technology Choices: Advanced CBDC Movers—China and Thailand

SPEIFICATION	CHOICE
Operation model	2-tier; central bank issues CBDC and the private sector interacts with end users
Interest bearing	No
Limit on individual holding	Yes
Ledger design	Combination (Centralized and decentralized)
Interoperability with existing payment networks	Yes
Payment authentication design	Multifactor
Authorized operators in second tier	Commercial banks (for China, banks may collaborate with non-bank payment service providers and telecom operators)

Source: IMF survey on CBDC and crypto assets.

Fact IX. Challenges of adopting CBDCs are many, and Asian countries are in the testing stage of finding solutions

All countries are grappling with a multitude of challenges to some degree, and nine main areas of challenges emerge: privacy, interoperability, performance and scalability, cybersecurity, compliance, legal framework (including for financial integrity), policy implications (monetary policy and financial stability), operational robustness and resilience, and technology-enabled functional capabilities. The survey also revealed some country-specific additional challenges, for example:

- Nascent financial markets and limited capacity (Bhutan)
- Integrating retail and wholesale CBDCs, and leveraging data from new forms of digital money and fintech to support the policy decision-making process (Indonesia)
- Promoting innovation through careful balancing of role-sharing arrangements between a central bank and payment service providers, as well as cross-border payments (Japan).
- Deciding on the appropriate design, technology, and interoperability requirements as CBDC system continues to evolve at a considerable pace (the Philippines).

Given that no Asian economy has launched a CBDC, solutions to the challenges are still being tested through pilots for feasibility and there is limited information on viable solutions. Still, the survey did reveal that authorities are engaging with the public on various aspects of CBDCs:

- The Reserve Bank of New Zealand (RBNZ), for example, undertook public consultations to gauge needs and design features of a CBDC.¹⁰
- The Bank of Thailand is laying the ground for greater use of CBDCs by creating public awareness and educational content via social media. Additionally, the government has been using digital money developed by the largest state-owned bank for tax refunds, cash handouts, and stimulus-related payments. Prior experience with digital money could also facilitate the public's comfort level in using CBDCs.
- The Hong Kong Monetary Authority (HKMA) has reached out to academia and industry for views and comments on the policy and design aspects of e-HKD.
- The Bangko Sentral ng Pilipinas (BSP) aims to further its knowledge and understanding by pursuing capacity building exercises and engage with other central banks that have experience in this field. Related to this, the BSP launched Project CBDCPh, which aims to build organizational capacity and hands-on knowledge of key aspects of CBDC that are relevant for a use case around addressing frictions in the national payment system.

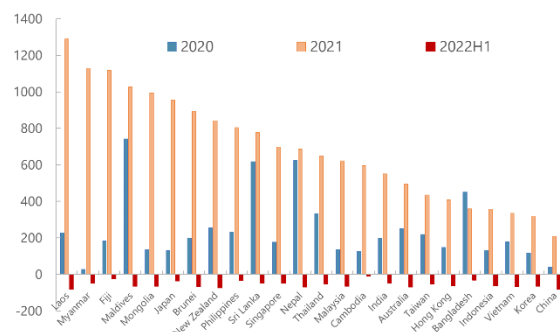
Fact X. The landscape of CBDCs in the Asia-Pacific region is intertwined with crypto assets

Asia's adoption of crypto assets almost mirrors the trend in other regions, which picked up strongly during the pandemic before the recent bust. In 2021, Asian emerging markets accounted for 16 percent of total crypto asset transfers in the world, while Asian advanced economies accounted for 14 percent (based on Chainalysis data, which tracks transaction activities on public blockchains). Additionally, the strong pick-up in the volume of crypto transactions in Asia was broad-based (Figure 10). The significant crypto price selloff that started in late 2021 has also had meaningful implications for Asia, notably with the failure of the crypto asset Luna and its associated algorithmic stablecoin, TerraUSD, which were administered by Terraform Labs.

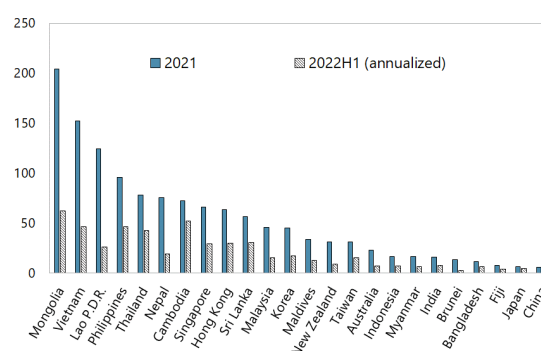
¹⁰ The RBNZ published two papers—"The Future of Money—Stewardship" and "The Future of Money—Central Bank Digital Currency"—as the basis for the public consultation, which closed in December 2021.

Figure 10. Crypto Transaction Volumes

Volume growth by country (year-over-year, percent)



Volume in share of GDP (percent)



Source: Chainalysis and IMF staff calculations.

The survey also yielded some interesting results:

Crypto asset adoption in most emerging markets and LICs kept pace with advanced economies in Asia. While it is not surprising that advanced economies such as Australia, Hong Kong SAR, Korea, and Singapore, have a large volume of transactions in crypto, several emerging markets and LICs, such as Mongolia, the Philippines, Thailand, and Vietnam, have seen crypto transactions amounting to more than 20 percent of their GDP. More countries are joining the crypto ecosystem. Lao P.D.R., for example, authorized two licensed crypto asset exchange platforms in January 2022.

The use of crypto assets for payments and settlements is still limited, with some exceptions. Cambodia, Thailand, and Vietnam, for example, represent the norm in most Asian emerging markets and LICs, by prohibiting the use of crypto assets as a means of payments, and not recognizing them as a legal asset or a foreign currency. Some advanced economies, such as Singapore, prohibit the use of crypto assets for retail services, while there are exceptions, such as Japan, where crypto assets are connected to the existing payment system through registered crypto asset exchange service providers under the Payment Services Act. A crypto asset exchange service provider in Japan receives bitcoin from users on the blockchain network and transfers fiat currencies corresponding to the received bitcoin through the existing payment systems.

With increased activity in the crypto ecosystem and the significant potential risks this may entail, several countries are in the process of developing frameworks for regulating crypto assets. Australia, for example, announced plans of creating a licensing framework for crypto asset exchanges in December 2021. Similarly, Hong Kong SAR is planning to introduce a statutory regime for regulating virtual assets and virtual asset service providers. Singapore regulates digital payment token service providers under the Payment Services Act. While Thailand already had an Emergency Decree on Digital Assets in 2018 to control and regulate digital assets, including crypto assets, it recently banned payments using crypto as its use was

becoming widespread which could lead to price volatility, cybertheft, and money laundering risks.¹¹ More recently, the failure of Luna in May 2022 drew greater regulatory scrutiny in Korea, and other Asian countries, particularly with respect to the stabilization mechanism of the algorithmic stablecoin, TerraUSD.

Fact XI. PICs have also shown interest in CBDCs and crypto assets as a way of leveraging new technology to enhance financial inclusion and cross-border payments

- Four out of the 11 PICs providing responses to the survey have engaged in some form of CBDC development.¹² In July 2021, Fiji, the Solomon Islands, Tonga, and Vanuatu initiated a general CBDC feasibility study with a private sector technology partner.¹³ The study aims to systematically assess financial infrastructures in the four countries and evaluate the potential risks and benefits of introducing CBDCs and other forms of digital money. The Marshall Islands is currently conducting a feasibility study on a US dollar stablecoin backed by government reserves to promote the national digital payment system.¹⁴ Previously, the Marshall Islands introduced a law in 2018 to adopt a crypto asset as the second legal tender, but the implementation was put on hold because of concerns raised by the international community regarding macroeconomic, financial stability, and integrity risks. Crypto assets have also reached PICs. Fiji has one of the fastest adoptions of crypto assets globally, while countries like Papua New Guinea and Vanuatu have seen active transactions using crypto assets.¹⁵

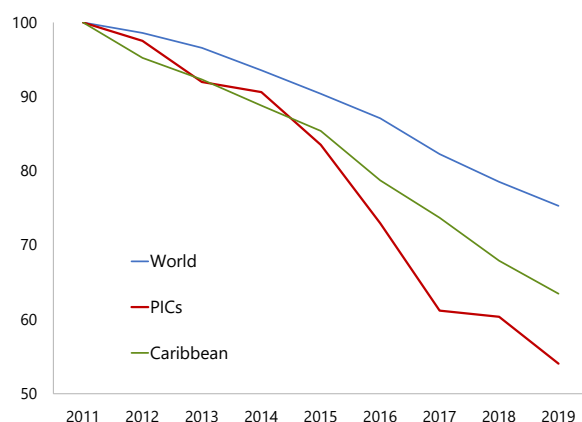
¹¹ In Thailand, 31 percent of people own digital assets, according to Statista. The share is the second largest among 56 countries in the survey after Nigeria.

¹² Countries without a central bank, including many PICs, technically cannot issue a CBDC but could consider some other form of digital money backed or issued by the state.

¹³ The National Bank of Cambodia also collaborated with a private sector technological firm to design and built Project Bakong, a blockchain-based digital currency and payments infrastructure that enables instant wholesale and retail transactions. Project Bakong was officially launched in 2020.

¹⁴ The Marshall Islands is not planning to launch a CBDC, as neither SOV (a blockchain-based currency and the new legal tender) nor the recent US dollar stablecoin initiative relate to central bank liabilities.

¹⁵ Other types of crypto projects are rising in PICs—see Annex II.

Figure 11. Number of Active Correspondent Banking Relationships*Index 2011—100*

Sources: BIS; and IMF staff calculations.

- Financial inclusion and cross-border payment efficiency are cited as the top two drivers for the exploration of CBDCs among PICs. As some of the world's most remote and geographically disperse countries, financial inclusion remains a major challenge, with many PICs in the region still lacking access to financial services. Financial technology, through a digital currency and/or an efficient payment system, may play an important role in facilitating financial inclusion and lowering cross-border transfer costs. Ongoing losses of correspondent banking relationships (CBRs) in PICs threaten to cut some countries' access to international finance, including remittances from abroad (Figure 11) (Alwazir and others 2017). The disruption of international financial access would have a significant adverse macroeconomic impact for PICs. CBDCs, if appropriately designed and implemented, could help alleviate CBR pressures in the region and promote smoother cross-border payments.
- PICs, however, face a multitude of challenges in adopting digital money, and significant capacity development will be needed before adoption. The surveyed PICs pointed to current soft and hard infrastructure gaps as main challenges. Practical infrastructural, technological, and institutional (legal, regulatory, and supervisory) frameworks are substantially underdeveloped for PICs to design and implement digital money. In pursuing new fintech solutions in PICs, proper frameworks and regulations will be particularly important, including to address financial integrity concerns and to meet the regulatory and supervisory requirements of digital money. PICs expressed interest in capacity development to understand the technical aspects of launching a CBDC, its regulation, and its impact on payment systems and monetary policy, and to develop proper frameworks for CBDCs and crypto assets.

Fact XII. There is a strong appetite for learning from cross-country experiences, regardless of the stage of development in launching a CBDC

Although most Asia-Pacific countries have conducted some form of exploratory or analytical work on CBDCs, it is evident that countries are eager to learn from cross-country experiences, including through

peer-learning forums and sharing knowledge on best practices. The survey also revealed that areas identified for knowledge sharing were broad-based, mirroring the myriad of challenges in adopting CBDCs (Fact IX). Several countries have suggested new areas for knowledge sharing. For example, Indonesia has suggested learning about the integration of retail and wholesale CBDCs, while Maldives would want to learn about the evolution from mobile payments to CBDCs, and Philippines would like information on how to gauge whether a central bank is ready or not for launching a CBDC. To facilitate knowledge sharing, Vietnam has thought about a possible conference, while Bhutan would prefer capacity building initiatives. The IMF has stepped up its role in knowledge sharing through a series of analytical papers¹⁶ and the survey shows that CBDC-related issues are also being covered increasingly in Asian countries through bilateral surveillance.

¹⁶ <https://www.imf.org/en/Topics/fintech>

III. Lessons Learned from the Survey and Country Case Studies

Public sector interest for digital money solutions has increased rapidly in recent years. The interest by Asian policymakers in considering CBDCs and improving the payment systems broadly mirrors that of other regions. The pandemic accelerated the digitalization of payments and contributed to a greater push by central banks to consider CBDCs (Kosse and Szemere 2021), and this push is likely to continue for years given the long-term nature of pilots and regulatory and legislative processes. Although it is too early to draw conclusive policy lessons given the evolving nature of digital money, there are several takeaways from this survey and the associated country case studies (presented in Annex II), which help provide lessons and form an initial assessment for the benefits and costs of CBDCs in these economies, reflecting the wide range of their needs and their economic diversity. For a broader discussion of the macro-financial implications of digital money see IMF (2020).

In most economies, the rapid emergence of crypto assets and associated technologies, and the extent or speed of their adoption are likely to determine how seriously central banks consider CBDCs. A common finding from most economies is that the significant boom in crypto activities—and subsequent bust in 2022—have, in part, led policymakers to evaluate the use cases of CBDCs, even though CBDCs and crypto assets are not substitutes for each other. In Indonesia, the Philippines, and Vietnam, the strong prevalence of mobile money platforms has supported some crypto usage for remittances and investment purposes among individuals and has made policymakers consider the tangible benefits of technological innovation, such as lower cost and payment system upgrades. The use of blockchain-based technology for other government functions, such as bond markets (the Philippines) and covenant monitoring (India) has also provided a favorable experience in CBDC consideration. The evolution and adoption of crypto assets could also give a nod to the use cases for CBDCs, especially as they are likely to become symbiotic in retail applications. Still, there are many important design and policy issues that need to be carefully considered to determine whether a CBDC will be an appropriate solution to a country's specific challenges.

For advanced economies, the focus will probably remain on the compatibility of CBDC designs with their monetary and payment frameworks. One of the main policy priorities for many advanced economies with well-developed payment infrastructures (such as Australia, Korea, Japan, and Singapore) is ensuring the interoperability of possible CBDCs (particularly wholesale) within the existing domestic payment and settlement systems, maintaining smooth interaction with the financial market infrastructure, and upgrading cross-border applications, such as for foreign exchange markets. Measures aimed at preserving some privacy in payments against data needs (for example, tiered wallets or accounts requiring different degrees of customer identification) are often evaluated against the need to adhere to anti-money laundering/combating the financing of terrorism (AML/CFT) compliance principles and requirements. In advanced economies, several factors, including technological hurdles and the need for regulatory compliance, are likely to lead most economies to a two-tier implementation system, with the central bank acting as the issuer of the CBDC and the private sector as the distributor and technology provider. The importance of multilateral cooperation and coordination for the application of CBDCs,

developments in other advanced and large economies, and standard-setting body policy advice, are all likely to strongly influence national implementation strategies.

Emerging market economies are likely to continue considering CBDCs mainly to upgrade their payment systems and to promote financial inclusion. Many emerging market economies seek to modernize their payment systems by adopting greater digitalization. Boosting the safety and resilience of payments, lowering the cost of transactions, and allowing for faster detection of illicit activities are core features of envisaged CBDCs. Giving greater access to financial services, such as the ability to make electronic payments, transfer capital, or save (that is, store wealth) without the use of a financial intermediary, can be facilitated via digital money, such as CBDCs (especially retail ones). This can be particularly helpful for emerging market and developing economies.

PICs and low-income countries are exploring other digital money options to promote financial inclusion. In some PICs and low-income countries, mobile money is already an efficient way of increasing financial inclusion and has the advantage of being relatively simple to implement compared to a CBDC. Additionally, the considerable expertise and deep understanding of design issues needed for CBDC development often contrasts with limited institutional capacity. Nevertheless, synthetic CBDCs, or privately issued stablecoins backed by government reserves, may to some extent replicate the function of CBDCs by offering users the convenience of digital payments with the needed regulatory and supervisory compliance, thereby improving access to more financial services (although there are many important design and policy issues that need to be addressed). Cambodia also leveraged existing technologies, such as blockchain and DLTs, to meet the strong demand by its younger population for mobile payments while encouraging greater use of the domestic currency in payments. Technology adoption can be leveraged similarly by other countries to fulfill their specific financial inclusion and access needs.

Using CBDCs for cross-border payments could play an important role, and more work is needed. Regional initiatives can help solve interoperability challenges between nationally issued CBDCs and allow smooth international settlements. They are necessary for linking national CBDCs, and multi-CBDC platforms can make cross-border payments faster and cheaper. Deeper exploration is needed on a broad array of technological, regulatory, and governance issues, as has already identified by Project Dunbar (BIS 2022b) and the multiple CBDC mBridge Project. It is also important to ensure that these various regional initiatives are themselves interoperable so that cross-border payments in the whole region remain integrated.

Greater communication and information exchange among countries and standards-setting bodies has the potential to enhance capacity building. Given the need for cross-country knowledge sharing, greater discussions in the auspices of regulatory and policymaking working groups with standards setters and international financial institutions can analyze the lessons learned and document how countries are navigating their challenges, especially where CBDCs are launched or are in the advanced stages of conducting pilots. For example, knowledge on changing the legal framework could be gathered from China or India, where countries can compare and contrast between the two different approaches. Similarly, lessons on measures to regulate crypto assets, including stablecoins, can be learned from policies considered by Australia, Japan, and Korea. Guidance on regulating stablecoins published by BIS's Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions can also be useful.

IV. Concluding Remarks

This note summarizes the latest developments on CBDC planning and adoption in the Asia-Pacific region. It draws on a survey of IMF country teams and authorities in the region conducted in early 2022, and it is augmented by country case studies for the design and implications of CBDCs. Given the large penetration of crypto assets in most of Asia, there is significant interest in broader digital money developments.

Progress comes fast and slow in digital money, especially for CBDCs. Despite an early foray by China in examining the use of the e-CNY as the main digital money domestically, it was only recently that most countries in the Asia-Pacific region have undertaken steps to consider the suitability of prospective CBDCs. The promise of lowering costs for transactions and broadening access to financial services is clearly important, but, as it is shown in this survey and the accompanying case studies, there is a wide range of objectives, challenges, and outcomes for CBDCs in Asia.

For some countries, crypto assets are part of the equation as well. A significant share of the increase in interest in CBDCs is because of growth in the global crypto ecosystem and the increasing adoption of crypto assets in Asia. This underscores to policymakers the need for greater control over payment systems, to maintain financial stability and protect consumers. The recent decline in crypto asset prices and the failure of large stablecoins and unbacked crypto assets are likely to intensify regulatory scrutiny in light of inherent risks, and will likely affect CBDC decisions, including the considerations for retail CBDCs. Since its 2021 ban, China does not consider crypto assets for any activity.

The overall cautious approach to CBDCs is appropriate and consistent with an incremental upgrade rather than a revolution in payments. Notwithstanding the legal challenges for central banks to issue CBDCs (see, for example, Bossu and others 2020), policy discussions on the costs and benefits of CBDCs are centered around improving the efficiency and safety of existing payment systems and potentially increasing financial inclusion, while keeping financial stability issues (such as bank deposit stability) in check. The identification of use cases, along with complex design and policy issues, requires careful consideration at the country level. Least-developed countries and small states, such as PICs, potentially have the most to gain from digital payments given transaction cost savings and better connectivity for remote locations. Overall, there is a shared sense in the region that CBDCs may bring significant benefits for many economies.

Annex I. Coverage of Economies

Table A1. List of Economies Covered in the CBDC Survey

AEs	EMs	LICs	PICs
Australia	Brunei Darussalam	Bangladesh	Fiji
Hong Kong SAR	China	Bhutan	Kiribati
Japan	India	Cambodia	Marshall Islands
Korea, Republic of	Indonesia	Lao P.D.R.	Micronesia
Macao SAR	Malaysia	Nepal	Nauru
New Zealand	Maldives	Papua New Guinea	Palau
Singapore	Mongolia	Vietnam	Samoa
	Philippines		Solomon Islands
	Sri Lanka		Tonga
	Thailand		Tuvalu
	Timor-Leste		Vanuatu
<i>Note: The breakdown considered for this note is non-exclusionary, as some PICs are also classified as LICs in other definitions.</i>			

Annex II. Country Case Studies

What are the steps the more advanced countries have taken on their path to adopting CBDCs? With a view to providing more granular information beyond the survey, a deeper analysis of 14 cases was conducted. These cases have been grouped into 7 categories based on their common characteristics. China and Hong Kong SAR were the first to pilot, while India and Thailand are preparing to launch their pilots soon. Japan, Korea, and Australia do not see a need to launch for now but have engaged in significant preparatory work. ASEAN countries, such as Indonesia, the Philippines, and Vietnam, see the need for CBDCs to keep up with crypto asset developments. Two multi-country CBDC platforms are already being tested in Asia; and, finally, Pacific Islands Countries are also testing the waters by starting research and development.

Category I. China and Hong Kong SAR – The First Movers

Country	China	Hong Kong SAR
Status	Pilot	Pilot (for wholesale); research/study (for retail)
Type of CBDC	Retail	Retail and wholesale
CBDC/project name	e-CNY	e-HKD; Project mBridge; Project Sela

Motivation. CBDC developments in China and Hong Kong SAR are both motivated by a fast-growing digital economy and a strong desire by the general public to further improve payment efficiency and to future-proof the payment systems. Given their already complex and advanced payment systems, the CBDC projects emphasize interoperability with existing electronic payment systems, including bank transfers and payments from other digital wallets.

Status in China. China's CBDC study dates back to 2014, and its pilot (e-CNY) started in 2019 (PBoC 2021). It is currently focused on retail use aimed at enhancing the efficiency and reliability of domestic payment systems, while cross-border use is being tested on a technical basis in Hong Kong SAR with a focus on compliance with local regulations (IMF 2022b). The e-CNY functions as legal tender and cooperates and complements the two main private sector payment platforms AliPay and TenPay, which are currently dominating China's retail payment ecosystem. It is developed on a two-tiered system with both centralized and distributed ledger architectures and is supported by technologies developed in-house. Banks, non-bank payment service providers, and telecom operators are among private sector participants that are authorized to interact with end users in the second tier of the system architecture. While official numbers are unavailable, the total number of e-CNY wallets reportedly reached 261 million in 2021, with total transactions of RMB 88 billion (equivalent to \$13.8 billion),¹⁷ still an almost negligible fraction of the total money supply in China despite the reportedly large number of wallets.

¹⁷ <https://www.scmp.com/tech/tech-trends/article/3163953/chinas-digital-currency-e-cny-wallet-nearly-doubles-user-base-two>.

Status in Hong Kong SAR. Hong Kong SAR currently operates three CBDC projects. Its wholesale CBDC project—LionRock—started in 2017 and was an important undertaking for the economy as an international financial hub. It was geared toward exploring the capabilities of DLT for facilitating real-time cross-border payments and settlements using CBDC(s), aimed at directly addressing the pain points in existing payment systems including inefficiencies, high costs, limited traceability, and complex regulatory compliance (IMF 2022a). A partnership was later formed with the Bank of Thailand to experiment on a cross-border CBDC platform—Project Inthanon-LionRock—which eventually became a cornerstone of the regional multiple CBDC project (BIS 2021, Bank of Thailand & HKMA 2021). Hong Kong SAR's retail CBDC project (e-HKD) started more recently, in June 2021, as a potential way to future-proof the economy's payments system while promoting innovation in the digital economy. Through technology experimentation and a study of legal and policy considerations, the project aims to explore a two-tier architecture for a retail CBDC and potential solutions for disintermediation risks, over-issuance prevention, privacy preservation, and the programmability of the e-HKD (HKMA 2021). While no decision has been made to formally introduce the e-HKD, the HKMA recently published a discussion paper covering the potential benefits and challenges of the retail CBDC, various design considerations and use cases of e-HKD, inviting public opinions on a range of policy issues (HKMA 2022). A third CBDC project—Sela—jointly developed by the HKMA, Bank of Israel and BISIH is currently underway. The focus of the project is to delve into cybersecurity issues in the context of retail CBDCs.

Legal reforms. On the legislative front, the revised Law of the People's Bank of China (PBoC) authorized that the PBoC has the exclusive right to issue RMB, including both physical RMB and digital RMB (i.e., e-CNY). A new Personal Information Protection law was recently adopted in China, which is observed by the e-CNY system to protect consumer privacy. In Hong Kong SAR, the HKMA discussion paper notes the importance of ensuring that the issuance and legal tender status of the e-HKD is clearly prescribed by law in a consistent and coherent manner, whether through amendment or consolidation of existing currency-related ordinances or a new standalone ordinance tailored specifically to accommodate the e-HKD.¹⁸ A review of the AML/CFT legal framework, in light of the architecture ultimately adopted, should ensure suitable coverage of e-HKD activities.

Take-aways. As pioneers, both cases can provide lessons for others, including the importance of developing sound security and risk management mechanisms while protecting data privacy and establishing a clear regulatory framework for the issuance and circulation of digital currency. For instance, wallets with a balance limit of 10,000 e-CNY can be obtained with only a registered phone number, while wallets with a higher balance are subject to higher identification and Know Your Customer (KYC) standards.

Category II. India and Thailand – Preparing Pilots

Country	India	Thailand
Status	Research/Pilot	Pilot

¹⁸ See the note prepared by the Hong Kong Monetary Authority “[e-HKD: A Policy and Design Perspective](#)”

Type of CBDC	Retail	Retail and wholesale
CBDC/Project name	Digital Rupee	Digital Baht; Project Inthanon

Context. In some emerging markets in the region—for instance, India and Thailand—high level of crypto adoption has raised concerns about potential financial stability and financial integrity risks. Authorities in India and Thailand are closely watching the developments related to crypto assets and have taken measures – while in Thailand, digital assets were banned for payment starting April 1, 2022, India introduced a 30 percent tax on profits from crypto trading. Both countries are also at advanced stages in their CBDC projects.

Status in Thailand. The Bank of Thailand (BOT) has been involved in R&D work on CBDCs since 2018 – starting with wholesale CBDC pilot as part of their project Inthanon, which subsequently evolved into multiple CBDC mBridge project (see below). As a next step, the project is collaborating extensively with the private sector to identify business use cases. On the retail side, the BOT is in the process of preparing a small-scale pilot from Q4 2022 and is assessing intermediaries that will take part in the pilot, including banks and non-bank payment service providers. The Thai retail CBDC will be based on a hybrid architecture with the BOT issuing the currency and intermediaries carrying out KYC and other customer-facing functions. The BOT has opted for a combination of centralized and distributed ledger design – while centralized technology offers advantages in terms of scalability and performance, decentralized technology offers greater resiliency, and its cryptographic techniques can help enhance security. Finally, there is a preference for the CBDC to be non-interest bearing, with specified limits for holding, transacting and conversion, to mitigate risks of disintermediation and, during times of crisis, runs.

Status in India. RBI is currently working towards a phased implementation strategy and examining use cases which could be implemented with little or no disruption. RBI is exploring to conduct a pilot/proof of concept of CBDC testing different design elements with respect to suitability of policy requirements. Based on the learnings from the pilots, it is expected that a CBDC will be launched subsequently.¹⁹

Legal reforms. To provide the RBI legal authority to issue a digital Rupee, the RBI Act 1934 has been amended to redefine 'bank note' as a note issued by the central bank, whether in physical or digital form. Similarly, plans are underway in Thailand to grant BOT the authority to issue a CBDC.

Take-aways.

- The emergence of private crypto assets has garnered regulatory interest and provided impetus to the CBDC agenda. While the endpoint is still uncertain, these countries want to minimize any negative implications from the growth of crypto use on the domestic monetary and financial system;
- R&D for the launch of CBDCs are done alongside regulatory and legal reforms, including in the central bank law.

Category III. Australia, Japan, Korea, and Singapore – Strong R&D

¹⁹ The Ministry of Finance of India has announced India's intentions of launching a retail CBDC in FY23.

Country	Australia	Japan	Korea	Singapore
Status	Proof of Concept	Proof of Concept	Experiment	Pilot
Type of CBDC	Retail and wholesale	Retail and wholesale	Retail	Wholesale
CBDC/ Project name	eAUD, Project Atom	Digital Currency JPY (DCJPY)	Undecided	Project Ubin

Context. Advanced economies in the region—most notably Australia, Japan, Korea, and Singapore—have undertaken strong R&D efforts to be technically ready for the issuance of CBDCs. These countries view CBDCs as an opportunity to reduce inefficiencies in the current payment system and to provide the central bank counterpart of digital money. However, they do not foresee any immediate need to issue CBDCs.

Status of CBDC Adoption. Research and development in Australia and Japan has covered both wholesale and retail CBDCs. Singapore has focused on a wholesale CBDC with Project Ubin, and Korea is considering a retail CBDC.

- For its wholesale CBDC, the Bank of Japan (BoJ) has explored opportunities and challenges of DLT for financial market infrastructures in a joint project with the European Central Bank over 2016 – 20 under project Stella. Over four phases, the project analyzed the processing of large-value payments using DLT, securities delivery versus payment in a DLT environment, implications for cross-border payment efficiency, and confidentiality and auditability in a DLT environment.
- In Australia, technical experimentation on wholesale CBDC started in 2018 and was initially limited to the Reserve Bank of Australia (RBA) and commercial banks. However, Project Atom undertaken in 2020 – 21 explored the implications of extending access to wholesale CBDC to non-bank wholesale market participants. The project involved the development of a proof-of-concept (POC) for the issuance of a tokenized form of CBDC that could be used by wholesale market participants for the funding, settlement, and repayment of tokenized syndicated loans on an Ethereum-based DLT platform. Australia embarked on a new research project in August 2022 to explore use cases for a CBDC, including a limited-scale pilot CBDC.
- The BoJ and the Bank of Korea (BoK) started their experimentation to test the technical feasibility of a retail CBDC in April and August 2021, respectively. In the first phase (already completed), both central banks tested the basic functions of a CBDC (creation, issuance, circulation, withdrawal, and destruction) in a virtual test environment. Both central banks are now focusing on additional, more sophisticated functions under phase 2.
- In 2016 – 20, the Monetary Authority of Singapore (MAS) in collaboration with the industry conducted Project Ubin to explore the use of blockchain technology and CBDC issued by the MAS to clear and settle payments and securities. The project involved industry testing of the technology, including more than 40 financial and non-financial firms, and demonstrated that multi-currency payment and settlement across borders could be achieved in real time, and at lower risks and costs. In 2021, the MAS joined other the central banks in Project Dunbar, a multi-CBDC cross border payments network rail (see Category VII below for more). In November 2021, the MAS initiated Project Orchid focusing on building the tech infrastructure and competencies to

support the issuance of a retail CBDC, even though there are no immediate plans to launch a digital Singapore dollar.

Architecture. The BOJ, BOK, and RBA have shown preference for a hybrid or two-tiered payment and settlement system, where the central bank issues the CBDC and delegates to the private sector to interact with end-users.²⁰ While these central banks are still at research/proof of concept stage, they have emphasized the importance of interoperability with existing payment systems and other digital money/CBDCs.

Private Sector Engagement. The ongoing research has also involved a strong collaboration with the private sector. In Australia, Project Atom was a collaborative research project between the Reserve Bank of Australia (RBA) and industry partners including two large commercial banks, a financial services company, and a blockchain technology company, with additional input from a legal firm. In Singapore, project Ubin involved a consortium of financial institutions, a DLT company, and several other technology partners that support the DLT platform and manage the development and deployment of prototypes. Similarly, in Korea, the experiment for retail CBDC is being conducted in cooperation with private companies.

Take-aways.

- Interoperability, both with existing domestic payment systems and internationally with other CBDCs/digital currencies is a key policy priority.
- Data privacy can be ensured by not storing personally identifiable information while still allowing the central bank to view transactions, for example for AML issues.
- There is a preference of a two-tier system with the central bank as an issuer and private sector as distributor.

Category IV. Indonesia, the Philippines, and Vietnam – Keeping up with Crypto Assets

Country	Philippines	Indonesia	Vietnam
Status	Planning stage for pilot	Research & development	Plans for feasibility study
Type of CBDC	Wholesale	Both	Undecided
CBDC name	CBDCPh	Digital Rupiah	Digital Dong

Context. ASEAN countries, particularly Indonesia, the Philippines, and Vietnam, already had a strong prevalence of mobile money. Recently, however, crypto assets have been widely used for remittance payments and investment purposes.²¹ The penetration of crypto assets is high despite the fact that

²⁰ The MAS's retail CBDC study explored a two-tiered system.

²¹ The Philippines and Vietnam placed third and fourth, respectively, out of 56 countries in using or owning crypto assets in 2021, according to Statista Survey (<https://www.statista.com/statistics/1202468/global-cryptocurrency-ownership/>).

Vietnam and Indonesia do not allow crypto assets for payments, while the Philippines only allows them for remittances.

Timeline of Adoption. All three countries have started R&D into CBDC as they see it as necessary to keep up with private crypto assets. The Philippines also sees wholesale CBDC improving the efficiency, safety, and transparency of cross border payments, particularly remittances. It has already done several exploratory studies on CBDCs.²² The Philippine central bank (BSP) established an expert panel in 2020 to explore creating a CBDC and began examining the impact on the financial system. Plans are underway to pilot wholesale CBDCs as early as 2023. The Indonesian authorities continue to improve digital payments (for example, the introduction of QRIS²³) and are doing research on how to integrate a prospective CBDC with the existing payment systems. Vietnam is planning a feasibility study with a private technology partner, though no commitment to issue a digital currency has been made.

Application of Technology. All three countries have previous experience in using blockchain platforms in other applications. In the Philippines, blockchain has been used to sell government bonds, while in Vietnam blockchain has been used to register national IDs. This experience could be useful in launching a CBDC. The strong security and traceability features of blockchains lend themselves to other applications such as for election voting processes that are under consideration in Indonesia.

CBDC Type. The Philippines has shown interest in piloting a wholesale CBDC which could help enhance the safety and efficiency of its national payment system and reduce cross-border transaction costs. Indonesia has shown interest in both types of CBDCs, although there are concerns on how to best integrate the two types of CBDCs. The State Bank of Vietnam is in the exploratory stage and has yet to decide on the CBDC type.

Legal Reforms. The National Payment Systems Act provides the BSP expanded authority to own and operate a payment system, and this may be used as the legal framework to introduce the use of CBDC in wholesale form, but there is a legislative constraint for the issuance of a retail CBDC. In Vietnam, there are plans to carry out legal reforms to broaden the mandate of its State Bank to include the issuance of digital currency issuance.

Take-aways.

- The emergence of private crypto assets, whether approved or not, has created an impetus to consider CBDCs.
- The use of blockchain platforms in other government services has provided a favorable experience in the use of technology that could inform future CBDCs.
- R&D for the launch of CBDCs are done in tandem with regulatory and legal reforms, including in the central bank law.

Category V. Cambodia – Leveraging Technology Used for CBDCs

What is Project Bakong? Project Bakong, developed in collaboration with a private technology partner, enables Cambodians to use a free mobile app provided by the National Bank of Cambodia (NBC) to

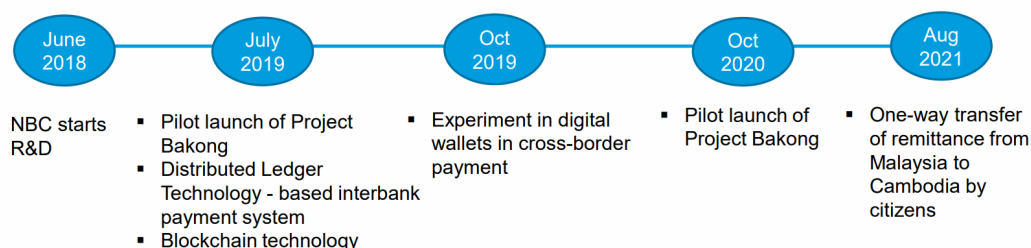
²² For details see Central Bank Digital Currency for the BSP

https://www.bsp.gov.ph/Media_And_Research/Publications/CBDC_for_the_BSP_Book.pdf.

²³ QRIS stands for Quick Response Code Indonesian Standard, a standardization of payments using a digital payment code or QR code intended for easier, faster, and secure transactions.

make payments and transfer money through financial service providers on its platform. Through the platform, commercial banks, microfinance institutions and payment service providers (PSPs) can deliver e-wallet and money transfer services to users. Payments or transfers can be made in U.S. dollar or Cambodian riel, the two currencies used in the country. Project Bakong is not a CBDC, as it does not involve the exchange of central bank-backed tokens, but rather a blockchain-based nationwide payment system from the NBC.

Timeline of Events



Goals. There were several major reasons for launching project Bakong:

- The first reason was to promote financial inclusion through secure and low-cost transactions. Project Bakong is able to leverage the high mobile penetration of the country to provide mobile service payments and bypass the problem of a highly unbanked population. Reports suggest that, as of November 2021, nearly half of the country's population (7.9 million out of 16.7 million) had transacted via Project Bakong directly or indirectly through electronic payments of participating banks.
- Cambodia's complex payment marketplace comprises banks, microfinance institutions and PSPs which operate relatively independently of each other, resulting in a fragmented financial services landscape. Project Bakong aims to unify the fragmented payment systems in Cambodia by bringing in all players together on a common and interoperable platform in real-time.
- Although Project Bakong allows transactions in both US dollars and Cambodian riel, it aimed to reduce dollarization in the economy through a surge in the users of Cambodia's blockchain payment system.
- Finally, it also aimed to help reduce the cost of sending remittances by eliminating fees to money transfer services and informal agents. Cambodian citizens can make one-way transfers from Malaysia to their unbanked families through Bakong.

Privacy issues. The blockchain records all transactions in a chronological series of cryptographically secured records. The Bakong system uses no personally identifiable information and preserves the privacy of users while still allowing the central bank to view transactions.

Other Issues. To make Bakong more attractive to the public, more can be done on the demand side such as on educating consumers on digital technology and promoting financial literacy and usage of digital financial services.

Take-aways. A high degree of mobile usage can be leveraged to enhance financial inclusion. The technology used in CBDCs can be tailored to meet country-specific needs to advance digital payments without issuing a CBDC.

Category VI. Pacific Island Countries – Testing the Waters

Context. Among the world's most remote and geographically dispersed, PICs face major challenges for financial inclusion, with many in the region still lacking access to financial services. Moreover, the ongoing reduction of correspondent banking relations in PICs threaten to cut some countries' access to international finance, including limiting their ability to receive remittances. Citing the global digital money and crypto assets revolution, policymakers in PICs are looking to leverage new technologies as a way to improve the financial inclusion and payment efficiencies, and gain economic benefits.

CBDCs and stablecoins. Marshall Islands has been an early starter in the region to explore digital money and crypto assets. It passed legislation for adopting a private cryptoasset (SOV) as the second legal tender in early 2018. However, substantial concerns on macroeconomic and financial stability and integrity risks that the introduction of the SOV would entail put the implementation on hold.²⁴ The authorities are currently conducting a feasibility study jointly with a technology partner, on developing a national digital payment system using a USD stablecoin. Palau, under a partnership with a private crypto firms, is also exploring plans to launch a government-backed national stablecoin. Fiji, Vanuatu, the Solomon Islands and Tonga are conducting feasibility studies on introducing CBDCs.

Crypto asset projects. Other crypto asset projects are also under way in PICs. Vanuatu amended its Financial Dealers Licensing Act in July 2021, reversing a previous ban on cryptoassets and making it the first country in the Pacific and one of the few in the world to legalize a broad set of cryptoasset activities. Marshall Islands has become the first country to formally recognize Decentralized Autonomous Organizations. Tuvalu's national digital ledger project aims to digitally transform the country and to go cashless. As Tuvalu uses the Australian Dollar as its national currency, the plan also includes to integrate a tokenized version of the AUD on the digital ledger.

Risks. Widespread adoption of digital money and crypto assets may be disruptive for PICs' financial and economic systems if associated risks are not well managed. These could include financial stability risks arising from weak digital resilience as well as financial integrity risks.

Considerations. Given the substantial capacity gaps, timely policy advice, international coordination, and capacity development will be crucial for successful digital money development and adoption in PICs.

Category VII. International Integration (project mBridge & Dunbar) – Strength in Numbers

Context. To explore CBDCs' potential for improving cross-border payments, two regional projects are being undertaken involving Asian economies.

- **Project multiple CBDC mBridge.** This project includes central banks and monetary authorities in China, Hong Kong SAR, Thailand, and the United Arab Emirates, and is undertaken jointly with the BIS Innovation Hub Hong Kong Center. It started in 2021 with a trial platform developed, focusing on the use of central bank digital currencies and DLT technology for real-time, cheaper and safer cross-border payments and settlements. mBridge adopts the Lego Bricks Approach,

²⁴ The IMF continues to recommend that the authorities seriously reconsider the issuance of SOV (Country Reports 18/270 and 21/96). The government commissioned a comprehensive due diligence study in early 2021 that will serve as the basis for Parliament's decision to potentially repeal the 2018 SOV act. A decision by parliament to repeal the SOV act remains pending.

which offers customized modules to satisfy regulatory needs of various jurisdictions. Supported by 22 private sector participants (including major international banks), the trial platform has been successfully tested under the use of international trade, showing promising early results by completing payment or foreign exchange payment versus payment (PvP) in seconds, as well as lowering costs and improving transparency. From 2022 Q3, the business use case of international trade settlement entered the pilot stage, with an aim to achieve a system that could support the full process of international trade settlement. The next step of the project is to conduct pilot transactions and further enhance platform designs to better serve the broader central bank community.

- **Project Dunbar.** This project included Australia, Malaysia, Singapore, and South Africa, also started in 2021 in a partnership with the BIS Innovation Hub Singapore Center and shares many common features with Project mBridge. It is built for wholesale use with an objective of utilizing DLT technology for more efficient and secure cross-border payments and settlements between financial institutions using digital currencies issued by multiple central banks. By enabling direct transactions on a common platform, the multiple CBDC network could reduce reliance on intermediaries and thereby the costs and time associated with cross-border payments and settlements. Two prototypes have been developed with technology partners which enabled international settlements using digital currencies issued by multiple central banks. The study also identified challenges of implementing a multi-CBDC platform shared across central banks, in the areas of access eligibility, compliance with varying regulatory requirements across jurisdictions, and governance arrangements to safeguard national payment systems. Several practical design solutions are proposed to address these challenges, which support the technical viability of such a platform.

Take-aways. International projects can help solve interoperability with other CBDCs/digital currencies to allow smooth cross-border trade and financial transactions. Prototypes developed so far have shown great promise in improving international payments and settlements. However, greater focus on cross-border regulations and governance is needed.

Annex III. Survey Questions

Stage of Development

- Has your central bank engaged, or will it engage, in any kind of research, experiments or development work related to the development and use of CBDC?
[Yes/No]
 If yes, please give details on the type of engagement.
 If no, please explain why not?
 If you plan to implement a CBDC, what's the expected timeline (dates) and milestones for the project, from design, pilot, to final deployment?

CBDC Type

- What type of CBDC are you interested in? Choose from the dropdown list --- Wholesale, Retail, or Both?
 - Wholesale*
 - Retail*
 - Both*
 Please explain why you are interested in this type of CBDC?
 Please explain how the interoperability between CBDC and other payment systems will be achieved?
 - If interested in retail CBDC, please answer question (3 – 13)*
- What's the CBDC's operation model?
 - Central bank issues CBDC & performs all functions*
 - Central bank issues CBDC & delegate private sector to interact with end users*
 - Private sector issues stable coin backed by central bank assets*
 Please explain the reason for your choice.
- Will you consider opting for an interest-bearing CBDC?
 - Very likely*
 - Somewhat likely*
 - Somewhat unlikely*
 - Very unlikely*
 Please explain the reason for your choice.
- Will you consider imposing a cap or limit on individual holding
 - Very likely*
 - Somewhat likely*
 - Somewhat unlikely*
 - Very unlikely*
 Please explain the reason for your choice.
- What ledger design would you consider?

- *Centralized*
- *Decentralized*
- *Combination*

Please explain the reason for your choice.

7. Please describe the technology stack you're considering adopting for your CBDC.
8. Will your CBDC be interoperable with open source blockchain networks such as Ethereum, and other countries' CBDC network?
If so, how is the interoperability achieved?
9. Will your CBDC be interoperable with existing payment networks? If so, how is it achieved?
10. What would be your preferred payment authentication design?
 - *Identity-based*
 - *Token-based*
 - *Multifactor*
 Please explain the reason for your choice.
11. What kind of user / transaction data will be collected through your CBDC system?
12. Will you be working with private sector partner(s) in implementing CBDC? If so, what're their roles?
Who are the partners you've chosen or are considering?
13. Who will own the technical infrastructure and use data of CBDC?
Additional Comments.

Work Type

14. What type of work is being, or will be, conducted? Please choose all that apply.
 - *Research / Study*
Research/Study
 - *Experiments / proofs of concept*
 - *Development / pilot arrangement*
 Please provide details i.e., when the work started, progress etc.
15. Which department or unit in the central bank will be in charge of your CBDC project?
16. In your view, what would be staffing requirement at the central bank for implementing a CBDC? [*E.g., How many staff is needed? With what type of expertise?*]
17. Are you considering any organizational changes to accommodate a CBDC project?
Additional Comments.

Drivers

18. What was the motivation for engaging in the development of CBDCs?
 - *Financial stability*

- *Monetary policy implementation*
- *Financial inclusion*
- *Payments' efficiency (domestic)*
- *Payments' efficiency (cross-border)*
- *Payments' safety / robustness*
- *Monetary sovereignty*
- *Others (please specify below)*

19. If there are more than one motivation, please list it below. *[For each aspect, please indicate Very important / Important / Somewhat important / Not so important]*

Please provide any comments on your motivations for any aspects you considered as very important or important.

20. To your best guess, what percentage of your population have used private sector crypto assets, such as bitcoin, Ethereum, stable coins?

21. What are the main use cases for these assets in your country? *[E.g., speculative investments, payments, store of value.]*

22. What are the main factors driving the adoption of private crypto assets in your country?

23. What's the level of dollarization in your country if any? *(For example, as measured by dollar denominated loans and deposits as percent of total.)*

24. Are you seeing increased dollarization from the usage of stable coins or expect it from CBDC? Do you think stable coins and CBDC will lead to increased dollarization in your country?

Issuance

25. How likely is it that your central bank will issue a wholesale CBDC?

- *Very likely*
- *Somewhat likely*
- *Somewhat unlikely*
- *Very unlikely*

26. What is the time horizon?

- *Short term (within the next three years)*
- *Medium term (four to six years)*
- *Long term (after six years)*

27. How likely is it that your central bank will issue a retail CBDC?

- *Very likely*
- *Somewhat likely*
- *Somewhat unlikely*
- *Very unlikely*

28. What is the time horizon?

- *Short term (within the next three years)*
- *Medium term (four to six years)*
- *Long term (after six years)*

29. Does your central bank have the legal authority to issue a CBDC?

- *Yes*
- *No*
- *Uncertain*
- *Laws are currently being changed to allow for it*

If yes, please provide details on the legal authority i.e., a law that was recently modified for CBDCs etc.

If not, please explain if plans are underway to provide legal authority.

30. Has the Covid-19 pandemic accelerated the development of CBDC? [Yes/No]

31. If yes, please select all that apply

- *Enable access to central bank money during times of emergency*
- *Serve as a payment channel for public funding programs*
- *Complement to cash and in-person payment methods when*
- *Social distancing is required*
- *Provide alternative to private payment systems in case of a credit crisis*
- *Other (please specify) _____*

Please provide an explanation for your selection.

32. How will the CBDC be regulated after it is issued?

Challenges

33. What are the main challenges you are facing in developing and implementing CBDCs?

Please provide details on the challenges

34. How are you planning to address these challenges?

35. What are the information sources you use to keep up to date on knowledge of CBDC and cryptocurrencies?

36. How is your central bank looking to develop the technical expertise in implementing CBDC?

37. Are you hiring any external consultants or technical advisors to help implement CBDC?

If so, what's their affiliation and background?

Digital Money

38. Are there any forms of digital money (ex. stable coins)/ crypto assets (ex. Bitcoin) circulated in your country? [Yes/No]

- If yes, please answer the following questions:

- a. What are they?
- b. What is their legal status?
- c. Are they offered by indigenous companies/institutions or foreign ones?
- d. What are the underlying assets that back their value?
- e. What is the size of the market?
- f. Are they freely exchangeable with other currencies?
- g. What platforms are they transacted/traded on?
- h. How are they integrated with the existing payment systems?
- i. Are they regulated? If not, is there any plan to regulate them?
- j. Are they in circulation outside the jurisdiction and being used for cross-border payments?

IMF Engagement

39. Has the Fund ever publicly commented on the development of CBDCs, digital money or crypto assets in your country? *[Yes/No]*

If yes, please provide the reference.

40. What kind of assistance would you like from the IMF for the development of CBDCs, digital money, or other crypto assets?

41. What kind of analytical work would you like to see from the IMF and the Asia-Pacific Department specifically?

Analytical Country Work

42. Does your team do any analytical country work on digital money, crypto assets, CBDC, or any similar topic? (yes/no)

43. Please list any published or forthcoming papers on these topics, including Article IV annexes and Selected Issues Papers.

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