



The Future of CBDCs

Why All Central Banks Must Take Action

As part of their remit of continuing to evolve money and payments, Central Banks around the world are beginning to explore, test and implement some form of Central Bank Digital Currency (CBDC).

There are a number of reasons for the growing momentum behind offering sovereign-backed versions of private cryptocurrencies.

The Rise of CBDCs

Through the power of blockchain technology, financial institutions are enabling seamless, instant global payments. Each Central Bank will also have its own motivations for pursuing a digital currency that will be driven by specific market challenges and opportunities.

The nature of that primary goal – whether it's overcoming limitations of existing payments infrastructure, promoting financial inclusion, boosting competition or fostering innovation – will determine the approach and technology of each CBDC.

It is likely that we will end up with a world of diverse CBDCs, which makes interoperability critical. Though most Central Banks are focused on solving domestic problems, the global nature of trade and finance means cross-border coordination must be baked into the original recipe of each CBDC.

The internet became a global tool for the exchange of information because the world agreed to build it using common standards. Likewise, CBDCs can adopt open payments protocols and use neutral bridge assets to facilitate a frictionless exchange of value across borders.

Without this crucial interoperability, Central Banks will be putting limits on their CBDC's success while compromising the future of their financial system – instead of developing a more effective and inclusive evolution of money.

Key Findings

Trend for declining cash use has been accelerated by COVID-19 as more people shop online and opt for contact-free payment options.

1/4

of US consumers used cash less often since the pandemic began.

Facebook's announcement of plans to create its own digital coin prompted fears that it could undermine the traditional global financial system.

2.4B

users is the potential global reach of Facebook-backed currency.

China's testing of a digital yuan payment system potentially threatens the U.S. Dollar's position as the dominant global reserve currency.

Feb 2022

Proposed launch date for China's CBDC.

There is a growing need for a more effective way for governments to pay benefits or stimulus money directly to citizens, especially the unbanked.

1.7B

Number of unbanked adults across the world.



SECTION I

Introduction to CBDCs

What Is a Central Bank Digital Currency?

A CBDC is the sovereign equivalent of private cryptocurrencies and digital assets like Bitcoin, Ethereum and XRP. It would be issued and controlled by a country's Central Bank and used by people and businesses for retail payments, much like cash but in digital form. **CBDCs will also be used for wholesale settlements in the interbank market.**

CBDCs: The Future of Fiat

Central Banks issuing their own digital currencies is a natural evolution of how we exchange value. But that does not mean that CBDC development should simply follow the old pathways. Our existing currencies were created in a much less globalized world and are not designed for efficient exchange.

While most markets are exploring CBDCs that solve specific domestic challenges, each Central Bank also needs to implement a holistic strategy that enables their CBDC to interact in the global market efficiently and ensure it can scale and evolve to meet future requirements.

The Main Benefits of CBDCs

Enhance existing payments infrastructure:

Increase the **speed and efficiency** of payments, while reducing costs and failure rates

Promote **financial inclusion**:

Increase access to financial services for under and unbanked populations and enhance direct person-to-person payments

Encourage greater competition:

Reduce barriers to entry and boost access to global markets through **interoperability**

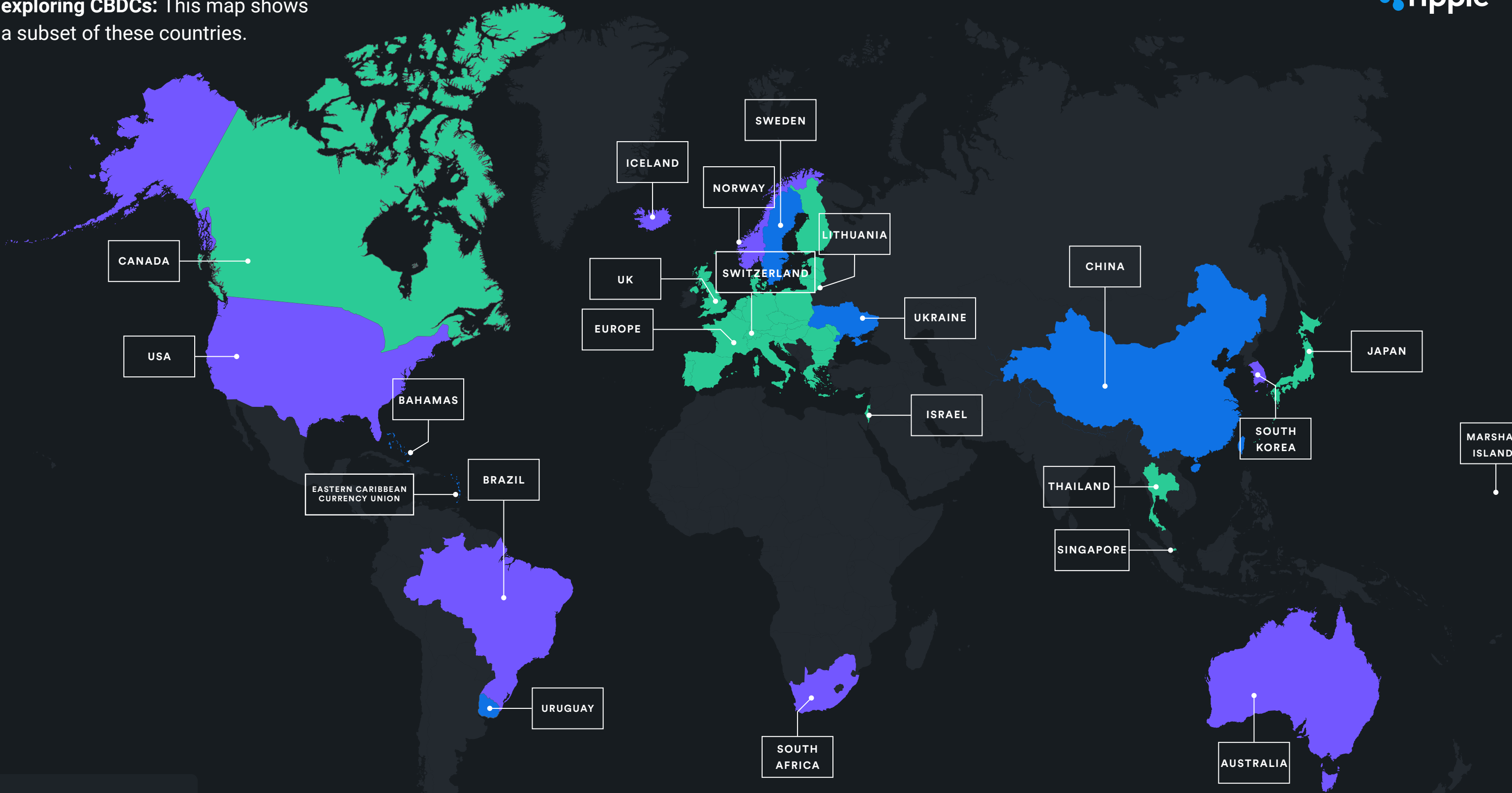
Foster innovation:

Use advanced digital features like smart contracts and programmable money that will be the basis of new financial services

Maintain control:

Ensure Central Banks retain sovereignty over monetary policy and not allow alternative currencies to dominate the market

80% of Central Banks are actively exploring CBDCs: This map shows a subset of these countries.



Legend

- Creating CBDC Prototypes
- Advanced Research Stage
- Early Research Stage

SECTION II

The Main Barriers Impeding CBDC Success

Despite the many benefits of CBDCs, most Central Banks are understandably cautious about pursuing real-world initiatives.

Everything, from how people pay bills and buy groceries to how businesses transact and governments are run, depends on a stable financial system

CBDC initiatives raise many challenges for Central Banks, who must balance the desire for transformation with the need to maintain stability on a global scale.

The Need for Control Versus Desire for Innovation

Most existing digital assets are based on decentralized blockchains where every transaction is validated by a public network of hundreds, often thousands of validators. Central Banks will not be willing to relinquish control to a completely distributed model, as they need the ability to direct and influence their economies through currency management

While a fully centralized model would provide the required control, Central Banks would miss out on innovations like programmable money and smart contracts that blockchain technology enables. It would also reduce the ability of private sector players to access and collaborate with CBDCs.

In addition, Central Banks are typically focusing CBDC approaches, solutions and technologies on achieving specific domestic goals. However, many stakeholders interested in using CBDCs will have other needs as well as global requirements.

If Central Banks do not enable the broad access, enhanced native functionality and interoperability that will allow their currencies to be adaptive and scalable, they risk losing control of the infrastructure for global digitized services.

"If [CBDCs] are cheaper, faster, more secure for users, we should explore it. If it's going to contribute to better monetary sovereignty, better autonomy, we should explore it. If it's going to facilitate cross-border payments, we should explore it."

Christine Lagarde, President of the European Central Bank

Connecting Across Borders

The vast majority of CBDC initiatives are focused on domestic use cases and in a 2019 BIS survey, **Central Banks rated cross-border payments as among their least important considerations**. This may be due to the fact that typically, **Central Banks are not part of cross-border payment flows** and do not have the infrastructure to deal with related functions like transaction monitoring and Know Your Customer (KYC), Anti-Money Laundering (AML) checks. Having its CBDC circulating in foreign jurisdictions will also impact a Central Bank's monetary policy and liquidity management.

Yet, it is extremely short-sighted to overlook cross-border requirements just because these requirements come with additional challenges. In our globalized world, consumers and businesses will inevitably have a need to transact with foreign suppliers and vendors. CBDCs that are interoperable with each other will give those countries a competitive advantage, much like how being part of a trading block benefits member nations.

It will take a lot of effort to harmonize the global frameworks and standards that will enable CBDCs to be successful for cross-border payments. It's critical that Central Banks start working together to resolve these issues now, rather than leaving a bigger problem to fix further down the line.

Confirming Identities

While many private digital assets make a virtue out of anonymity, the ability to identify CBDC users will be a fundamental requirement for Central Banks.

When the U.S. government was struggling to get much-needed stimulus checks to citizens and businesses during the height of the COVID-19 pandemic, fintech advocates noted that a CBDC would have made it much faster and cheaper to pay people directly. However, it would also have required robust identity infrastructure to ensure that each payment was transferred to the right person.

Many other benefits of CBDCs require ID certainty — and the ability to clearly connect users and transactions will be a key condition for Central Banks. Some private cryptocurrencies are already beginning to grapple with some of these issues and Central Banks will need to build on their efforts to create interoperable ID solutions that work globally.

Including Non-bank Channels

One of the bigger drivers of financial inclusion over the past decade has been the rise of financial services from outside the banking sector, such as remittances providers and digital wallets. These services are pioneering new offerings and alternative experiences for traditional banking users.

Current fiat currency capabilities limit the effectiveness of monetary digitization and compel end users to transact in the private cryptocurrencies that Central Banks often view as a threat to financial stability. CBDCs will help retain those users, while boosting financial inclusion and enabling governments to make direct payments to citizens effectively, especially those who are unbanked.

This will require Central Banks to provide non-bank participants with greater access to core payment systems and infrastructure than they currently offer. They will also have to start understanding the potential impact of this change on the role of commercial banks as gatekeepers to retail customers, in order to ensure the continuing stability of the entire system.

By 2024, at least half of the world's population is expected to use digital wallets for transactions that will be valued at more than \$9 trillion annually.

SECTION III

Bridging the Gap in Innovation

The Three Keys to Overcoming Every CBDC Challenge

1. Interoperability

For a digital currency to have any utility to people and businesses, it needs to coexist and interact with other payment schemes in that domestic market. The next level of interoperability for CBDCs is the ability to work for global transactions. Without seamless cross-border functionality, most CBDC projects will significantly underachieve their potential.

Just as the global internet thrived by early agreement on common protocols like TCP/IP, HTTP and FTP, so too should Central Banks start coordinating on CBDC standards to cover basic functions, including:

- Transaction-level operations, such as escrow and hash time-locks
- Identity and addressing schemes
- Flexible routing to determine most efficient ways of transmission

This will allow CBDCs to connect with other domestic services, as well as each other, thereby enhancing their utility, lowering transaction costs and reducing barriers for new market entrants — while allowing each Central Bank to retain sovereignty.

For an even greater level of interoperability, Central Banks will need the ability to actually exchange assets between ledgers, rather than issuing instructions via an API. The key will be for all Central Banks to enable cross-issuance of CBDCs on interoperable ledgers.

Each individual CBDC can create its own rules and policies that best suit its domestic market. However, CBDCs should also be united and guided by collective protocols that will enable them to cooperate seamlessly with other CBDCs and Digital Currencies .

Such a network of networks will allow independent CBDCs to also operate as a unit and make cross-border value exchange faster, cheaper and more reliable for businesses and consumers. It means pushing the idea of interoperability further than many Central Banks have yet considered — but without these shared standards, CBDCs will be as inefficient and expensive a way to exchange value globally as existing fiat currencies.

Every CBDC will need to have some basic level of interoperability built into it from day one.

2. Public and Private Partnerships

The infrastructure supporting the existing financial system is vast and varied and not likely to be redundant any time soon. **CBDC technology cannot replace what we already have, which is why a layered architecture model, where new systems are built on top of the existing infrastructure, makes the most sense.**

A major benefit of layered architecture is that Central Banks can call on the expertise of the private sector to implement CBDC infrastructure without compromising the integrity of the rest of its system. Many reputable private companies have developed successful digital currencies – their technology and experience can help Central Banks get initiatives up-and-running faster and more effectively than starting from scratch.

A CBDC could be issued and managed using a private version of an existing decentralized ledger. While blockchain transactions are typically validated by many public validators, **Central Banks could restrict this ability to a handful of trusted partners** such as commercial banks or the different member states of cooperating unions like the European Union or Eastern Caribbean Currency Union.

This would give Central Banks the flexibility and functionality that comes with decentralized ledgers, while retaining enough centralized control over their monetary policies and economic management.

3. Neutral Bridge Currencies

While interoperability will support the direct exchange of a CBDC in domestic transactions, many of the same, old issues with cross-border transactions will remain. In particular, supporting immediate real-time foreign exchanges, as opposed to the current 3-5 day process, will likely still require the **need for prefunded currency accounts.**

Like any commercial bank or global business, Central Banks will want to avoid the increased costs and risks associated with this familiar liquidity issue. They would also welcome the ability to free up capital that could be generating value elsewhere and skews the financial system in favor of the most liquid currencies – typically those of the most powerful nations.

A neutral bridge asset can support healthy, alternative liquidity markets that will allow for frictionless and cost-effective value movement between various CBDCs in real-time. It would also enable the exchange of less liquid CBDC pairs and increase global competition by lowering entry barriers to new and smaller market participants.

To enable a truly efficient global market, **a bridge currency** must be specifically optimized for payments and support the same speed, scalability, low cost and security that CBDCs will provide. One example of a neutral bridge is the digital asset **XRP**, which can be used to bridge two different currencies quickly and efficiently.

By underpinning an effective alternative liquidity market, neutral bridge currencies are the final piece of the interoperability puzzle that will drive the success of CBDCs as a global tool for exchanging value.

"A neutral bridge asset can support healthy, alternative liquidity markets that will allow for frictionless and cost-effective value movement between various CBDCs in real-time"

SECTION IV

Closing



Time to Define the Future of Money

The introduction of CBDCs will be one of the defining transformations in the history of money.

How the underlying technology is implemented and monetary policies are set over the coming decade will determine whether sovereign-backed digital assets open the door to enhance global trade and financial inclusion or maintain the siloed, inefficient and inequitable status quo.

Today, some Central Banks are moving faster than others, when it comes to piloting programs and implementing initiatives. But the future success of CBDCs will require a global consensus, rather than relying on a few pioneers with their own agendas to lead the way. The world's Central Banks must come together to agree on common CBDC standards and protocols that will enable interoperability, while also drawing on the existing knowledge and infrastructure of the private sector to accelerate initiatives.

CBDCs have enormous potential but must first overcome numerous challenges. Now is the time for Central Banks to explore these issues, develop common solutions and ensure that the next evolution of money benefits more people and businesses and makes the world better.

About Ripple

Ripple provides one frictionless experience to send money globally using the power of blockchain technology.

By joining Ripple's growing global network, financial institutions can process their customers' payments anywhere in the world instantly, reliably and cost-effectively.

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