

# The Future of Money in 3 Parts

## Money in the age of tech

Rise Insights report

#HomeofFinTech

rise Created by BARCLAYS

**PART 1**

McKinsey & Company

Financial Services Practice

## Tokenization: A digital-asset déjà vu

Tokenization adoption was poised for success six years ago, but progress was limited. Renewed interest might feel like déjà vu, but stronger business fundamentals and structural changes suggest the path could be different this time.

**PART 2**



Monetary Authority of Singapore

15 August 2023 | 19

## Annex A: Summary of Finalised Key Requirements

KEY REQUIREMENTS FOR MAS-REGULATED STABLECOIN ISSUERS

**PART 3**

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 **BARCLAYS**



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# Foreword

The last decade witnessed some of the most pivotal transformations in the payments space.

Sustainable digital payments are slowly transforming how people transact and utilise money. According to the World Bank, two thirds of adults worldwide now make or receive digital payments, with the share in developing economies growing from 35% in 2014 to 57% in 2021.<sup>1</sup>

The shift from cash to digital has improved accessibility and also made it possible for financial institutions to offer digital payments to suit customers' needs. Innovative tech like blockchain, 5G, DeFi and digital tokens like NFTs has gained momentum and caught the attention of consumers, fintechs, banks and regulatory bodies. Despite its volatile and complex nature, crypto-assets have gained popularity. As of 2023, there are an estimated 420 million global crypto users. The growth in decentralised finance has led to more conversations around stablecoins and their potential use cases. In one of the most noticeable developments, a bill to regulate stablecoins has progressed through the UK parliament.<sup>2</sup>

Central banks have been and continue to be at the heart of this evolution by maintaining financial stability as well as laying down strong regulatory policies to protect consumers and businesses. This year, we're already seeing a push towards central bank digital currencies (CBDC) as 65 countries are in the advanced stages of development and more than 20 countries have launched pilots.<sup>3</sup> To modernise an

already advanced digital payments infrastructure, the Reserve Bank of India (RBI) has also launched a retail and wholesale CBDC pilot with over 50,000 users and 770,000 transactions.<sup>4</sup> If the right CBDC design choices are made, they can support consumers and banks by providing a range of benefits, including reduced dependency on cash, lesser settlement risk, faster transactions and reduced costs.

Web3 and the metaverse also promise several shake-ups in the way traditional money and monetary norms operate. Web3 is being touted as the next iteration of the internet that reimagines the way people interact with each other, consume services and transform traditional money into 'programmable money', potentially reshaping the future of payments and finance (for more on the topic of payments, see our report [The power of payments](#)). Several players, such as Nike, Samsung, Walmart, Hyundai, Ferrari, Coca-Cola and many more have marked their presence in the metaverse and are trying to adapt to the new digital economy. To facilitate this digital economy, several notable financial institutions are also exploring digital money, NFT-backed services, trade finance and custody of digital assets. One such example is Fnality, a venture supported by a consortium of banks including Barclays and which develops a digital cash instrument that runs off blockchain technology.<sup>5</sup> Developments are still nascent with new advances arriving each day.

The role of regulators and policymakers is also crucial. A strong regulatory framework will be needed to protect consumers and investors so that it ensures they and businesses don't get tangled up in the complexity of tech and the ever-evolving digital nature of money. Banks, fintechs and other bodies will have to collaborate to smooth the mass adoption of digital tokens, stablecoins, CBDCs and other new forms of money, and ensure the tech is sustainable.

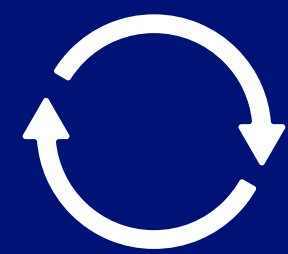
As this report shows, we're witnessing one of the most exciting periods in the history of finance and money. Enjoy reading it.



**Nilesh Chaudhari**  
CIO, Global Payments Technology,  
Barclays

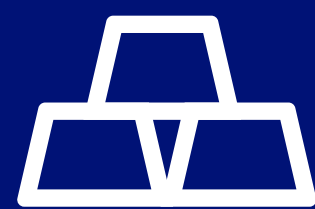
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Timeline: Progression of money and currencies



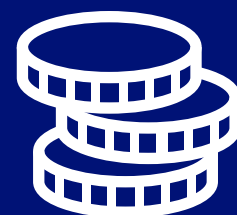
Barter system

- Oldest form of commerce dating back to 6,000 BCE: Before Common Era
- Goods, cattle, services, etc. were exchanged and traded



Precious metals

- Use of cowries made up of metals such as bronze and copper for transactions by the end of stone age
- Use of gold and silver as medium of exchange can be traced back to 4,000 BCE



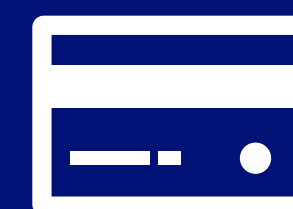
Coins

- Coinage began circa 650 BCE



Paper currency

- First development of paper money dates to around 7<sup>th</sup> century CE in China
- Paper bills gradually spread to other parts of the world



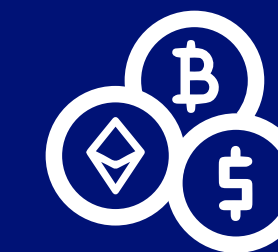
Plastic money

- Charg-it (1946), Diners Club (1950), AmEx card (1958) issued initial version of credit cards
- Barclays launched Britain's first credit card in 1966, revolutionising personal finance
- Magnetic strip and ATMs were introduced in the late 1960s



Electronic payments

- The late 1990s saw the introduction of online payments with companies like Amazon, PayPal, etc.
- Online banking and mobile payments took off since 2000s



Crypto-assets, digital tokens, CBDCs

- Bitcoin was launched in 2009 by Satoshi Nakamoto, becoming the first decentralised crypto-asset
- In 2014, the first stablecoin, BitUSD, is issued on the BitShare blockchain
- The Bahamas became the first country to launch its own CBDC in 2020
- In 2021, El Salvador became the first country to introduce Bitcoin as legal tender

# 2

## Minting a new future—together

Until now, cash was king: Money has always been a physical symbol of value used for exchange of goods and services. In this new era of money, countries are working together to build cashless societies and, with it, greater financial inclusion.





## The evolution of money

The physical objects used to represent money don't always have intrinsic value, whether it's represented by a seashell, metal coin, piece of paper or a string of code electronically mined by a computer. Its total global value—currently estimated to be around \$418 trillion<sup>1</sup>—depends on the importance that people place on it as a medium of exchange, a unit of measurement and a storehouse for wealth.

There are over 150 currencies worldwide,<sup>2</sup> and although the perception is rapidly changing, often when we think of money we think of cash – exchanging a physical representation of money for an item or service. But with cash comes inherent issues, such as counterfeiting. For example, in recent years globally, it's been estimated that over \$2.27 trillion money is counterfeit.<sup>3</sup> The Indian government has taken various steps to address this issue, including introducing new security features in banknotes, but counterfeiting continues to evolve.

Enter digital money.

From the beginnings of online banking in 1981<sup>4</sup> to the introduction of mobile payments in 1997,<sup>5</sup> digital banking has evolved, and continues to evolve, in leaps and bounds. Think of physical cards, which are no longer needed with mobile payments since they don't require an infrastructure such as ATMs to accept payments. Result: less infrastructure and wider adoption of digital banking by consumers who are mobile and tech-savvy. Simultaneously for merchants, the adoption of low-cost QR codes has increased significantly, making them a preferred option over traditional card machines. These instant, digital payment methods have enabled people to make transactions across borders and opened new opportunities for ecommerce.

In India, digital payment systems such as Unified Payments Interface (UPI), offer many benefits over physical money, including increased security, faster transaction times and easier tracking of financial transactions.

## Digital India and its global influence

As the graphic shows, digital payments in India have increased in number dramatically in just a short time. Much of this is due to the advent of the UPI system in 2016, which allows payments via a user's virtual payment address (VPA) or from QR-code transactions.

The success of UPI in India has inspired the development of similar payment systems around the world. The UPI architecture has been adopted by several countries, such as Singapore, Bhutan, UAE, Oman and France.<sup>6</sup> Other countries have also produced their own set of instant payment systems that are based, like UPI, on mobile phone numbers or national identification numbers. They include:

- [PayNow](#), Singapore's peer-to-peer payment system
- [PromptPay](#), Thailand's real-time payment system
- [Pix](#), Brazil's account-to-account payment method

As with UPI, these payments systems have helped drive the shift towards digital payments and have made it easier for people to transfer money and make purchases securely using their mobile devices.

## But as with any evolution, there are still pain points

The shift towards digital and near real-time payments puts pressure on banks' legacy systems, which weren't always designed to handle large volumes of

transactions. This has led to friction and delays in processing payments and creates a negative impact on customer experience. Therefore, innovations like UPI Lite allows low-value payments to be processed without the need to connect with a consumer's bank for every transaction.

Additionally, to ensure that consumers are able to pay using their choice of accounts, real-time payment (RTP) systems should be interoperable to ensure that all existing accounts are discoverable rather than forcing the consumer to open new types of accounts. For example, UPI allows consumers to attach debit accounts, credit card accounts (Rupay) and prepaid accounts.

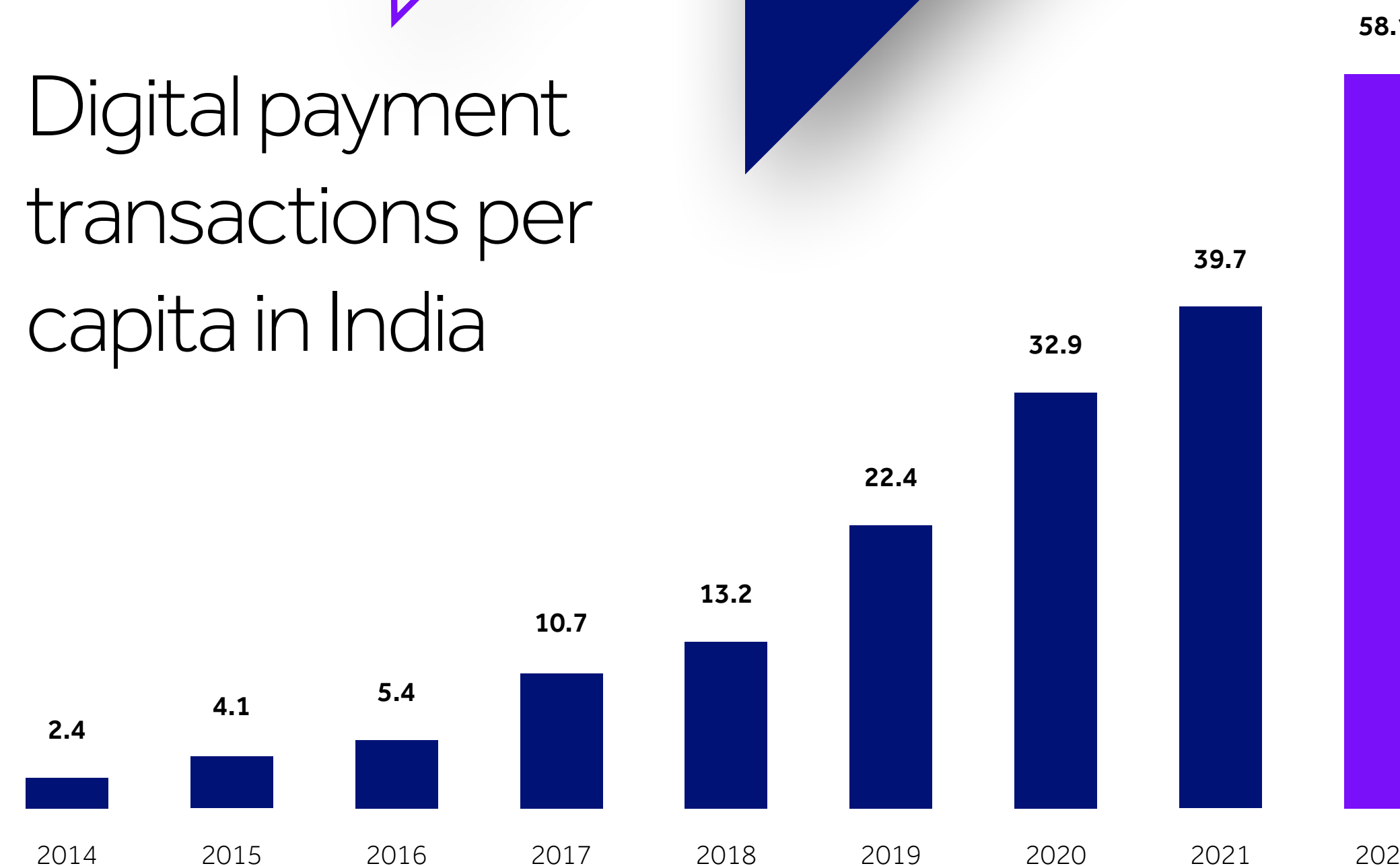
While NPCI continuously works towards expanding the coverage, the core challenge remains adoption of RTP systems across a diverse network of people, languages, connectivity and demographics. Payment services that are IOT-based, recurring (AutoPay), voice (123Pay), network-less and biometric-based (AePS) will help penetrate markets for both the middle- and lower-income classes.



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## Digital payment transactions per capita in India





# Scandinavia: Pioneer of a cashless economy?

In many respects, Scandinavian countries are often seen as being at the forefront of digital innovation. The region's recent move towards digital money presents perhaps yet another great example.

Over the past decade, the Nordic countries - Denmark, Sweden, Norway, Finland and Iceland - have been rapidly transitioning towards a cashless economy, with the use of digital payment methods becoming increasingly widespread.<sup>1</sup>

As we have all experienced with the rapid adoption of cashless payments as a consequence of COVID-19, the shift towards digital money has transformed the way that people conduct transactions. The swift development in Scandinavia was caused by a number of factors. First and foremost, these countries are among the ones with the highest internet and smartphone penetration in the world,<sup>2</sup> which prepared people with both the necessary hardware and the familiarity to make digital payments. The region also has a highly developed banking infrastructure, making it relatively easy for financial institutions to introduce digital payment options.

A concerted effort between governments and businesses in the region to promote digital payment methods also helps to make them a more efficient and, more importantly, secure alternative to cash.<sup>3</sup>

Many shops and businesses no longer accept hard currency, and some banks have even stopped providing cash services altogether.<sup>4</sup> Take Sweden, where cash transactions in the country fell by around 40% between 2010 and 2019. Today, only around 13% of all transactions in Sweden involve cash, with most people preferring to use digital payment methods such as mobile payment apps and credit or debit cards.<sup>5</sup>

The change in practices, habits and preferences to move away from cash and deep into digital money has had various implications. For businesses, the move allows them to operate more efficiently, dispensing with the need to handle cash and other, costly operations, as well as reducing the risk of physical theft and fraud. For consumers, digital payments have made transactions more convenient and efficient. Long gone are the days of having to search for and get money out of an ATM and carry it around. For governments, it's reduced the level of tax evasion. More broadly, the shadow economy (cash-only jobs) shrinks with a digital economy.



In Sweden, cash transactions fell 40% between 2010 and 2019. Today, only around 13% of all transactions in Sweden involve cash.

### Did someone mention crypto?

The level of crypto adoption across the Scandinavian countries varies. But, as they've generally been early adopters of new technologies, it's no surprise that interest in crypto-assets is relatively high. For instance, Sweden has a vibrant crypto community and many merchants and businesses accept Bitcoin and other crypto-assets as payment. In addition, the Swedish government has been exploring the possibility of creating a central bank digital currency (CBDC), which could further boost crypto adoption in the country.<sup>6</sup>

Norway has also seen significantly greater interest in crypto-assets, with a growing number of merchants taking crypto payments. However, the Norwegian government has been more cautious than its Swedish counterpart with crypto regulation, the result of which could slow down the take-up.<sup>7</sup> Denmark also has a relatively high level of crypto adoption. In 2019, Denmark's tax authority reportedly began targeting crypto-asset traders to ensure that they weren't evading taxes on their earnings. This move suggests that the Danish government is taking crypto seriously and we could see it turning out to be a currency alternative.<sup>8</sup>

Overall, while the level of crypto adoption in Scandinavian countries may not be as high as in others, there is certainly a growing interest in crypto-assets in the region, and many businesses and individuals are exploring the potential of these new digital assets.

### But beware, problems remain

While most people in the region have access to digital payment technology, many do not. This group includes elderly people, who may not have access to the necessary technology or be comfortable using it. For example, despite Sweden's commitment to digital currency, there is some scepticism as to whether it's for the best.<sup>9</sup> And although the number of crimes linked to cash has fallen in Sweden,<sup>10</sup> some in Scandinavia have raised privacy and security concerns with the shift to a cashless society. As digital payments can be easily tracked and monitored, many are worried that governments can easily evolve into a surveillance state. In addition, all payments made online create new opportunities for hacking and the potential for data breaches.

As the rest of the world tracks the developments in the Nordic region and learns from their experience, it's likely that we will see more countries transition towards digital money in the coming years.



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# 3

## Improving the paper trail **without cash**

With virtual currencies such as central bank digital currencies (CBDCs) and stablecoins, money will become abstract. But even though you won't carry money in your pocket, technologies such as blockchain help ensure it's more secure and accountable.



# The CBDC footprint is expanding globally

Central banks across the world have been experimenting with central bank digital currencies (CBDCs). Almost 120 countries, representing over 95% of global GDP, are exploring a CBDC in some shape or form.

Eleven countries have fully launched a digital currency, and China's pilot, which reaches 260 million people, is set to expand to most of the country in 2023. Also this year, over 20 countries will take significant steps towards piloting a CBDC.

## So, what is a CBDC?

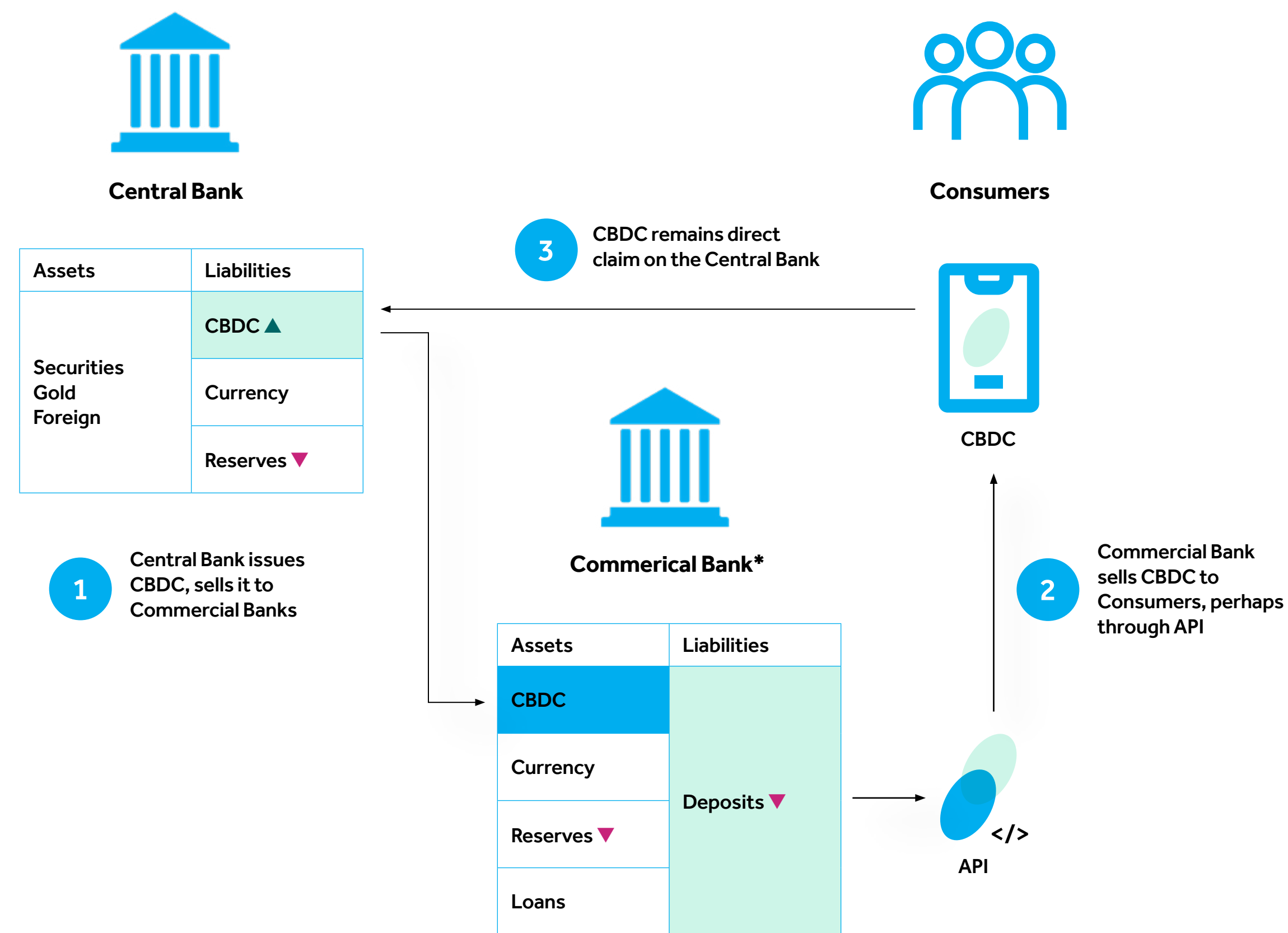
A CBDC is a digital form of a country's fiat currency that is issued by its central bank. Like paper currency, a CBDC is a direct claim on the bank. Unlike some of the most well known crypto-assets, a CBDC is not issued by a public blockchain that can be accessed by anyone.

As a result of regional conflicts and sanctions, countries have sought to diversify their payment options without a dependency on any particular currency. There are now nine cross-border wholesale CBDC experiments and seven cross-border retail projects.<sup>1</sup> Besides cross-border transactions, CBDCs create lending marketplaces, legalise donations and reduce cost of stimulus fund injections, and most also reduce illegal fund movements by embedding smart contracts.<sup>2</sup>

## Direct and indirect CBDCs

In the direct model, consumers have a direct account with a central bank, which sells or transfers CBDCs in the consumer's account. Inherently, this model is built on maximum trust, but it puts pressure on the central bank and dilutes the role of commercial banks.

In the indirect model, banks are the intermediaries. Central banks issue or sell CBDCs to commercial banks, which sell or transfer CBDCs to retail consumers. In this more widely explored model, consumer accounts are owned and managed by commercial banks.<sup>3</sup>



Note (▼) Central bank debits commercial bank's reserve account with the central bank to pay for CBDC, thus overall reserves decline. Additionally, commercial bank debits consumer's deposit account to pay for CBDC obtained through API. Decline in reserves is offset by (▲) increase of CBDC in circulation.

\*Unlike banknotes, CBDC can be distributed by other Payment Interface Providers such as exchanges and virtual asset service providers, and not just commercial banks

## Use case: India's eRupee

India is piloting CBDCs for the future, with much research and excitement at the prospect of supporting the use of Web3. Scalability, privacy, liquidity, interoperability, standardisation and offline transactions are all being examined.

The Digital Rupee-Wholesale (e-W) was launched on 1 November 2022, but limited to the settlement of secondary market transactions in government securities.<sup>4</sup> According to the Reserve Bank of India (RBI), "use of the e-W is expected to make the inter-bank market more efficient [and] reduce transaction costs by pre-empting the need for settlement guarantee infrastructure or for collateral to mitigate settlement risk."<sup>5</sup>

The pilot in the retail segment, known as Digital Rupee-Retail (e-R), was launched on 1 December 2022, within a closed user group comprised of participating customers and merchants.<sup>6</sup> The first phase included four banks: State Bank of India, ICICI Bank, Yes Bank and IDFC First Bank.

The pilot has already seen digital rupees worth over \$15.8 million issued as of March 2023 across the wholesale and retail CBDC pilot.<sup>7</sup> RBI aims to scale the pilot of the retail CBDC to one million users<sup>8</sup> by July 2023 and, per the RBI Executive Director Ajay Kumar Choudhary, the central bank is going to test a multiple-tech architecture, multiple design features and multiple use cases, including an offline programme.<sup>9</sup> RBI has launched a hackathon to identify use cases and solutions for retail CBDC transactions, including transactions made while

offline.<sup>10</sup> Target is to onboard one million users by the end of June 2023. RBI is also looking to integrate India's Universal Payment Interface fully interoperable with CBDC for quick adoption.


## There is a lot of excitement in this space...

Factors such as scalability, privacy, anonymity, liquidity, interoperability, ability to transact offline and standardization are likely to determine CBDC's mainstream adoption. Nevertheless, CBDCs have caught the attention of various economies and could serve as a unifying factor.

*The views expressed in this article are those of the author and not necessarily those of IBM. Information in it is for general guidance only.*



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<sup>4</sup> New India Express <sup>5</sup> New India Express <sup>6</sup> The Economic Times <sup>7</sup> Alexa Blockchain  
<sup>8</sup> Businessworld <sup>9</sup> The New Indian Express <sup>10</sup> Apix



# The impacts and benefits of regulation on stablecoins

Stablecoins have been a major topic of discussion in the crypto community over the past few years. They're just one form of crypto-asset, but stablecoins are digital currencies whose value is pegged to another currency, commodity or financial instrument, and offer the benefits of blockchain technology without the volatility associated with traditional crypto-assets.

As the adoption of stablecoins continues, regulatory bodies are starting to take notice. In the UK, there is a push towards regulating them, which could have a significant impact on the future of the financial services industry.

Stablecoins have come a long way since their inception in 2014, with the likes of Tether (USDT), which is pegged to the US dollar.<sup>1</sup> Today, stablecoins are used for a variety of purposes, from day-to-day transactions to cross-border payments to hedging against crypto-asset volatility. As businesses and individuals become more familiar with the benefits of digital currencies, we can expect to see increased adoption of stablecoins as:

- A means of conducting transactions and storing value
- A key component of many DeFi applications
- A faster and cost-effective alternative to traditional methods of cross-border payments

However, with all the benefits comes the need for increased due diligence.

## How the UK is steadying the ship on stablecoins

In early 2021, the UK government announced its intention to give stablecoins the same level of regulation as traditional payment methods, such as debit cards and bank transfers.<sup>2</sup> The UK's Financial Conduct Authority (FCA) has also proposed new rules requiring stablecoin issuers to meet capital rules, hold sufficient assets to back their stablecoins and be subject to anti-money laundering (AML) and counter-terrorism financing (CTF) regulation.<sup>3</sup> These requirements are designed to prevent stablecoins from posing a risk to financial stability in the event of a market downturn. Of course, regulation is a double-edged sword: Strict capital requirements and asset backing reduce insolvency, but over-regulation could stifle innovation and competition.

The Bank of England (BoE) is exploring the possibility of introducing its own central bank digital currency (CBDC).<sup>4</sup> The so-called digital pound, a 'platform model' with a core database that's accessed by an API, aims to provide instantaneous transactions

between parties with a tamper-resistant record of all payments.<sup>5</sup> To promote cross-border transactions and global adoption, the BoE has been working closely with other central banks and financial institutions around the world to ensure that their CBDC will be interoperable with other digital currencies and payment systems.

But even though stablecoins might seem like the logical evolution in economies...

## Things can go wrong

The primary question isn't one of innovation or use of technology—simply put it's a matter of securing funding.

Other factors are at play, but in order for stablecoins to experience smooth sailing, banks need to feel more engaged with the crypto market.





## Where we go from here

Stablecoins are a rapidly growing area of the crypto-assets industry, offering the robust benefits of blockchain technology.

The UK's push towards regulation of stablecoins will provide increased security for investors and facilitate wider adoption of these digital assets. While the UK's CBDC may have long-term impact on the financial industry in the future, it's already clear that the move towards digital currencies is gathering momentum, and the introduction of a 'digital pound' is a major step forward in that direction. The momentum is confirmed by the BRICS nations (Brazil, Russia, India, China and South Africa) that have announced plans to launch their own digital currency.<sup>8</sup>

Overall, the future of stablecoins is bright, as they offer a reliable option for those looking to invest in digital currencies. As adoption of digital currencies continues to grow, we can expect to see increased demand for stablecoins as a means of conducting transactions and storing value. However, it will be important for stablecoin issuers and users to navigate the challenges and risks associated with this rapidly evolving market, which is why robust but flexible regulation is important.



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<sup>6</sup> CNN <sup>7</sup> CNBC <sup>8</sup> First Post

# 4 Harnessing the **full potential** of **Web3** and the **metaverse**

Web3 and the metaverse are open for business and virtual economies are taking off, with central banks and regulatory bodies overseeing their development and inherent risks.







## The axioms and accelerants making the metaverse a powerful economic engine

It can be argued that the first metaverse was created some 50,000 years ago. Through language, we can programme imagery in the minds of others.

Imagine an elephant raising its trunk. For most, it would be an easy exercise. Think of the stories we narrate. A person or culture's oral traditions allow us to construct elaborate worlds in our minds. Those, too, are a form of metaverse.

Technology is taking that imagination to the next level.

Researchers claim that by 2030<sup>1</sup> we'll spend more time in the metaverse than the real world. So, what's the modern metaverse? We can define it as a maximisation function of four axioms coupled by blockchain and AI as accelerants. The four axioms, which will drive growth of the metaverse economy, should be considered when developing business strategies.

The first axiom is the human need for immersive experiences. Quite simply, humans tend to prefer greater sensory engagements over lesser ones.<sup>2</sup> A rollercoaster ride is more immersive than watching a video of the same ride. Although watching the video might almost always be at little to no cost, there's nothing like taking the ride in reality and the premium we pay for the immersion is indicative of the demand.

The second axiom is the human need for community. The desire to bond with others and connect, or at least have the impression that we are connecting, is critical and there are ample studies to suggest that humans crave it, depend on it and even thrive longer with the right community.<sup>3</sup>

Third, we prefer pleasure over pain. It may be stating the obvious, but this is at the root of how we may prioritise some activities over others, even if those activities yield little to no return. Think binge-watching an entire Netflix series versus filing your taxes.

Finally, and often unnecessarily controversial, is that our conception of reality is at the root a fundamental belief system. Hollywood's objective is to convincingly cause us to suspend our disbelief when watching a movie and the metaverse attempts nothing less. In fact, it goes beyond the suspension of disbelief and attempts to convince the user that there's an alternative reality by blurring the line between the real and the imagined.

We can now define the metaverse maximisation function, with the four axioms as inputs or factors in the function. And we can further define the metaverse itself as whichever platform currently maximises all four and creates synergies.

A simple example of a sector that largely incorporates these four axioms is gaming – it involves community, immersion and joy. And although the line between gaming and reality is still wide, it's becoming narrower.

## The accelerants: AI and blockchain

Blockchain, machine learning and AI can act as accelerants or multipliers to this function.

Often, a metaverse employs a marketplace where virtual goods and services can be bought and sold. For example, I can buy a top-of-the-line pair of virtual sneakers to improve my experience, standing or branding in a game. Without blockchain, I do not truly own a perpetual asset – the life of the asset is limited by the life of the centralised organisation that provides the experience. With blockchain, my virtual sneakers can outlive the organisation that issued them or processed the payment, and port them to any other metaverse for use or trade.

Stablecoins allow payments to occur across borders and across systems, dissolving boundaries and payment friction. Couple that with the fact that metaverses can potentially have theoretically limitless internal GDP, and there's nothing to restrict the economic size of a virtual world as money from all corners of the world flows in. If we're spending more time in the metaverse than in the real world, it stands to reason that we may be transacting and trading more there as well. The digitisation of currencies and the virtualisation of reality will together force the whole financial services industry to reconsider how to best capitalise on this opportunity, one that can potentially eclipse the payments volume of a real-world country. This may mean different types of products, fee structures and access points need to be designed.

AI is growing in adoption in the hands of retail users with tools like ChatGPT. Bloomberg's own financial generative, pre-trained transformer (GPT) system indicates that generative AI, the type of AI that produces more information out of existing information, is in its early days. Domain-specific GPTs will become the norm in the coming years.<sup>4</sup> The metaverse has yet to capitalise on this, but it's not difficult to see that hyper-personalisation is coming, meaning a metaverse is no longer provided to you, rather your behaviour creates a dynamic metaverse as algorithms deeply study your virtual activity. Actors, agents or players you face within the metaverse act and react more in line with your psychology as platforms more narrowly tighten the gap between reality and fiction.

In other words, so-called 'hallucinations' (surprising or incoherent responses from AI systems) may someday be highly monetisable



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# The impact of Web3 on global financial systems

Welcome to the digital age, where technology has transformed nearly every aspect of our lives, including how we handle money and other financial assets.

There's been a significant shift towards leveraging Web3 technology in recent years, which has introduced new opportunities for individuals and businesses. Smart contracts, digital assets, non-fungible tokens (NFTs), decentralised finance (DeFi) and decentralised identity offer unparalleled transparency, security and efficiency in financial transactions, making them a promising complementary solution in the shorter run, and disruptive in the longer run, to the traditional monetary system.

Here are some key areas in which Web3 is causing a paradigm shift.

## Global payments: Breaking down geographical barriers

High transaction fees, delays and opaque currency conversion are persistent issues with global payments. Web3 technology that uses native digital currencies like Bitcoin or programmable assets like stablecoins results in a more efficient flow of virtual money across borders. Stablecoins issued

by regulated banks are an innovative hybrid model combining central bank digital currency (CBDC) compliance with stablecoin innovation, bringing programmable money into existing financial systems. Decentralised identity, leveraging self-sovereign principles, can further simplify global customer verification enabling privacy and reusability.

While adoption of cross-border payments is faster in Web3-native areas such as gaming, NFTs, crypto on-ramping and P2P transfers, there's a growing demand in traditional cross-border applications too, such as trade finance. In 2022, settlements using stablecoins surpassed \$7 trillion (in comparison to Mastercard's business transactions totaling \$2.2 trillion), indicating Web3 technology is gaining adoption.<sup>1</sup> Canton Network<sup>2</sup>, a blockchain network that combines public decentralisation with financial market privacy and controls, is just one example of how large institutions are embracing Web3 features for global payments. Visa collaborating with Circle Internet Financial, PayPal and JPMorgan Onyx are others.



## Micropayments: A new wave of business models

Today's digital age has created several new global business opportunities, especially in content creation like influencers and artists, but monetising them is challenging due to inefficiencies with micropayments. With the advent of digital currencies and crypto rails, micropayments can be made with few or no fees, boosting innovative business models that were previously non-existent or unprofitable. Examples include pay-per-use, token-gated access (to exclusive events or content), subscriptions, tipping, loyalty and air-dropping for customer acquisition, retention and services. Payments of a fraction of a dollar without custodial risk offer a new level of financial flexibility.

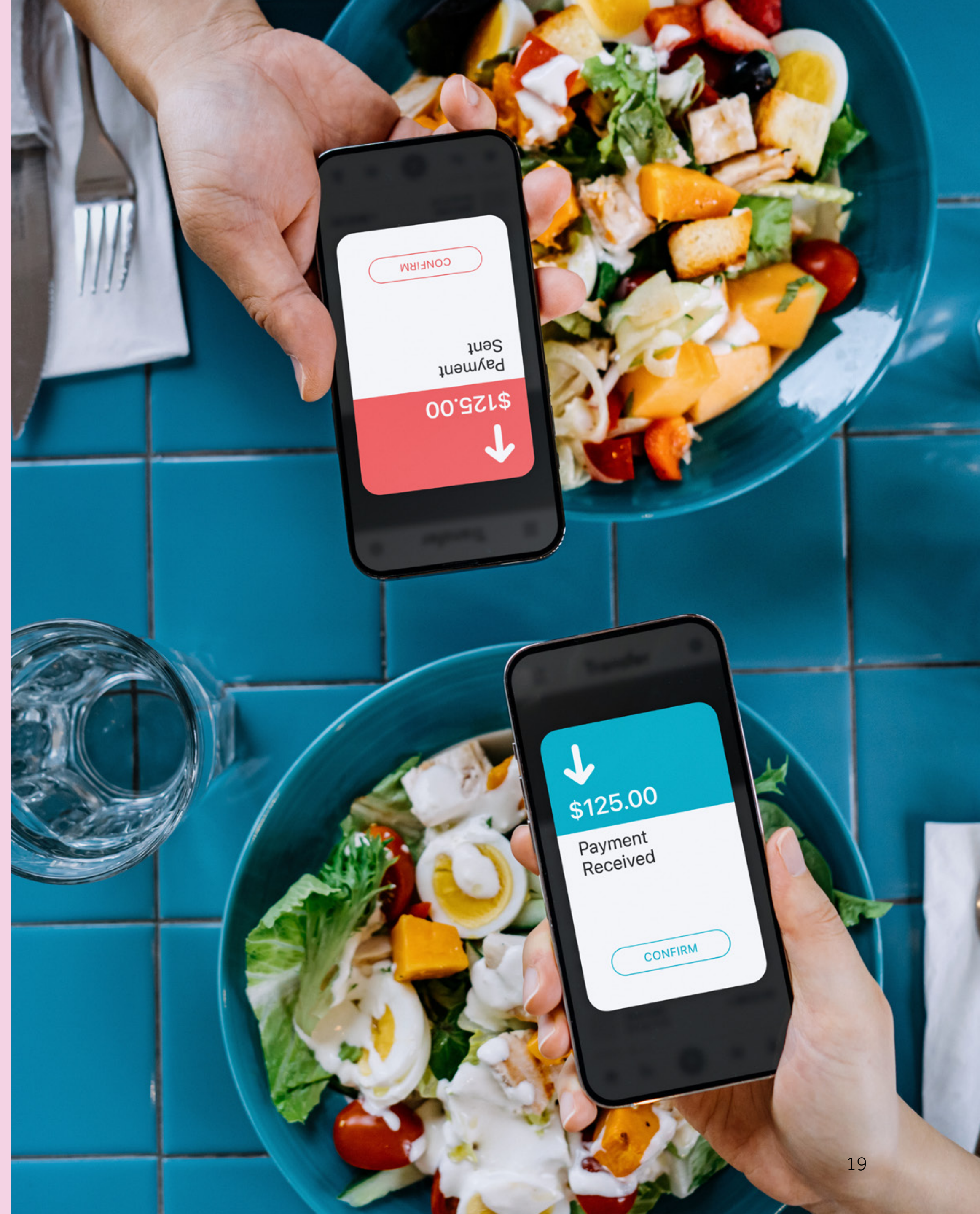
A mainstream example using this type of innovation is Nubank, the Brazilian fintech that offers a token-based loyalty programme (Nucoin) to their 70 million customers. Others include popular browsers like Brave incentivising users for their attention, Opera with its Opera Points as a cashback reward,<sup>3</sup> and startups like Ammer Wallet enabling peer-to-peer payment like a message in Telegram.<sup>4</sup> Furthermore, non-custodial software wallet apps enable simplified payment UX with QR or NFC, making micro-payments more accessible.

## Programmable assets: An innovative way to create new assets

The programmability of digital assets means that digital tokens can be created on the blockchain that represent ownership of an underlying asset, which could be a piece of property, stocks or a work of art. Critically, the assets promote financial inclusion by increasing accessibility to underserved adults.<sup>5</sup> Democratisation with tokenised assets has added global liquidity and a new class of investor, and fractional ownership of high-value assets like real estate or high-value goods has created new asset classes.

As digital assets mature, they become less speculative and gain more utility. Tether (USDT), a popular stablecoin, reported record profits of \$1.48 billion in Q1 2023 and demonstrates the surge in demand in this area.<sup>6</sup> Research by the Boston Consulting Group suggests that the tokenisation of global illiquid assets could become a \$16 trillion industry by 2030.<sup>7</sup> GS DAP™ (Goldman Sachs' digital asset platform), Hamilton Lane, Franklin Templeton and Siemens are leading examples in the tokenisation space. Forward-thinking regulators like the Monetary Authority of Singapore (MAS) are also venturing into Web3 with, for example, Project Guardian<sup>8</sup>, which is a collaborative to test asset tokenisation and DeFi.

<sup>3</sup> Opera <sup>4</sup> Twitter <sup>5</sup> Rise, created by Barclays <sup>6</sup> Tether  
<sup>7</sup> Boston Consulting Group <sup>8</sup> Monetary Authority of Singapore



## Document management: Ownership proven by NFTs

NFTs have disrupted traditional document management practices because they provide a tamper-resistant record of events on-chain that all involved participants can access and validate, resulting in significant savings and fewer delays. From simple certificates to more complex examples like documents of title (e.g. bills of lading) that, to be exchanged, traditionally require courier services, NFTs can offer a simpler, one-click user experience for verification of ownership and transfer.<sup>10</sup>

## Web3 in the future

There are uncertainties ahead: How will policymakers provide clear frameworks? Will tech mature to become more scalable and interoperable? Those caveats aside, Web3 builders are building composable foundational Lego blocks to follow the analogy of the 'dial-up to 5G' internet growth era. Web3 technologies are a promising complement to the existing monetary system and poised to revolutionise it in ways we can't imagine, especially, perhaps, as a platform for the currency of the future. The potential impact is huge, with use cases ranging from disintermediation to ones involving programmable assets.

*The views expressed in this article are those of the author and not necessarily those of Polygon Labs. Information in it is for general guidance only.*



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# 5

## Technology alone isn't **the future** **of money**

Broad adoption is also required. But customer trust and security must not be sacrificed as we fundamentally change how we use money. In order for this to work in everyone's best interest, we'll need all hands on deck, which includes traditional banks and fintechs.



# New money, new challenges

The world of money is evolving, and new forms of it are emerging.

Crypto-assets such as Bitcoin, Ethereum and Litecoin are now widely recognised as legitimate forms of money, and more people are beginning to accept and use them. Other digital currencies and payment systems are also making their way into the mainstream. However, for these new forms of money to be truly successful, there are some critical considerations.

One of the most important factors is convenience. People need a system that's easy to use and can be accessed from anywhere, at any time. This is where fintechs and financial institutions (FIs) can make a difference – by leveraging cutting-edge technologies and providing seamless and user-friendly experiences.

Security is also paramount. People need to know that their money is safe, and that they can transact without fear of losing their funds. Of course, it's banks that provide this assurance, by ensuring the security of transactions, by protecting customer data and preventing fraud. In many cases, banks and other FIs often take the responsibility of refunding money when adverse incidents occur. So providing, for example, two-factor authentication, encryption and monitoring for suspicious activity will all be required.

Another important factor that can drive the adoption of new forms of money is trust. People need to believe it's reliable and trustworthy. By building trust through transparency, communication and regulatory compliance, fintechs and FIs can help foster trust in the new system.

## Back to technology and user experiences

One of the biggest challenges is ensuring that customers are not overwhelmed or confused by the complexities that advanced technologies often bring with them. User acceptance must be seamless because, according to one study, it takes a user 50 milliseconds to form an opinion about an application.<sup>1</sup> The whole financial services industry, including fintechs, can help by educating users in how new systems of money work. This helps to demystify the technology and make it more accessible to the average person. By providing clear and concise information about the benefits and risks of new ways of paying, saving and lending, the industry can build trust and encourage adoption.

Case in point: Revolut, a UK-based digital bank that provides a one-stop shopping experience for its over 28 million users. Services include basic money management to investing to crypto, but also extend to the cutting edge: disposable virtual cards that change after every transaction, thus adding a layer of protection for the user.<sup>2</sup>

The Bank of England (BoE) is exploring a potential retail UK central bank digital currency (CBDC) called the 'digital pound'.<sup>3</sup> The BoE entered the design phase for the digital pound in early 2023, with a decision on whether to proceed to a build phase expected by the

end of 2025. Barclays is engaged with the research and design of the digital pound, which includes:

- participating in the BoE's CBDC Technology Forum<sup>4</sup>
- releasing a public whitepaper describing an illustrative industry architecture that aims to mitigate the risk of fragmentation by placing the digital pound and commercial bank money on a similar footing<sup>5</sup>
- participating in Project Rosalind,<sup>6</sup> which was a joint experiment led by the Bank for International Settlements (BIS) and the BoE to prototype and test interfaces for a potential retail CBDC.

Undoubtedly, fintechs and FIs play a critical role in the implementation of new forms of money. They can help to drive innovation, create new products and services and provide access to new markets. By leveraging technology and providing innovative solutions, they can help to create a more efficient and streamlined financial system, one that includes secure, efficient and reliable payment gateways, merchant services and customer support. They can also work with regulators on compliance and oversight such as anti-money laundering (AML) and know-your-customer (KYC) regulations. This is especially important in the case of crypto-assets, which are often viewed conservatively by regulators.

The Reserve Bank Of India (RBI) is currently piloting both retail and wholesale CBDCs, with a participation of over 100,000 customers and 13 banks. Obviously, security and regulatory compliance are critical. As such, RBI is working with regulators on a provision that would allow retail CBDC users that ability to delete transactions. Why? To maintain anonymity,<sup>7</sup> which is one of the chief concerns about retail usage of CBDCs.

Alongside these specific factors is the smooth functioning of the entire value chain, including operations like payment processing, reconciliation and settlement. By providing reliable and efficient infrastructure and support, fintechs and FIs can help to ensure that the value chain runs smoothly and that transactions are processed quickly and accurately.

To prevent abuse of the financial system as a whole and maintain its integrity the successful adoption of new forms of money will require collaboration, innovation and a commitment to building a better financial future for all.



**Utpal Chakraborty**  
AI & Quantum Scientist  
Founder & CTO, Inteltie Technologies

 utpal-chakraborty

# 6

## From our **Rise sites**





# Rise London

The UK has set a goal to become a science and technology superpower by 2030.<sup>1</sup> Fintech in particular remains a priority, with the groundwork being built for clearer, regulatory frameworks to enable acceleration within financial services.

**Crypto-assets remain in the spotlight: Adoption continues to grow, with 6.2% of residents owning some form of crypto-asset.<sup>2</sup> Despite this, the crypto ecosystem is still largely unregulated. But the UK Government announced plans to “robustly regulate crypto asset activities” sending a message of hope to consumers and businesses.<sup>3</sup> The Spring Budget 2023 also introduced an amendment of self-assessment forms for consumers holding crypto assets for the 2024-25 tax year.<sup>4</sup> This change will unveil more information on consumer behaviour, which in turn could help shape regulation. While we wait for this new bill and consequent regulation to come into effect, fintechs must carry the baton. For example, Rise resident company SavingBlocks helps customers build crypto portfolios that match their risk appetites. From an ecosystem perspective, Rise London continues our in-person monthly Crypto Club, exploring the developing role of digital currencies from a global perspective.**

The central bank digital currency (CBDC) is also being explored in the UK, with the Bank of England and HM Treasury actively exploring the digital pound. Barclays’ Chief Technology Office is actively working in this realm, researching and proposing ways to mitigate potential fragmentation if or when a CBDC is introduced.<sup>5</sup> The proposed platform model even intends to provide non-UK residents such as tourists the option to use it. With an expected earliest build date of prototypes and pilot tests in 2025, the financial roadmap for the UK is strong.

In April, Barclays joined Innovate Finance at its ninth Global Summit, which saw over 2,000 attendees from a wide range of countries. In London’s iconic Guildhall, we heard from Sir Jon Cunliffe, who highlighted areas of opportunity for the fintech world and gave encouraging remarks on the Bank of England “aim[ing] to be forward looking, both in developing the regulatory frameworks and in developing public systems and public money necessary so that safe innovation can flourish to the benefit of all.”<sup>6</sup> But what will developed regulatory frameworks look like? Could this hinder innovation? Will fintechs have to remodel

their propositions? Despite the uncertainty for both nascent and mature fintechs, we look forward to guidelines that support consumer safety and pave the way for innovation.

With carefully crafted regulation and guidelines for companies, we can expect a lot more innovation as all stakeholders support a healthy environment where innovation can thrive.



**Magdalena Krön**  
Global Head of  
Rise Digital Innovation

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## Rise India

India's push towards a cashless society under the Digital India programme has laid the foundation for a financial revolution in India.

In 2016, the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI) introduced a real-time payment system known as Unified Payments Infrastructure (UPI), which allows users to link more than one bank account to a single smartphone app and transfer money to recipients instantly. As of March 2023, UPI's total transaction count stood at 8.7 billion.<sup>1</sup>

India has also piloted both wholesale and retail central bank digital currencies (CBDCs). The pilots have been launched in selected cities and the RBI plans to extend it to others in the coming months.<sup>2</sup> A Digital Rupee would extend numerous benefits, such as lower transaction costs and increased efficiency by removing intermediaries like banks and payment gateways, and easier cross-border payments.<sup>3</sup> During the Digital Rupee's pilots, Reliance Retail, India's largest retail chain, accepted CBDCs as a form of payment.<sup>4</sup> In future pilots, RBI plans to test CBDCs in cross-border payments and offline functionality<sup>5</sup> that might, for example, allow CBDC transactions to be made in remote regions with no internet connectivity.<sup>6</sup>

The rise of Web3 has generated a huge buzz around the metaverse and NFTs, and some of the Indian banks are cozying up to the idea of the metaverse. Keeping the excitement around Web3 in mind, Rise India hosted multiple events this year covering crypto-assets, digital identity, banking in the metaverse and extended reality (which blends human and computer-generated interaction). We also introduced a new initiative, Rise Masterclass, to support the emergence of low-code/no-code tech.

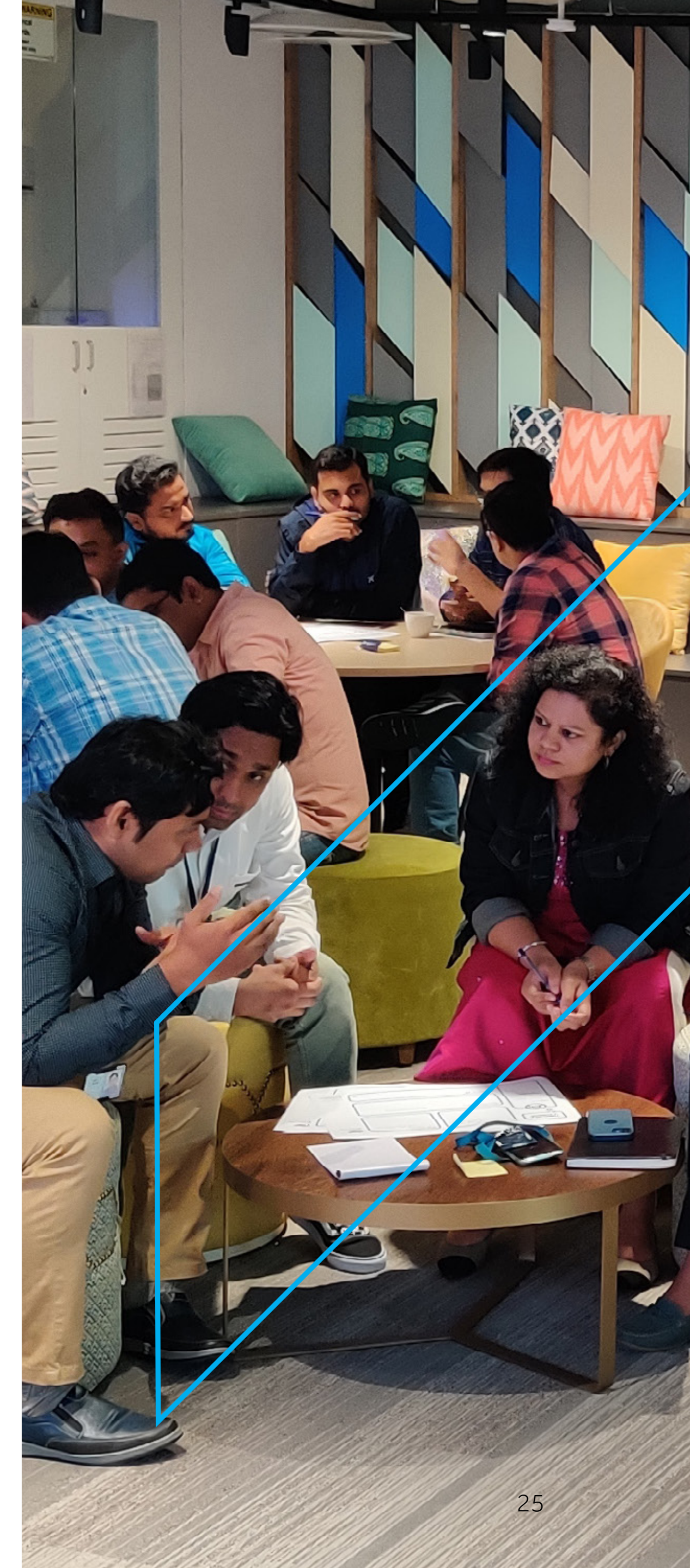
Rise India alumni and Rise Connect member CreditEnable was named one of India's leading BFSI & FinTech Companies 2023 by Dun & Bradstreet India.<sup>7</sup> Another Rise India alumni, Entropik Tech, an emotion AI startup, raised \$25 million in Series B funding, led by Bessemer Venture Partners.<sup>8</sup> Hyperface, the Bangalore-based Rise Connect member, were named FinTech of the Year in the Retail Banking category at the NASSCOM India FinTech Awards 2023. Three Rise startup founders were given the accolade of FinTech: Excellence Under 40 at a recently held payment summit conference.



**Aakash Poojary**  
FinTech Platform Executive,  
Rise India

 aakash-poojar

This year will be an exciting one for the evolution of money and its various forms in India. Rise India is keeping a close eye on developments and we're excited to play a key role in elevating the ecosystem.



## Rise New York

Hello from summer in NYC! This year has gone off with a bang, giving Rise great opportunities to bring the fintech ecosystem together.

In the last week of April, Rise New York was the anchor sponsor of Empire Startups New York FinTech Week 2023. We hosted almost 3,000 visitors in our space over four days and eleven events. The buzz was palpable. From founders interested in Rise Academies to fintech investors, to corporate innovators looking for the next big thing, we were glad to partner with the likes of AARP AgeTech Collaborative, AWS, the Fintech Business Weekly podcast, Fintech is Femme, Fintech Sandbox, the Holt Xchange, Independent Community Bankers Association, Republic, RevTech Labs and Softserve on an engaging week of content.

Our monthly meetup series, NYC Fintech Coffee, was also a hit during the Fintech Nexus conference where Rise was a featured judge of the startup pitch competition, hosted by Received and This Week in Fintech.

A key focus of the featured content was the future of money. One of the week's demos was given by Laurence Latimer, co-founder and CEO of Dinara, a secure, fully integrated platform for sending, receiving, converting and managing crypto assets for banks and other enterprise clients. "More than ever, transparency, simplicity and trust will be foundational to the long-term success of any organisation in the digital asset space. Our proactive approach

to regulatory and compliance processes will be a key differentiator for providing a safe and efficient platform for our clients," said Latimer.

Through the ebbs and flows in the US banking system this year, the fintech sector marches on. Founders are building today the tools that will scale and enable corporates to participate fully in whatever state money will take in the future. Processing payments, reducing onboarding times for both consumer and business clients and the exchange of value from dollars to rewards in the metaverse will be just a few use cases that banks are keen to explore and prepare for, today, through Rise's fintech ecosystem.

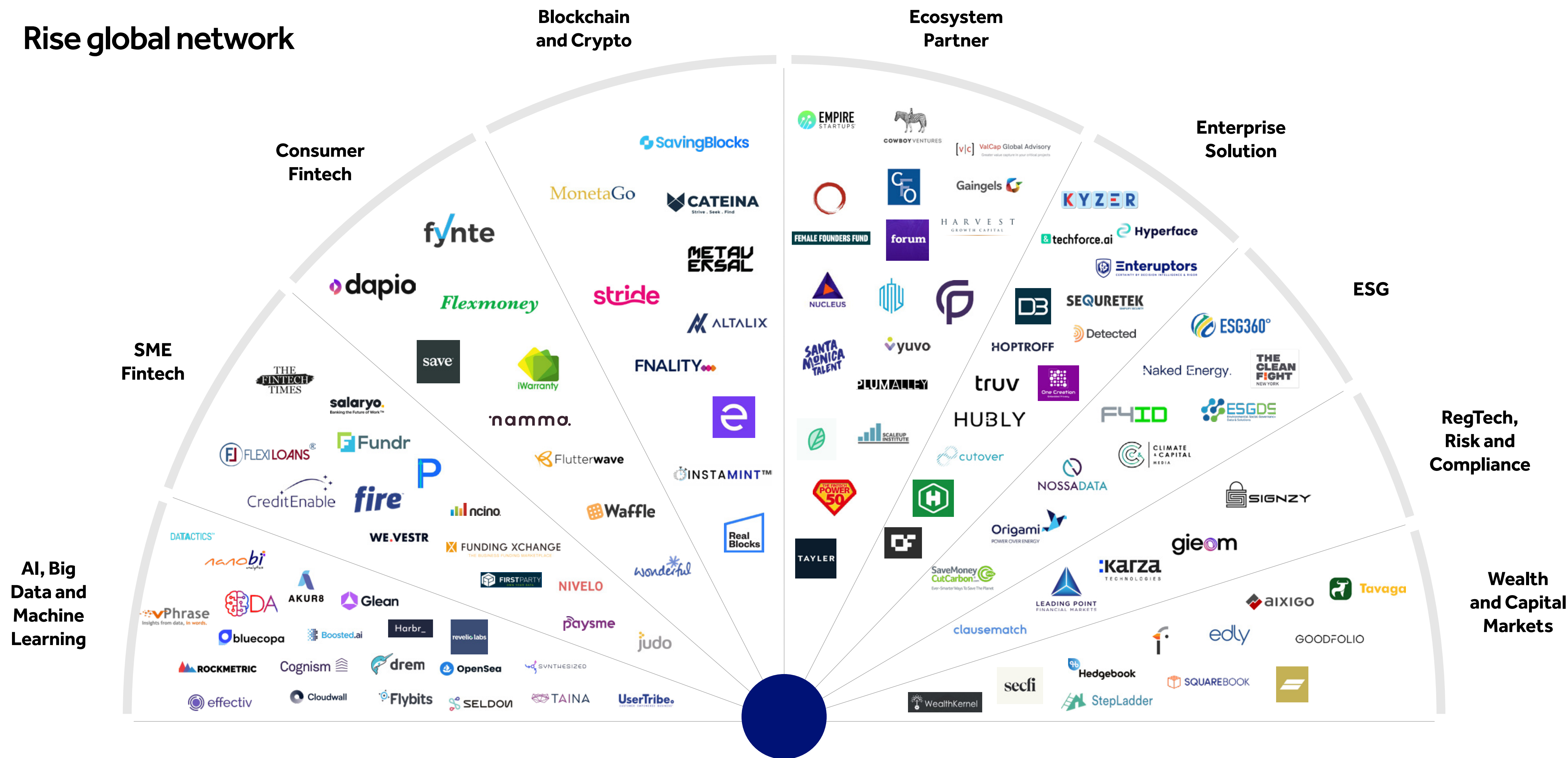


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Head of Innovation (interim), Barclays

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# Rise global network



# rise

Created by



## About Rise, created by Barclays

Rise, created by Barclays, is a global community of the world's top innovators and entrepreneurs working together to create the future of financial services. By connecting technology, talent and trends, the mission of Rise is to accelerate innovation and growth in the financial services industry.

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### #HomeofFinTech

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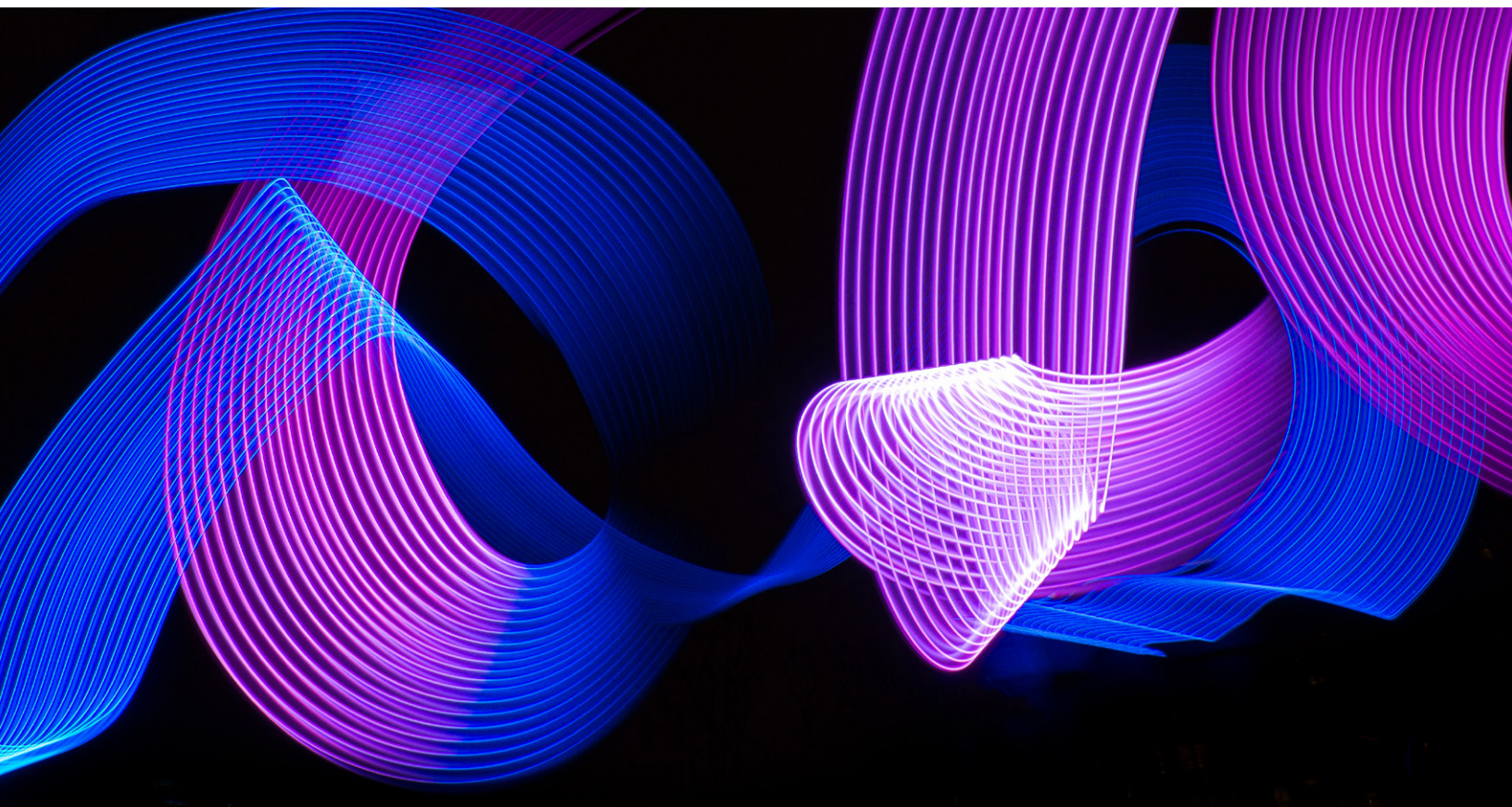
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Financial Services Practice

# Tokenization: A digital-asset déjà vu

Tokenization adoption was poised for success six years ago, but progress was limited. Renewed interest might feel like déjà vu, but stronger business fundamentals and structural changes suggest the path could be different this time.

*This article is a collaborative effort by Anutosh Banerjee, Ian De Bode, Matthieu de Vergnes, Matt Higginson, and Julian Sevillano, including input from McKinsey's Corporate and Investment Banking team.*



**The past 12 months** have been highly tumultuous for digital assets and Web3 players, even by the turbulent industry's standards. Multiple bankruptcies, high-profile cases of fraud, and regulatory enforcement actions have had an impact on mainstream enthusiasm for the sector.

Yet companies in financial services, retail, music, gaming, and media, among other sectors, continue to pursue opportunities in Web3, such as tokenized loyalty programs. In financial services, the emphasis is shifting to the reemergence of a "blockchain, not crypto" narrative. Banks, asset managers, and other institutions are intrigued by the technological potential of "tokenization"—the process of issuing a digital representation of a traditional asset on a (typically private) blockchain, sometimes referred to as a distributed ledger. Several leaders of large institutions have publicly voiced interest in tokenization's potential to transform capital markets.<sup>1</sup> Analysts have forecast that \$4 trillion to \$5 trillion of tokenized digital securities could be issued by 2030.<sup>2</sup> While these numbers are, of course, only projections, in-production examples at scale are emerging. For example, US-based Broadridge, a fintech infrastructure company, now facilitates

over \$1 trillion worth of tokenized repurchase agreements monthly on its Distributed Ledger Repo (DLR) platform.

These pronouncements and projects give many digital-asset veterans a distinct sense of déjà vu. The first tokenization took place in 2017, and critics point to the limited traction it has gained since then. The question now is, will this time be different?

This article attempts to provide a careful and balanced look at some of the asserted benefits and perennial challenges of tokenization across asset classes. From this, we conclude that challenges remain, but growing institutional interest and stronger business fundamentals across certain asset classes offer potential for a different outcome this time, especially for players that follow a well-structured approach.

### **Tokenization's potential benefits**

Tokenization refers to the process of creating a token on a blockchain that represents an asset. These tokens can be representations of traditional tangible assets (such as real estate, agricultural

## **In financial services, the emphasis is shifting to the reemergence of a 'blockchain, not crypto' narrative.**

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<sup>1</sup> As cited by the BNY Mellon CEO in "Time for a reset of the crypto opportunity," *Financial Times*, December 2, 2022; the Goldman Sachs CEO in "Blockchain is much more than crypto," *Wall Street Journal*, December 6, 2022; and the BlackRock CEO in "The next generation for markets will be tokenization," *New York Times*, 2022 Dealbook Summit, November 30, 2022.

<sup>2</sup> "Money, tokens, and games: Blockchain's next billion users and trillions in value," Citigroup, March 30, 2023.

or mining commodities, analog artworks), financial assets (equities, bonds), or nontangible assets such as digital art and other intellectual property. Whether these assets have a parallel representation in other systems of record (“off-chain” in a central securities depository, say) or are native to the on-chain model, tokenization typically involves four fundamental steps (see sidebar, “The process of tokenization”).

Tokenization gives asset holders and market makers access to blockchain technology’s potential benefits. Broadly speaking, these include 24/7 operations and data availability, along with so-called atomic (that is, instantaneous) settlement. In addition, tokenization offers programmability—that is, the ability to embed code in the token, and the ability of the token to engage with smart contracts—enabling higher degrees of automation.

More specifically, when tokenization is conducted at scale, beyond proofs of concept, its benefits will differ by asset class but could include some combination of the following (Exhibit 1):

- **Improved capital efficiency.** Tokenization can deliver meaningful capital efficiencies in certain capital market use cases. Triparty repurchase agreements or money market fund redemptions can occur in a matter of minutes, as opposed to the current T+2 settlement, for instance. Shorter settlement times generate significant savings in high-interest-rate environments such as the current cycle. For investors, these savings may be the greatest near-term impact from tokenization, and the main reason why the business case is now different from six years ago.

Exhibit 1

## Tokenization can benefit asset owners, service providers, and investors.

### Potential benefits from tokenization, by stakeholder type, nonexhaustive

	Asset owners		Service providers		Investors	
	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency
<b>Improved capital efficiency</b> Lower cost of capital and free up capital in transit					✓	✓
<b>Democratization of access</b> Access to new secondary markets; greater liquidity					✓	
Access to new pools of capital with lower minimum investment required	✓					
<b>Operational cost savings</b> Opportunities to embed manual and error-prone product-structuring and asset-servicing tasks into the token smart contract and eventually across a portfolio		✓		✓		✓
<b>Enhanced compliance, auditability, and transparency</b> Embedding of rules and credentials into the token smart contract (eg, investor qualification, carbon credit verification)		✓		✓		✓
<b>Cheaper and more nimble infrastructure</b> Open-source technology driven by thousands of Web3 developers and billions of investment dollars		✓		✓		✓



## The process of tokenization

The “tokenization” of an asset involves the following four steps:

1. **Asset sourcing.** The process begins when the owner or issuer of an asset identifies that the asset or use case would benefit from tokenization. This step also includes identifying the structure to be tokenized, because the specifics will shape the process. For instance, tokenizing a money market fund is different from tokenizing a carbon credit. It helps to understand whether the asset will be treated as a security or commodity, which regulatory frameworks will apply, and which partners will be engaged.
2. **Token issuance and custody.** Creation of a digital, blockchain-based representation begins with immobilization of any related physical asset. This involves moving the asset to a control location, typically with a qualified custodian or a licensed trust company. Then a digital representation of the asset is created on a blockchain in the form of a token with embedded functionality—that is, code for executing predetermined rules. To do this, the asset owner selects a particular token standard (ERC-20 and ERC-3643 are common standards), a network (private or public blockchain), and (compliance) functions to be embedded (for example, user transfer restrictions, freeze capabilities, and clawbacks). The tokenization provider implements these decisions. Once the digital asset(s) have been created, they are stored by a custodian or special-purpose broker–dealer pending distribution.
3. **Token distribution and trading.** The digital asset can be distributed to the end investor through traditional channels or through novel channels such as digital-asset exchanges. The investor or the investor’s delegate will need to set up an account, or wallet, to hold the digital asset, with any physical-asset equivalent remaining immobilized in the omnibus issuer account at the traditional custodian. This step typically involves a distributor (for example, the private wealth division of a large bank) and either a transfer agent or a special-purpose broker–dealer to move the digital assets. Depending on the issuer and type of asset, the owner may enlist a secondary trading venue—for example, an alternative trading system (ATS)—to create a liquid market for these tokenized assets postlaunch. Some issuers prefer that their tokenized assets not trade on secondary trading venues, as this may lead to unwanted price signals that could require markdowns on their portfolios.
4. **Asset servicing and data reconciliation.** A digital asset that has been distributed to the end investor requires ongoing servicing, including regulatory, tax, and accounting reporting, notice of corporate actions, and periodic calculation of net asset value (NAV). The nature of servicing may depend on the asset type; for example, servicing of carbon credit tokens will require different auditing than fund tokens. Servicing requires the reconciliation of off- and on-chain activity, as well as extensive data sources.

The current tokenization process can be challenging to navigate. It involves as many as nine parties (asset owner, issuer, traditional custodian, tokenization provider, transfer agent, digital custodian or special-purpose broker–dealer, ATS, distributor, and end investor), two more than the traditional asset process. Furthermore, many tokenized assets will continue to exist in both physical and digital instances,<sup>1</sup> each with its own data systems to be synchronized and its own servicing needs.

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<sup>1</sup> A good example of this is the bond issued by the city of Lugano in Switzerland on the SDX platform.

- **Democratization of access.** Among tokenization's most touted benefits is the inherent democratization of access, which offers potential for improved liquidity resulting from the fractionalization of assets (that is, division of ownership into smaller parts). In some asset classes, streamlining operationally intensive manual processes can lower the unit economics, thereby making it feasible to serve smaller investors. However, access to these investments may have regulatory limitations, meaning many tokenized assets may be available only to accredited investors. And while fractionalization can certainly be appealing and feasible for better liquidity, tokenized asset distribution will need to reach much larger scale before true democratization of access is realized.
  - **Operational cost savings.** Asset programmability can be another source of savings, particularly for asset classes where servicing or issuing tends to be highly manual, is error prone, and involves numerous intermediaries. Examples of such assets include corporate bonds and other fixed-income products, which often involve a bespoke structure, imprecise interest calculations, and coupon payment disbursements. Embedding operations such as interest calculation and coupon payments into the smart contract of the token would automate these functions, lowering their costs. System automation via smart contracts also can lower the cost of services such as securities lending and repos. And over time, digital-asset programmability can also create benefits at the portfolio level by enabling asset managers to automate the rebalancing of portfolios in real time.
  - **Enhanced compliance, auditability, and transparency.** Current compliance systems often rely on manual checks and (often retroactive) analyses. Asset issuers could automate these compliance checks by embedding specific compliance-related actions (for example, transfer restrictions) into tokenized assets, automating these compliance checks. In addition, the system's 24/7 data availability creates opportunities for streamlined consolidated reporting, immutable record-keeping, and real-time, auditable accounting (where the blockchain can be used to create a so-called triple-entry bookkeeping system, where immutable time stamps are the novel addition). A high-profile example is carbon credits, where blockchain technology can provide an immutable and transparent record of the purchase, transfer, and retirement of credits, with transfer restrictions and measurement, reporting, and verification (MRV) functionality built into a token's smart contract. This way, when a transaction of a carbon token is initiated, the token can automatically check up-to-date satellite imagery to ensure that the underlying nature-based removal project is still operating, enhancing trust in the ecosystem.
  - **Cheaper and more nimble infrastructure.** Blockchains are inherently open source and continue to evolve, spurred by the thousands of Web3 developers and billions of dollars' worth of venture capital invested in the space. Assuming financial-services companies elect to operate private or hybrid instances of public permissionless blockchains,<sup>3</sup> future innovations—for example, in smart contracts and token standards—could be easily and quickly adopted, further lowering operating costs.
- In light of these benefits, it's clear why many big banks and asset managers are intrigued by the technology's promise. However, some of these benefits remain theoretical in nature given the lack of scale of tokenized assets and use cases, and it begs the question why more progress has not been achieved over the past six years.

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<sup>3</sup> Public permissionless blockchains currently attract more developers than private blockchains by orders of magnitude, but enterprises may elect to employ a private instance to regulate access to transactions and data and to implement more rigorous governance.

## **Continuing challenges to widespread adoption**

Despite the benefits tokenization may deliver, few assets have been tokenized to date. A notable exception is cash, in the form of fully reserved “stablecoins” and tokenized bank deposits.

Why hasn’t digital-asset tokenization achieved widespread adoption to date? Conditions have posed challenges related to infrastructure, implementation costs, market maturity, regulation, and industry alignment.

### **Technology and infrastructure unpreparedness**

Adoption of tokenization is held back by limitations of the available infrastructure. The limitations include a continuing shortage of institutional-grade digital-assets custody and wallet solutions offering sufficient flexibility in managing account policies, such as trading limits. Also, blockchain technology, particularly the public permissionless versions of it, has been hindered by limited system uptime at high transaction throughputs—a deficiency that is unacceptable to support tokenization of certain use cases, particularly in mature capital markets. Finally, the fragmented (private) blockchain infrastructure—including developer tooling, token standards, and smart-contract guidelines—creates interoperability challenges across financial institutions. This introduces new risks (such as bridging protocols between blockchains), fragmentation of liquidity, and challenges in harmonizing data across systems to deliver necessary reporting.

### **Limited short-term business case and high cost to implement**

Many of tokenization’s potential economic benefits come to fruition at scale, when a sizable majority of assets or use case volumes have migrated to the new digital infrastructure. However, this will likely require a cost-intensive transition to adapt middle- and back-office workflows not designed for tokenized assets. The situation implies unclear short-term benefits and a challenging business case on which to gain organizational buy-in. Further

complicating the short-term business case, such transitions often involve running digital-twin operations (for example, digital and traditional settlement, data reconciliation and compliance on and off chain, digital and traditional custody and asset servicing) to reduce near-term operational and regulatory risk. Finally, many legacy clients in capital markets have yet to demonstrate interest in 24/7 infrastructure and movement of value, presenting further challenges to the go-to-market approach for tokenized products.

### **Market immaturity**

Tokenization’s ability to achieve faster settlement times and greater capital efficiency requires instantaneous cash settlement. However, there currently exists no cross-bank solution at scale, despite the progress that has been made on this front: tokenized deposits currently operate only within a single bank, and stablecoins lack the regulatory clarity for now to be considered bearer assets to provide for real-time ubiquitous settlement. In addition, the tokenization provider landscape has been fragmented and nascent, with no integrated and established one-stop-shop offering the requisite licenses and capabilities. A third remaining issue is the absence of at-scale distribution channels for digital assets to be accessed by the appropriate investors. Many tokenized assets are available only on homegrown platforms from tokenization providers, in contrast to the established distribution channels used by wealth and asset managers.

### **Regulatory uncertainty**

To date, the regulatory framework for tokenization has differed substantially by region or has simply been absent. US players are particularly challenged by undefined settlement finality, lack of legally binding status of smart contracts, and unclear requirements for qualified custodians. Further unknowns remain regarding the capital treatment of digital assets. For instance, the US Securities and Exchange Commission has implied through Staff Accounting Bulletin 121 that digital assets must be reflected on the balance sheet when providing

# Despite the challenges, tokenization may have reached an inflection point for certain use cases and asset classes.

custodial services—a stricter standard than for traditional assets. This requirement makes it cost prohibitive for banks to hold and potentially even distribute digital assets.

## Industry in need of alignment

Capital market infrastructure players have yet to signal the concerted will to build out tokenization capabilities or move markets on chain, although their involvement is critical, as they are the ultimate recognized holders of books of record. Incentives to move to new infrastructure may be misaligned, given that certain functions now performed by intermediaries could become obsolete or change dramatically. Even carbon credits as an asset class have encountered challenges in gaining alignment on an established registry. At present, Gold Standard is the only registry publicly preparing to support tokenized carbon credits, despite the clear benefits of enhanced transparency.

## Tokenization may be at an inflection point

Despite the challenges, tokenization may have reached an inflection point for certain use cases and asset classes. Trends over recent months are consistent with a possible acceleration of adoption.

- *Advances in cash tokenization.* Settling trades of tokenized assets instantaneously and 24/7 requires cash tokenization; without it, only one leg of a transaction can be completed instantly.

Approximately \$120 billion of tokenized cash is now in circulation in the form of fully reserved stablecoins (for example, USD Coin). Some banks have launched or will shortly launch tokenized deposit capabilities to improve the cash settlement leg of commercial trades. These nascent systems are not perfect by any means; liquidity remains fragmented, and stablecoins are not yet recognized as bearer assets. Even so, they have proven sufficient to support meaningful volumes in the digital-assets market. Stablecoin on-chain volumes have routinely exceeded \$500 billion monthly.<sup>4</sup>

- *Improving short-term business case fundamentals.* Higher interest rates have improved the economics for some tokenization use cases that deliver capital efficiency. Short-term liquidity transactions such as tokenized repos and securities lending are more attractive with higher rates, as are tokenized money market funds for fluid collateral management. To see the shift in business case, imagine the difference in cost of a \$100 million notional one-hour repo facility versus the standard 24-hour facility when rates have risen from 0 to 5 percent. In addition, in the United States, established banks have recently received an influx of large (and often very profitable) digital-asset business clients—for example, stablecoin issuers. Keeping these clients will require 24/7 movement of value and tokenized cash, further facilitating the business case to accelerate tokenization capabilities.

<sup>4</sup> Stablecoin data from The Block, accessed July 19, 2023.

- **Emerging regulatory framework outside the United States.** In the past six months, the European Union has moved to approve Markets in Crypto-Assets (MiCA) legislation,<sup>5</sup> and other regions such as Hong Kong, Japan, Singapore, the United Arab Emirates, and the United Kingdom have published new guidelines that enhance the regulatory clarity for digital assets. Even in the United States, market participants are exploring various tokenization and distribution approaches, leveraging existing rules and guidance to mitigate the impact of the current regulatory uncertainty—for example, by limiting distribution of tokenized assets to accredited investors only and by running digital-twin instead of digital-native operations.
- **Increasing market readiness and infrastructure maturity.** Over the past five years, many established financial-services companies have added digital-asset talent and capabilities. Several banks, asset managers, and capital market infrastructure companies have built digital-asset teams of 50 or more people, and these teams are growing. With that, the level of understanding of the technology and its promise has expanded among established market participants. Additionally, we are currently seeing greater experimentation and planned expansion of capabilities (often through partnerships) among these capital market incumbents, with some working on integrating or rolling up necessary capabilities to become a one-stop shop for asset tokenization and distribution.

While tokenization has yet to achieve the scale needed to deliver on all its stated promises, the ecosystem is maturing, underlying challenges are becoming clearer, and the business case for adoption may be improving. Initial proof points, especially in use cases that benefit from increased capital efficiency in a higher-rate environment

(as opposed to the traditional argument of better liquidity for illiquid assets), highlight more use cases where the technology could gain traction and generate meaningful value for global markets over the next two to five years.

### **Considerations for financial-services companies**

Whether or not tokenization is at an inflection point, a natural question to ask is how financial-services companies should respond at this juncture. The specific time frame and ultimate adoption of tokenization are unknown, but early institutional experimentation across certain asset classes and use cases (for example, money market funds, repos, private funds, corporate bonds) has shown the potential to scale in the next two to five years. Those who would look to ensure a leading position in this ecosystem could consider the following steps.

#### **Reexamine underlying business cases**

Businesses should reassess the concrete benefits and value proposition of tokenization, as well as the avenues and costs of implementation. Understanding what impact higher interest rates and volatile public markets have on specific assets or use cases is important to appropriately evaluating tokenization's potential benefits. Similarly, continually exploring the landscape of providers and understanding the early applications of tokenization will help to refine estimates of the technology's costs and benefits.

#### **Build out tech and risk capabilities**

Regardless of an incumbent's position in the value chain, a few capabilities are necessary to prepare for a tokenized world. First and foremost is building a basic understanding of the technology and its associated risks, particularly relative to blockchain infrastructure and governance duties (who can approve what and when), token design (restrictions placed on the asset and enforcement of these restrictions), and system design (decisions about

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<sup>5</sup> "Crypto-assets: Green light to new rules for tracing transfers in the EU," European Parliament, April 20, 2023. MiCA's general goal is to establish tighter rules for crypto asset service providers (entities engaged in issuance, offer, and trading of crypto assets) while easing access to regulated markets. This includes stricter rules on stablecoins, disclosure obligations, anti-money-laundering checks, and data security procedures.

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where books and records reside and what the implications are for the bearer nature of the asset). An understanding of these underlying principles could also inform conversations with regulators and customers who are still getting up to speed on the technology.

### **Form ecosystem relationships, particularly for asset distribution**

Given the fragmented nature of the current landscape, it will be important for these emerging leaders to develop an ecosystem strategy for off-the-shelf integrations into other (legacy) systems and partners. Very few asset owners are willing to engage eight different parties to tokenize an asset; the custody, distribution, trade, and servicing of these assets should be as simple as possible. Partnerships expanding distribution and access to investors can create meaningful strategic distance for an incumbent by helping such a company reach scale.

### **Participate in standard setting**

Finally, institutions that are looking to have a leading position in tokenization should provide regulators with streamlined input about emerging standards to avoid further fragmentation of liquidity, data, and composability. Some examples of key areas where standard setting can be considered include

controls (that is, appropriate governance, risk and control frameworks to protect end investors), custody (what constitutes qualified custody for tokenized assets on private networks, when to use digital-twin versus digital-native records, what constitutes a good control location), token design (what type of token standards and associated compliance engine to support), and blockchain support and data standards (what data are kept on chain versus off chain, reconciliation standards).

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This is not the first time an industry has attempted a shift to a more modern infrastructure. These shifts are always challenging, as it means running the old and new operating models in parallel for a while, which is hard to do when costs are in focus. Regulatory uncertainty only compounds the difficulty. However, given the potential benefits tokenization can bring to financial services, recent moves by leading incumbents suggest they may be up for the challenge, although it could take some time. Meanwhile, banks, asset managers, custodians, and others can take some no-regret moves today to prepare for this possibility of a tokenized world—the strategic optionality may be worth it after all.

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Monetary Authority of Singapore

Response to Feedback Received

P009 – 2022 – 15 August 2023

# Response to Public Consultation on Proposed Regulatory Approach for Stablecoin-related Activities



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# 1. Preface

- 1.1. Stablecoins are emerging as a new class of digital payment tokens (“DPTs”) with the potential to become a widely used payment instrument.
- 1.2. The Monetary Authority of Singapore (“MAS”) first published a consultation paper<sup>1</sup> on 23 December 2019, seeking views on the concepts of money, e-money and DPTs, and their consequent regulatory treatment. Due to the nascency of stablecoins, there was a range of feedback received and no firm landing on one regulatory treatment versus another.
- 1.3. Over the last few years, developments in the digital asset space have sharpened the clarity of thinking regarding the appropriate regulatory treatment of stablecoins. On 26 October 2022, MAS issued a consultation paper<sup>2</sup> on the overall regulatory approach for stablecoin-related issuance and intermediation activities, highlighting the key requirements that would be imposed on such activities. The consultation period closed on 21 December 2022, and MAS would like to thank all respondents for their contributions. The list of respondents, and their submissions, can be found in Annexes B and C respectively.
- 1.4. MAS has carefully considered the feedback received and has incorporated them where appropriate. Comments that are of wider interest, together with MAS’ responses, are set out below. This paper represents MAS’ finalised regulatory approach towards stablecoins in Singapore. A summary of the key requirements of the framework can be found in Annex A.

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<sup>1</sup> Consultation on the Payment Services Act 2019: Scope of E-money and Digital Payment Tokens, Dec 2019 [here](#).

<sup>2</sup> Consultation on Proposed Regulatory Approach for Stablecoin-related Activities, Oct 2022 [here](#).



## 2. Overall Regulatory Approach for Stablecoins

### Scope of MAS' stablecoin framework

- 2.1. In the consultation paper, MAS proposed to bring within the stablecoin regulatory regime, single-currency stablecoins (“SCS”) pegged to the Singapore dollar or Group of Ten (“G10”) currencies<sup>3</sup>, that are issued in Singapore – herein known as the “SCS framework”. Non-SCS will continue to be subject to the existing DPT regulatory regime under the Payment Services Act 2019 (“PS Act”). MAS sought comments on whether the regulatory scope was adequate and whether there might be reasons for MAS to extend its regulatory powers to SCS issued outside of Singapore.
- 2.2. Respondents generally agreed with the regulatory scope. Several respondents suggested that MAS expand the scope of stablecoins regulated under the SCS framework going forward, taking into account developments in the stablecoin landscape as well as any changes in the risks posed by stablecoins. Some respondents commented that the SCS framework was restrictive as it did not include other prominent currencies. A few respondents cautioned against the prohibition of other types of stablecoins, such as SCS issued outside of Singapore, from being circulated and used within Singapore.

### **MAS' Response**

- 2.3. MAS will retain the proposal for the regulatory scope of the SCS framework to include only SCS pegged to the Singapore dollar or G10 currencies that are issued in Singapore. The restriction to SGD and G10 currencies within the SCS framework takes into consideration the availability of high-quality liquid assets in those currencies that would be fundamental to providing a strong reserve backing for SCS.
- 2.4. Other types of stablecoins will not be prohibited from being issued, used or circulated within Singapore. Such stablecoins, including SCS issued outside of Singapore or pegged to other currencies or assets, will continue to be subject to the existing DPT regulatory regime. MAS will continue to monitor developments in the stablecoin landscape, with a view to bringing other types of tokens into the SCS framework.

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<sup>3</sup> The G10 currencies are the Australian Dollar, British Pound Sterling, Canadian Dollar, Euro, Japanese Yen, New Zealand Dollar, Norwegian Krone, Swedish Krona, Swiss Franc and the United States Dollar.



## Introduction of “Stablecoin Issuance Service” as a new regulated activity

- 2.5. MAS had consulted on the proposal to introduce a new regulated activity of “Stablecoin Issuance Service” under the PS Act, and whether there was a need to introduce any other regulated services specific to stablecoins.
- 2.6. Respondents were largely supportive of the introduction of stablecoin issuance as an additional regulated payment service. There were also suggestions and clarifications to include the custody and management of reserve assets backing the SCS as additional regulated payment services.

### **MAS’ Response**

- 2.7. MAS will retain the proposal to introduce “Stablecoin Issuance Service” as an additional payment service under the PS Act. This additional regulated payment service will encapsulate the necessary activities that a stablecoin issuer undertakes, including custody of SCS issued by the issuer and management of the reserve assets backing the SCS.

## Treatment of bank and non-bank SCS issuers

### Regulatory treatment for non-bank SCS issuers

- 2.8. MAS had proposed that non-bank SCS issuers with SCS in circulation not exceeding S\$5 million in value need not obtain a Major Payment Institution (MPI) licence and comply with SCS issuer requirements under the SCS framework. Accordingly, their SCS will not be recognised under the new SCS regime, given that issuers of such SCS will not need to be subject to requirements to address the stability in value of the SCS issued. MAS sought comments on whether such a regulatory approach was appropriate.
- 2.9. One respondent suggested that smaller SCS issuers should still be subject to minimum reserve asset requirements and be encouraged to adopt appropriate corporate controls and management practices. This would ensure that such issuers could prepare for compliance with the SCS framework ahead of exceeding the S\$5 million threshold, given that the circulation of any stablecoin could drastically increase in a short period of time.



## Regulatory treatment for bank SCS issuers

- 2.10. For banks that issue SCS by tokenising liabilities of the bank, MAS had proposed that additional reserve backing and prudential requirements would not be imposed on such banks. This was on the basis that banks were already subject to prudential requirements under the Banking Act. For banks that issue reserve-backed SCS, MAS had proposed that they be subject to the same regulatory regime as non-bank SCS issuers, except for the prudential requirements. MAS sought comments on whether this regulatory approach for bank SCS issuers, vis-à-vis non-bank SCS issuers, was appropriate and whether it would achieve an equivalent regulatory outcome for SCS issued in Singapore to maintain a high degree of value stability.
- 2.11. Some respondents agreed with the proposed approach. Reasons included the view that introducing additional regulatory measures for banks issuing SCS in the form of tokenised liabilities would only cause confusion for banks, or that it would introduce unnecessary barriers for banks to enter the stablecoin space given the fact that they were already highly regulated.
- 2.12. Many respondents were also of the view that requirements for bank versus non-bank issuers should be harmonised, for a level playing field. Some respondents were of the further view that tokenised bank liabilities should not be deemed as SCS, because the risks between tokenised bank liabilities and reserve-backed SCS were inherently different. Specifically, tokenised bank liabilities adopted the fractional reserve banking model, while SCS would be fully collateralised through their reserve backing. Correspondingly, these respondents were of the view that tokenised bank liabilities and reserve-backed SCS should, at the minimum, be labelled differently to differentiate between the two.

## MAS' Response

- 2.13. Regarding non-bank SCS issuers, MAS will retain our proposal not to subject SCS issuers with SCS in circulation not exceeding S\$5 million to requirements under the SCS framework. Some SCS issuers may have niche use cases, or they may employ other mechanisms to maintain value stability in one form or another. Any SCS issuer that anticipates or intends its total SCS circulation to exceed S\$5 million and would like its SCS to be recognised as being regulated under the SCS framework may still be able to apply for the MPI licence to conduct the "Stablecoin Issuance Service".
- 2.14. As to bank SCS issuers, MAS acknowledges the feedback that there are differences in the value-stabilising mechanisms used for fully reserve asset-backed stablecoins and tokenised bank liabilities, and thus the risks they pose to holders. MAS will therefore exclude tokenised bank liabilities from the scope of the SCS framework. However, MAS may impose additional requirements on tokenised bank



liabilities in the future as necessary, taking into consideration the design of such tokenised bank liabilities.

2.15. MAS will retain flexibility to consider certain tokens as stablecoins under the SCS framework, should a bank SCS issuer design such tokens to meet standards that are deemed equivalent under the framework. MAS will continue to monitor banks' initiatives in this space as well as international regulatory developments, and assess new developments accordingly.

## Appropriate term to differentiate MAS-regulated SCS from other stablecoins

2.16. MAS sought comments on whether it would be appropriate to have a single label for SCS that are under the SCS framework. MAS also sought views on three specific options – “regulated stablecoin”, “qualifying stablecoin”, or “securely-backed stablecoin” to label such SCS, and whether there were alternative terms that could be used to distinguish such stablecoins (which would be regulated for a high degree of value stability) from other types of stablecoins.

2.17. Respondents were supportive of a label to differentiate SCS regulated under the SCS framework. While there were mixed preferences as to a specific label, respondents emphasised the need for a straightforward label that would provide sufficient clarity.

### **MAS' Response**

2.18. On balance, MAS will be adopting the label “MAS-regulated stablecoin” for all SCS that will fall under the SCS framework. MAS is of the view that this label is straightforward and is expected to be easily understood by the public. In order to preserve the credibility of the SCS framework, only SCS regulated under the SCS framework will be permitted to use the label. All other DPT service providers and persons will be prohibited from using the term “MAS-regulated stablecoin”, or any derivatives of the term, to refer to tokens that are not regulated under the SCS framework. Financial penalties and imprisonment (in the case of individuals) may apply in the case of contraventions.



## 3. Requirements Imposed on Issuers of MAS-regulated SCS: Reserve Asset Requirements

- 3.1. MAS sought comments on whether the proposed reserve asset requirements were appropriate, and whether there might be unintended consequences that might affect the development of Singapore's digital asset ecosystem.

### Composition of reserve assets

- 3.2. The majority of respondents were supportive of the proposed reserve asset composition requirements. Several respondents requested more specific parameters on the liquidity of assets, proportion of acceptable asset classes as well as credit rating of assets, while one respondent suggested allowing for longer tenor debt securities.
- 3.3. Some respondents commented that the requirement for reserve assets to be in the same currency denomination as the peg of the SCS was unnecessary, and that reserve assets should be allowed to be denominated in any G10 currency instead, regardless of the peg of the SCS.
- 3.4. On the requirement that reserve assets, on a mark-to-market basis, must be at least 100% of the par value of the outstanding SCS in circulation at all times, some respondents suggested different approaches to account for price volatility of the reserve assets. A few respondents suggested requiring reserve assets to be maintained at prescribed levels greater than 100% at all times, while another respondent suggested that an element of margin be permitted, such that the value of reserve assets be allowed to fall to between 90% and 100% of the total value of SCS in circulation.

### **MAS' Response**

- 3.5. MAS intends to maintain a simple framework for reserve assets and will thus require SCS issuers to maintain a portfolio of reserve assets with very low risk. However, such SCS issuers will be required to maintain a robust and resilient risk management policy for its reserve assets, covering aspects such as credit, liquidity and concentration risk. Where necessary, SCS issuers should demonstrate to MAS how they review and determine the appropriate buffers in order to ensure that the valuation of their reserve assets is maintained at a level that is at least 100% of the outstanding SCS in circulation at all times.



## Segregation and custody of reserve assets

- 3.6. MAS had proposed that SCS issuers must hold all reserve assets used to back the SCS in segregated accounts, separate from its own assets which are not reserve assets. MAS had also proposed for reserve assets to be held only in financial institutions licensed to provide custodial services in Singapore.
- 3.7. There was broad support for SCS issuers to hold the reserve assets of the SCS in segregated accounts, separate from its own assets which are not reserves. However, a few respondents suggested that non-SGD denominated reserve assets should be allowed to be custodised at overseas institutions, aligned with the existing regulatory requirement in the Securities and Futures (Licensing and Conduct of Business) Regulations. One respondent suggested that permitted custodians should have a minimum credit rating of “A-”.

### **MAS’ Response**

- 3.8. MAS will go ahead with the proposed requirement for SCS issuers to hold the reserve assets of the SCS in segregated accounts, separate from its own assets which are not reserves. MAS also agrees with respondents that custody of assets by overseas-based custodians may be allowed, provided that such custodians have a minimum credit rating of “A-”, and have a branch in Singapore regulated by MAS to provide custodial services.

## Reserve asset audit requirements

- 3.9. There was a range of feedback on the proposed requirement for reserve assets to be independently attested to on a monthly basis, and for attestations to be published on the issuer’s website and submitted to MAS no later than the end of the following month. Some respondents agreed, with a few suggesting an even higher frequency of publication of reserve asset valuations (e.g. every fifteen days or daily), while some other respondents said that monthly independent attestations could be too onerous and costly for industry players. One respondent suggested that MAS set the requirements based on thresholds of the SCS issuance amount, such that smaller entities could be subject to less onerous attestation and reporting requirements.



## MAS' Response

3.10. MAS will proceed with the proposal without amendments. This is in view that the SCS framework is intended for SCS issuers with a significant amount of SCS in circulation, and to achieve a high level of transparency and trust in the value of the SCS.

## Prudential requirements

3.11. MAS sought comments on whether the following prudential requirements to be applied on SCS issuers under the SCS framework were risk proportionate, and suggestions on alternative approaches to address the risks:

- (a) **Base capital** – Higher of S\$1 million or 50% of annual operating expenses of the SCS issuer;
- (b) **Solvency** – To hold at all times, liquid assets<sup>4</sup> which are valued at higher of 50% of annual operating expenses or an amount assessed by the SCS issuer to be needed to achieve recovery or an orderly wind-down; and
- (c) **Business restrictions** – An SCS issuer is not allowed to undertake other activities that introduce additional risks to itself. This includes investing in and extending loans to other companies, lending or staking of SCS and other DPTs, and trading of DPTs. This is to ringfence and mitigate risks to the SCS issuer in lieu of a comprehensive risk-based capital regime. Such activities can still be conducted from other related entities (e.g. sister company in which the SCS issuer does not have a stake in).

3.12. Responses to the proposed base capital requirement were varied. One respondent suggested it was excessive compared to the existing capital requirement for e-money issuers (S\$100,000 or S\$250,000) under the PS Act, or the proposed stablecoin capital requirement of other jurisdictions. On the other hand, some respondents suggested higher base capital requirements, for example, to be in line with that required of banks. There were also suggestions to adopt a risk-based capital framework instead, or to consider referencing a fixed percentage against the value of SCS in circulation, as opposed to the issuer's operating expense, since the latter would favour large issuers given economies of scale.

3.13. On solvency, respondents were in general agreement with the requirement for SCS issuers to hold sufficient liquid assets for recovery or an orderly wind-down. However, one respondent suggested that further specifications, such as specific tenor buckets of negotiable Certificates of Deposits ("CDs") or

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<sup>4</sup> Proposed assets that will be considered liquid assets include cash and cash equivalents, debentures of government, negotiable certificate of deposits, and money market funds.





overnight and weekly requirements for money market funds (“MMFs”) that may be recognised as liquid assets, be set out. There were also suggestions that the amount assessed to achieve recovery or an orderly wind-down be subject to independent or regulatory review, at least on an annual basis.

- 3.14. The proposed restriction on non-SCS issuance activities by SCS-issuing entities received mixed responses. Some respondents proposed for MAS to consider allowing SCS issuers to undertake ancillary DPT/SCS-related services, such as the lending, investing or trading of DPT/SCS, on the condition that additional safeguards be implemented to ringfence the risks. A couple of respondents suggested that instead of a blanket prohibition, SCS issuers should be allowed to undertake DPT/SCS-related services up to a specified limit, such as up to the amount of its reserve assets or capital.

## **MAS’ Response**

- 3.15. MAS will maintain the base capital proposal as is. The base capital requirement for SCS issuers is set relatively high to ensure that SCS issuers demonstrate a strong financial commitment to carry on its business for the long term. A simplified capital framework takes into account the intent that SCS issuers will be highly restricted in their business operations so as to reduce the risks they are exposed to.
- 3.16. On solvency, MAS agrees with the feedback and will adjust the proposal to require that the amount assessed to achieve recovery or an orderly wind-down of an SCS issuer be subject to independent audits on at least an annual basis. This will provide an additional layer of verification on the appropriate amount of liquid assets that would be sufficient to meet our objective.
- 3.17. On business restrictions, MAS reiterates that SCS issuers under the SCS framework should not be exposed to risks beyond the primary activity of SCS issuance. MAS notes that there may be necessary activities which SCS issuers carry out as part of their business operations, such as custody of issued SCS, or facilitating the transfer of issued SCS to buyers. However, MAS does not intend for an SCS issuer under the SCS framework to take on other business offerings such as lending services, dealing or fund management services, which carry significant risks.



## 4. Requirements Imposed on Issuers of MAS-regulated SCS: Timely Redemption of SCS to Fiat

- 4.1. MAS sought feedback on whether the time period of five business days to return the par value of the MAS-regulated SCS to the SCS holder (from the date when a legitimate redemption request was received) was reasonable, and whether there might be significant operational challenges or unintended consequences that MAS would need to consider in setting the redemption-related requirements.
- 4.2. There was broad support for the proposed timeline. That said, some respondents felt that five business days was too generous and argued that redemption should be done within a shorter time frame, or even on a real-time basis. Other respondents suggested that provisions be included to allow for redemptions to exceed five business days, if there were factors outside an issuer's control. One respondent also sought clarification on how the five business day timeline would apply for cases where redemptions take place through an intermediary that is a DPT service provider.

### **MAS' Response**

- 4.3. MAS will proceed with the requirement that SCS issuers return the par value of MAS-regulated SCS to holders within five business days. The redemption timeline is intended to strike a balance between responsiveness to users' requests and ensuring there is enough time for the SCS issuer to do so in an orderly manner under various stress situations. In exceptional circumstances, for example, during times of market stress, MAS may direct SCS issuers to carry out liquidation of the reserve assets within a specified period to meet redemption needs. In normal business conditions, redemption should be expedient and not delayed unnecessarily. MAS notes that the stipulated time period applies only to redemption by parties that redeem directly with the SCS issuer.



## 5. Requirements Imposed on Issuers of MAS-regulated SCS: SCS Issued in Multiple Jurisdictions

- 5.1. MAS sought views on whether it was a likely development that the same SCS could be issued in multiple jurisdictions, and put forth two proposed avenues to recognise SCS with multi-jurisdiction issuance:
  - (a) Require the SCS issuer in Singapore to obtain and submit to MAS an independent attestation on an annual basis that other significant issuers of the SCS are deemed to meet equivalent standards relating to reserve backing and prudential requirements; or
  - (b) Establish regulatory cooperation among relevant regulatory bodies of the SCS to exchange information on operations of the SCS.
- 5.2. While respondents acknowledged the likelihood of SCS being issued out of multiple jurisdictions, several highlighted practical difficulties with industry participants ascertaining regulatory equivalence of stablecoin requirements across jurisdictions. Some respondents also commented that regulatory cooperation might not be sufficient to achieve MAS' objectives, as there could be challenges in enforcement, without formal schemes in place to recognise regulatory equivalence across jurisdictions.

### MAS' Response

- 5.3. MAS notes that given the nascent state of stablecoin regulations globally, it would be difficult to establish regulatory equivalence and cooperation with other jurisdictions at this juncture. The current technical standards also do not allow for the tracing of the SCS' issuance origin (i.e. the issuance entity and jurisdiction), once such SCS are commingled. This makes it practically difficult to monitor and establish the adequacy and availability of reserve assets held in an overseas jurisdiction that may be utilised towards redemption requests in another jurisdiction.
- 5.4. Given the above, MAS will not allow multi-jurisdictional issuance at the onset and will require SCS issuers to issue solely out of Singapore, if issuers wish for their SCS to be recognised as an "MAS-regulated stablecoin" under the SCS framework. MAS will continue to monitor regulatory and technical developments relating to stablecoins, and consider formal regulatory cooperation mechanisms with other jurisdictions as stablecoin regulations mature over time.



## 6. Requirements Imposed on Issuers of SCS Intermediaries

### Scope of regulated SCS-related intermediation services

- 6.1. MAS had proposed that SCS would be treated as DPTs for the purpose of non-issuance activities, and that intermediaries offering SCS-related services would therefore be regulated under the PS Act if the services fell within the scope of regulated DPT services. Correspondingly, MAS sought comments on whether there might be other specific SCS-related activities that would not be caught as a regulated DPT service (including those under the Payment Services (Amendment) Act)<sup>5</sup>, and which MAS should regulate either as a new payment service or through amendments to the scope of an existing payment service.
- 6.2. Several respondents proposed that instead of treating all non-issuance activities of SCS as regulated DPT services, MAS should adopt a calibrated risk-based approach, on the basis that SCS has greater value stability than DPT. In particular, one respondent suggested that MAS should scope out payment services arising from intermediaries' use of SCS (e.g. transmission of SCS, facilitating the exchange of SCS) from the scope of regulated DPT services.

### **MAS' Response**

- 6.3. MAS will proceed with the proposal as is, as non-issuance SCS activities carry the same risks as DPT-related services currently regulated under the PS Act. This means that an entity that is conducting the dealing in or facilitating the exchange of MAS-regulated SCS will have to be regulated as a DPT service provider under the PS Act.

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<sup>5</sup> The scope of DPT services that will be regulatable under the PS Act will be expanded when the Payment Services (Amendment) Act takes effect. Please refer to *Consultation on the Payment Services Act 2019: Proposed Amendments to the Act* for more details.



## Timely transfer of SCS

- 6.4. MAS sought comments on whether three business days would be a reasonable timeline for DPT service providers to transmit MAS-regulated SCS from a payer to payee.
- 6.5. While there was support for the proposed timeline, several called for a shorter time frame while others suggested that provisions be built in to account for factors outside the intermediaries' control (e.g. blockchain outages).

### **MAS' Response**

- 6.6. Transfers of SCS, by virtue of them being done on a blockchain, may be expected to be completed more quickly than transactions on traditional payment rails. MAS notes, however, that the transfer of MAS-regulated SCS may occur on various types of blockchain infrastructure that may have different service standards, and that such infrastructure may not always be fully under the intermediary's control. As such, MAS will retain the proposed timeline of three business days. This would mirror the existing money transmission requirement for domestic money transfer services.

## Segregation of customers' SCS

- 6.7. MAS sought comments on whether the proposal for SCS intermediaries to segregate customers' MAS-regulated SCS from other customers' assets (e.g. DPTs) as well as its own assets in different custody accounts would be appropriate to mitigate the risk of misuse of customers' SCS.
- 6.8. Respondents were broadly supportive of the proposed requirement for SCS intermediaries to segregate customers' MAS-regulated SCS from the intermediaries' own assets. However, many respondents were concerned that the proposed requirement to segregate customers' MAS-regulated SCS from customers' other assets would be too operationally challenging and did not bring any incremental benefit in mitigating the risk of misuse of customers' SCS.
- 6.9. A few respondents clarified if SCS intermediaries would be required to segregate each customer's MAS-regulated SCS from that of other customers', while another respondent sought clarification on whether



the proposed segregation requirements were similar to that as outlined in MAS' consultation paper on "Proposed Regulatory Measures for Digital Payment Token Services".<sup>6</sup>

## MAS' Response

6.10. MAS will proceed with the proposal for SCS intermediaries to segregate customers' MAS-regulated SCS from the intermediaries' own assets. The upcoming measures<sup>7</sup> relating to segregation and custody of customers' assets for DPT service providers will apply equally to SCS intermediaries, given that SCS intermediaries will also be subject to regulations for DPT service providers. MAS will therefore not require customers' MAS-regulated SCS to be further segregated from customers' other DPT.

6.11. In line with the asset segregation requirements for DPT service providers, SCS intermediaries will be allowed to commingle an individual customer's MAS-regulated SCS and/or DPT with that of other customers in an aggregated pool, while keeping this pool separate from the intermediary's own assets. The risks of such arrangements, as well as steps taken by the SCS intermediary to mitigate them, will have to be clearly disclosed to its customers.

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<sup>6</sup> Consultation on Proposed Regulatory Measures for Digital Payment Token Services, Oct 2022 [here](#).

<sup>7</sup> Response to Public Consultation on Proposed Regulatory Measures for Digital Payment Token Services (Part 1), Jul 2023 [here](#).



## 7. Systemic Stablecoin Arrangements

### Regulatory treatment of systemic stablecoin arrangements

- 7.1. MAS sought comments on whether to regulate and protect the smooth functioning of systemic stablecoin arrangements similar to other Designated Payment Systems (“DPS”), by designating them under the PS Act and the Payment and Settlement Systems (Finality and Netting) Act 2002 (“FNA”). MAS also sought comments on whether key entities of a systemic stablecoin arrangement should be subject to higher regulatory and supervisory standards to safeguard financial stability risk.
- 7.2. Most respondents were supportive of the proposed regulatory treatment for systemic stablecoin arrangements. However, a few respondents highlighted the impracticalities of subjecting stablecoin arrangements that are hosted on decentralised public blockchains to enhanced regulatory and supervisory standards. The main reason cited was the difficulty in identifying the operator(s) for such stablecoin arrangements, unlike in a typical payment ecosystem, where the operator is identifiable and responsible for the smooth functioning of the payment system that it operates.

#### **MAS’ Response**

- 7.3. MAS will proceed with the proposal, to ensure that MAS has powers to regulate a systemic stablecoin arrangement adequately. MAS notes the challenges and will continue to monitor international developments on the expectations of regulating systemic stablecoin arrangements, before developing the specific requirements to regulate such arrangements.



## 8. Other Comments on MAS' Regulatory Approach Towards Stablecoins

- 8.1. MAS sought further comments relating to the regulatory approach towards stablecoins and stablecoin-related activities, including any implementation issues that MAS should consider. Some respondents sought clarity on whether MAS-regulated SCS would be insured under the Singapore Deposit Insurance Scheme, if pegged to the Singapore Dollar. A respondent clarified if SCS issuers would be required or allowed to pay interest on “deposited cash” relating to the SCS issuer’s SCS. Others provided feedback regarding risks to monetary sovereignty and interoperability with other stablecoins and Central Bank Digital Currencies (“CBDC”).

### **MAS' Response**

- 8.2. SCS issuers under the SCS framework will be subject to business restrictions to ensure that they are not exposed to additional risks, including through offering of other business services such as staking or lending, where interest is paid to customers. MAS-regulated SCS are not deposits and will not qualify as insured deposits as set out in the First Schedule of the Deposit Insurance and Policy Owners' Protection Schemes Act. As such, they will not be covered under the Deposit Insurance Scheme.
- 8.3. MAS notes that monetary sovereignty, and broader implications on financial stability, are concerns that warrant continued monitoring as the market develops. The DPT and SCS regulatory regimes will help MAS monitor the growth of the use of DPT and SCS as alternative media of exchange, and consider necessary measures to safeguard the efficiency of monetary policy and maintain stability in Singapore's financial system.



# Annex A: Summary of Finalised Key Requirements

## KEY REQUIREMENTS FOR MAS-REGULATED STABLECOIN ISSUERS

Requirements for MAS-regulated stablecoin issuers		
<b>RESERVE ASSETS</b>	<b>Composition</b>	<ul style="list-style-type: none"> <li>• Denominated in currency of stablecoin peg</li> <li>• Held in cash/ cash equivalents/ debt securities with up to three-month residual maturity and issued by (i) government or central bank of pegged currency; or (ii) organisations that are of both a governmental and international character with a minimum credit rating of “AA-”</li> </ul>
	<b>Valuation</b>	<ul style="list-style-type: none"> <li>• At least equivalent to par value of SCS in circulation at all times</li> <li>• Valued at mark-to-market basis daily</li> </ul>
	<b>Segregation &amp; Custody</b>	<ul style="list-style-type: none"> <li>• Held in segregated accounts on trust</li> <li>• Held in permitted custodians as follows:               <ul style="list-style-type: none"> <li>- Financial institutions licensed for custodial services in Singapore by MAS; or</li> <li>- Overseas-based custodians, with minimum credit rating of “A-”, which have a branch in Singapore regulated by MAS to provide custodial services</li> </ul> </li> </ul>
	<b>Independent Attestation &amp; Audit</b>	<ul style="list-style-type: none"> <li>• Independently attested to on monthly basis, report to be disclosed on entity’s website and submitted to MAS</li> <li>• Annual audit, report to be submitted to MAS</li> </ul>
<b>REDEMPTION AT PAR</b>		<ul style="list-style-type: none"> <li>• Direct legal claim for redemption at par</li> <li>• Redemption requests can be made anytime</li> <li>• Timely redemption (no later than 5 business days)</li> <li>• Redemption conditions (if any) must be reasonable, and disclosed upfront</li> </ul>
<b>PRUDENTIAL</b>	<b>Base Capital Requirement</b>	<ul style="list-style-type: none"> <li>• Higher of S\$1million or 50% of annual operating expenses (“OPEX”)</li> </ul>
	<b>Solvency</b>	<ul style="list-style-type: none"> <li>• Liquid assets valued at higher of 50% of annual OPEX or amount assessed to achieve recovery/ orderly wind-down</li> <li>• Amount assessed to achieve recovery/ orderly wind-down to be independently verified</li> </ul>
	<b>Business Restriction</b>	<ul style="list-style-type: none"> <li>• Prohibit provision of other non-issuance services (e.g. lending, staking, dealing in DPTs other than the SCS being issued and recognised as MAS-regulated stablecoin) in SCS-issuing entity</li> <li>• SCS-issuing entity cannot have stake in any other entity</li> </ul>
<b>WHITE PAPER ISSUANCE</b>		<ul style="list-style-type: none"> <li>• White paper to be issued, disclosing details such as, but not limited to:               <ul style="list-style-type: none"> <li>- General information of the issuer;</li> </ul> </li> </ul>



**Requirements for MAS-regulated stablecoin issuers**

	<ul style="list-style-type: none"><li>- Operations of the SCS (including value-stabilising mechanism, technology adopted);</li><li>- Risks arising from use of SCS; and</li><li>- Rights and obligations related to the SCS (e.g. redemption) etc.</li></ul>
<b>ANTI MONEY LAUNDERING/ COUNTERING THE FINANCING OF TERRORISM (AML/CFT)</b>	<ul style="list-style-type: none"><li>• Existing AML/CFT standards on DPT service providers and banks, e.g. customer due diligence, travel rule, screening, etc.</li></ul>
<b>TECHNOLOGY/ CYBER RISK</b>	<ul style="list-style-type: none"><li>• Existing technology and cyber risk management standards on DPT service providers</li></ul>