

the payments association

# Digital Assets Demystified:

The history, status, and future of  
programmable digital assets

# Welcome

Welcome to this whitepaper from The Payments Association's [Project Digital Currencies](#) working group, where we explore the exciting and rapidly evolving world of digital assets.



## Manish Garg

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**The Payments Association**



In recent years, digital assets have emerged as a new asset class, offering investors an innovative and decentralised way to invest in a range of different assets.

In this whitepaper, we delve into the various aspects of digital assets, from the underlying technology to the economic implications and the regulatory landscape. Our goal is to provide an in-depth analysis of this emerging and exciting market, and to help readers understand the opportunities and risks involved in investing in digital assets.

Ultimately, we believe that digital assets represent a powerful opportunity for growth and diversification in the portfolios of clients', partners and consumers. As the global financial landscape continues to evolve, cryptocurrencies offer a decentralised alternative to traditional financial systems, and can provide a hedge against inflation and a means of diversifying risk.

Digital assets also have the potential to revolutionize the way we invest and manage our assets. By leveraging the

power of blockchain technology, digital assets offer a secure and decentralised way to invest in a range of different assets, from cryptocurrencies to real estate and even art.

Our team of experts has brought together the latest research and insights into this rapidly evolving field and we are excited to share our insights and analysis with members of The Payments Association and the wider payments industry.

As the digital asset market continues to grow and evolve, we believe that it will play an increasingly important role in the global financial landscape. We hope this whitepaper will serve as a valuable resource for anyone interested in digital assets, whether you are a seasoned investor or simply curious about this emerging trend

Meanwhile, The Payments Association will continue to champion for the appropriate adoption of these innovations through its policy work, project activity and collaboration with others on the UK Forum for Digital Currencies. If you want to get involved, get in touch.



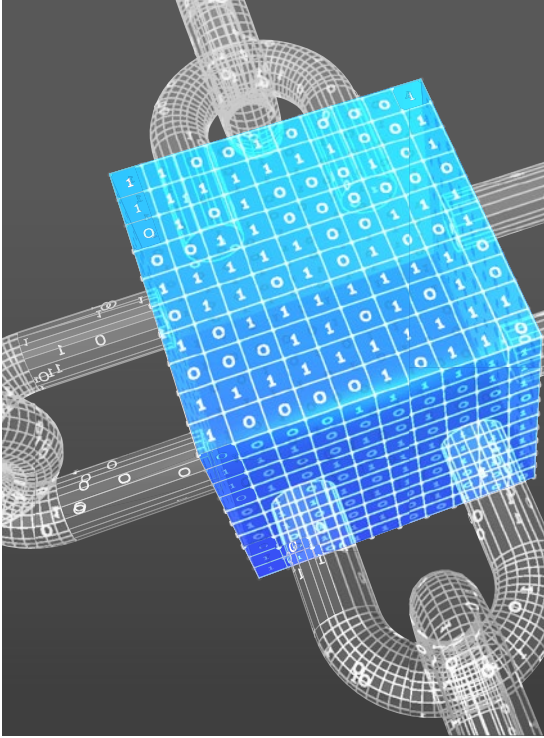
“As the digital asset market continues to grow and evolve, we believe that it will play an increasingly important role in the global financial landscape.”

# Introduction

**T**he history of money has been fascinating throughout millennia and this is no different in the 21st century. With money becoming digital and our lives being revolutionised by the computer and internet over the last 40 years, the more recent developments are again making a mark in the evolution of money and payments.

Something new and rather different has emerged in recent years: money that is not only digital but also decentralised – and it is arguable as to whether it can be labelled as money at all. You know what we’re talking about here, Bitcoin, and everything else that followed it, in what we call, ‘cryptocurrencies’. But cryptocurrencies were just the beginning. Built on a new type

of database called distributed ledgers, the speedily developing world of cryptocurrencies has evolved further into the much broader ecosystem of ‘digital assets’. This white paper from The Payments Association provides an overview of this evolution for payments professionals everywhere. It sets out to explain the different types of currencies or assets that we encounter today. Furthermore, this white paper gathers thoughts, perspectives and examples of new business models from several members of The Payments Association, to help bring these sometimes very technical and theoretical discussions to life. You can watch our interviews with Arf, aryze, Ethics Grade, Kroll, Mastercard, payabl, SWIFT, on page 17.



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“Something new and rather different has emerged in recent years: money that is not only digital but also decentralised.”

## The Four Categories of Digital Assets

To start, we essentially have four groups of digital assets today:

### Unregulated (mostly) Digital Assets:

- 1) Cryptocurrencies and Utility Tokens
- 2) Stablecoins

### Regulated Digital Assets:

- 3) Securities Tokens
- 4) Central Bank Digital Currencies (CBDCs)

In this report, we explore all of the above, explain what they are and how they work, and clarify what regulations apply in the UK and EU for regulated digital assets. ■



# Cryptocurrencies: history and evolution

**I**n the aftermath of the financial crisis a disruptive and outstanding innovation appeared on the scene with the arrival of Bitcoin, the first cryptocurrency to operate without the involvement of the financial industry. Bitcoin started as an isolated experiment, endorsed by libertarians that took issue with the way our centralised societies operated. Since 2009, Bitcoin has inspired the creation of thousands of cryptocurrencies and tokenised assets, which now make up the ever-growing digital financial ecosystem that remains largely outside the control of governments and regulators. Bitcoin's underlying technology, the distributed ledger technology (DLT), came into focus for both the emerging new players as well as the regulated financial industry and is hailed as providing a more secure and efficient way of transferring digital assets or currency. (Note that this white paper uses the term DLT and blockchain – the specific type of DLT used by Bitcoin – interchangeably.)

Since the Bitcoin blockchain, 100s of different types of DLTs have developed. The main thing that all these platforms have in common is the architectural concept of using a shared digital ledger to distribute the process of transmitting information across an ecosystem. They do this by providing a single source of data that all of the participants in the network can see, can contribute to, and can trust. So, what are the differences between traditional payment systems and the Bitcoin blockchain?



## Payment systems

- Network with a central operating node
- Account Based
- Fiat currency (backed by or in central bank money)
- System and currency are separate
- Highly regulated and supervised
- Full information/transparency on sender and receiver by central operator
- Batch or single transaction processing
- Within ledger transfers
- Multitude of ledgers with no common view and associated complexity, significant reconciliation costs for participants

## Bitcoin blockchain

- Distributed network
- Cryptographic Keys
- Private cryptocurrency (not backed)
- System and currency are integrated
- Not regulated and in parts almost impossible to supervise
- Pseudonymity, with option to separately combine data to identify individuals
- Batch processing
- Within ledger transfers
- One immutable ledger or transaction log, that is shared with all participants and updates automatically

Source: Dr. Ruth Wandhöfer, PhD 'Technology Innovation in Financial Markets – Implications for Money, Payments and Settlement Finality', 2019, <https://openaccess.city.ac.uk/id/eprint/23308/>.

With some implementations of DLT, such as the Bitcoin blockchain, there is no central authority or intermediary such as a Central Bank that is responsible for the settlement of transactions and the system is built instead on financial protocols. In the case of the Bitcoin blockchain, which is a 'permissionless network', anyone can join the network and even participate in the validation process of transactions across the network. The network also has embedded participant verification and uses cryptographic keys to ensure that the holders of these keys have the authority to initiate a transfer. If a particular account does not have the right key, the network will not accept the information being broadcast by that account.

In addition to this reduction of intermediaries, DLT has a unique and rich stack of inbuilt capabilities. For example, the distribution of the network's operation makes the overall network more resilient and available as it doesn't have a single point of failure. The ability to customize control of the network is another important capability. The auditable ledger means that once a transaction has been validated and agreed upon to be committed to the ledger, it cannot be removed (known as "irrevocable") and can't be changed ("immutable"). This indelible audit trail makes it valuable for use cases that require verification of existence, process or provenance. In a payments context this would mean that, subject to the degree of identification and transparency, in a complex transaction different parties transacting with each other could be identified and flows traced more accurately, mitigating the challenges of money laundering and other financial crime aspects. A similar transparency benefit could be delivered in a supply chain context, for example where

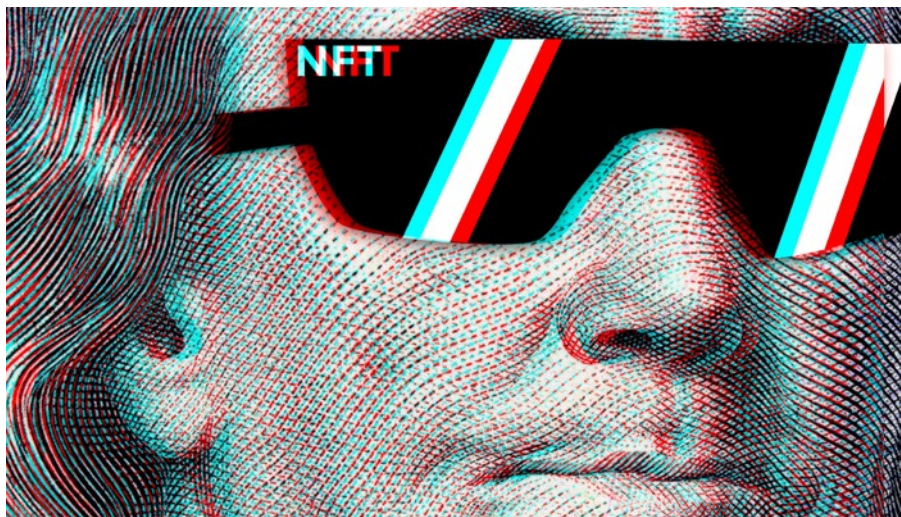
“Bitcoin started as an isolated experiment, endorsed by libertarians that took issue with the way our centralised societies operate.”

provenance is really important such as in the case of diamonds.

Smart contracts are a further evolution, where DLT can have embedded business logic, which allows for self-executing enforcement of contractual terms that are specified in digital form. Such 'programmable money' enables the sender of money to add conditions to the money so that, for example, it can only be redeemed in certain areas, or at certain times, or to pay for certain things to specific people or entities.

And thirdly, tokenisation - replacing sensitive data with a non-sensitive token with no exploitable value

- allows the creation of a 'digital wrapper' around value (whether that is currency, commodity, or a financial instrument), which can then be transferred across the network in an efficient and secure manner. In the payments context we have been used to tokenisation for some time, when we think about one-time tokens to authorise a transaction. Here we are talking about using the same concept to represent value itself. For example, based on a balance in your bank account, some of your money could be tokenised and you could use that digital form to make payments on a DLT infrastructure. As we will see shortly, tokenising items of value, also allows sharing the ownership more easily. ■



# The arrival of utility tokens

**B**ut innovation didn't stop with Bitcoin and other altcoins. Soon the concept of utility tokens arrived. Put simply, a utility token is a crypto token that has a particular use within a specific ecosystem. It can be thought of as a piece of software that allows the holder to perform some action on a blockchain-based network. Utility tokens might, for example, give access to cloud storage space (now or in the future), or allow the user to swap tokens or perform decentralised finance (DeFi) activities on a decentralised exchange (DEX).

The majority of these types of tokens are created on the Ethereum blockchain to then run on top of that blockchain, but there are also other types of platforms like Solana, Ron or the Binance Smart Chain. The Ripple XRP token is another example of a utility token.

These types of coins are usually created all at once and distributed via Initial Coin Offerings (ICOs). Beyond their specific utility, utility tokens have also often been used for speculative purposes, which can create problems when the value of tokens fluctuates significantly. As a consequence, some utility tokens have become stablecoins, meaning their value is pegged 1:1 to another asset, commonly a fiat currency such as the US dollar. The other technical challenge is that utility tokens are ERC-20 tokens running on Ethereum (the standard for fungible tokens on Ethereum, so they are interchangeable with other smart contract tokens), which triggers Ether gas fees (simply the fee required to execute a transaction on Ethereum) to be charged whenever a transaction takes place. These can get quite expensive for those involved depending on transaction demand.

## Non-fungible-tokens (NFTs)

The origins of NFTs go as far back as 2012, a lifetime in the world of crypto. Whilst a bitcoin is always a bitcoin a bit like a dollar is a dollar, NFTs are non-fungible, meaning each NFT is truly unique. They function as a tool to represent the ownership of a unique asset. This is an important point. We are not saying that NFTs represent the asset itself, they represent the ownership of it. This ownership is secured on Layer 1 blockchains such as the Ethereum blockchain, Solana and Cardano, which makes it impossible to copy or recreate a particular NFT.



***“We want to enable users to spend their money the way they want, whether this is via cards or crypto wallets. We want to make NFT buying easy and immediate. The future is likely to show a more fragmented landscape with more choice and Mastercard embraces that as long as it is compliant and safe to use.”***



**Christian Rau**

Senior Vice President Fintech & Crypto Enablement Europe,  
**Mastercard**

In the early days of NFTs, these were actually small fractions of bitcoins, at the time called coloured coins, which served as digital representations of real-world assets such as government bonds, precious metals, cars or other crypto currencies. In 2014, a group of coders joined forces to create an open source platform that enabled trading of NFTs on a decentralised ledger network. This opened the door for creativity to enter this new digital world and in the same year the first 'expensive' digital art had been minted. The launch of 10,000 unique CryptoPunks in 2017 created a somewhat crazy trend with secondary market prices for these pixelated characters quickly moving into double-digit millions of USD. The same year saw the arrival of CryptoKitties, a blockchain-based game where players can trade, breed, buy and raise digital kitty characters using Ethereum. The media jumped on this and prices also rocketed. In response to these developments, NFT marketplaces began to appear, making minting and trading of NFTs a more visible and centralised proposition, which also allowed for more price discovery by displaying bid/ask prices in one place.

In 2021, the artist Beeple sold a digital art piece as an NFT at Christie's auction house for \$69 million, followed by Pak's art piece, which sold for \$91.8 million! This piece was sold to many buyers in units, also questioning the concept of a piece of art versus a collection of art.

Of course, this is just the beginning. Other creative industries are smelling the coffee.



One such example to showcase here is how DLT and the arrival of NFTs have the potential to disrupt the film industry. Because NFTs represent sovereign ownership of a digital asset on a blockchain, independent film makers can now enable users not only to digitally access and consume films, but also to purchase unique and individual digital avatars and other digital merchandise. NFTs can also give access to games based on films allowing users to play out their own stories based on these avatars. This in itself can create new primary and secondary markets, as we have seen with digital art and CryptoKitties. Again, there are no limitations to creativity and commercialisation, and this time the Hollywood Mega Studios won't be the producers, middlemen and overall rent extractors.

## Stablecoins

As a result of the shortcomings of cryptocurrencies as payment instruments – e.g. price fluctuations, lack of broad acceptance – some crypto coders came up with the idea of creating a crypto coin that would be more stable by pegging it to a fiat currency. Nothing new here, some of you may think, as this is essentially e-money, which has been a regulated activity in many markets (in the EU since 2001). Having a stable cryptocurrency would finally fulfil the promise of it being a medium of exchange, store of value and, of course, unit of account – the key features of money.

Let's look at the stablecoin world for a moment, because we see this as being central to the evolution of payments and the application of payments regulation in the future. Today we have three types of stablecoins in the market:

- 1 Stablecoins backed by fiat currency, or other assets such as commodities;
- 2 Stablecoins backed by cryptocurrency and
- 3 Algorithmic stablecoins

Well then, how do they work and how stable are these stablecoins?

In simple terms stablecoins shift counterparty risk from regulated financial institutions, such as banks, to often unregulated institutions – the stablecoin issuers and operators – thereby increasing counterparty risk. This means that stablecoins are riskier than the commercial bank money you hold in your bank account. The big question here is, who do users or participants trust? There is no deposit insurance for stablecoins. This absence of regulation means that if something goes wrong with the issuer of the system or you accidentally send the coins to the wrong person, they will have been lost. And there's more. We can't be sure if and how stablecoins are collateralised or backed, or whether the collateral backing the stablecoins exists. It's important to note that we are seeing good practices emerging with stablecoin issuers being banks

themselves, or taking stringent measures to have third-party audits, both of their code and their collateral, and making that publicly available. However, the meltdown in 2022 of algorithmic stablecoin TerraUSD and stablecoin Luna that was linked to it was a great case study of a run on a stablecoin and the implications of the lack of regulation in this area.

A recent analogy from the Federal Reserve's Governor Christopher Waller is worth considering at this point. Speaking on 'Thoughts on a Crypto Ecosystem' in February 2023, he noted that such assets had no intrinsic value, and likened them to collecting baseball cards – adding that he was not a collector! Yet, if sufficient people believe that baseball cards have value, then they do indeed have value, as they can be traded, or converted back into fiat currency. Referencing Paul Samuelson's 1958 theory on 'the social contrivance of money', the reality that something is worth what you can get for it is self-evident.

It is clear that opinion remains split, considering that at the very same event that Waller attended, the President of the Federal Reserve Bank of Philadelphia, Patrick Harker, cited survey evidence that there was sufficient demand in the market to preserve value. Who knows, perhaps Harker has a large collection of baseball cards?

From a Stablecoin perspective, if a Stablecoin is backed 1:1 with the US dollar, for example, then it may well be a reliable asset class, but if one were to adapt Samuelson's proposition into 'the market contrivance of money', then it would be worth checking whether it is stabilised against the US and not the Zimbabwean dollar. ■



# Digitising assets: the role of security tokens

**A** security token, first of all, has nothing to do with security in the ‘cyber’ or ‘risk’ sense. The term ‘security’ is pulled from the investment world, ‘securities’ or alternatively ‘equity’, and with tokens these are sometimes called ‘equity tokens’. This category of digital assets, unlike utility tokens referred to above, is increasingly being regulated like actual securities as these tokens represent a share in the issuing company, just like a share in the traditional financial world.

The origins of Security Token Offerings, or STOs, can be found in the challenges that Initial Coin Offerings or ICOs have triggered in the market, i.e. that many of the ICOs were actually scams. Market participants demanded regulatory oversight and given that security tokens are considered as securities

in more and more jurisdictions, raising funds via STOs was seen as a much safer route, because these tokens usually give holders rights similar to those of ordinary securities (for example, sharing, voting, dividends, etc.)

The US, for example, regulates security tokens in the same way as other securities. In order to determine if something is a security, the so-called ‘Howey Test’ has to be applied, where something is a security if it fulfils the following four criteria:

- 1** There is an investment of money.
- 2** There is an expectation of profits.
- 3** The investment of money is in a common enterprise.

- 4** Any profit comes from the efforts of a promoter or third party.

And it doesn’t matter if the enterprise in question is a speculative one or whether there is a property for sale that has or has not any intrinsic value. The key is, are you investing money for the purpose of making a profit? If that is the case, then you are buying a security, not matter what it looks like.

In Europe there is also no specific STO regulation, but instead existing regulations may apply. For example, in the case of EU prospectus Regulation, security tokens are characterized as transferable securities under MiFID II. In addition, traditional AML legislation also applies to STOs, where all investors are subject to AML/KYC checks. Below you can find a comparison table between ICOs and STOs.

## Comparing ICOs and STOs

	ICO	STO
Token Type	Utility Type	Security Token
Benefits	Investor rights to use platform, products/services	Profit sharing, voting, dividend rights
Investors	General public	Accredited investors or defined no. of non-accredited investors
Regulations	Varies with jurisdiction	Regulated according to local securities laws
KYC Requirements	Varies with jurisdiction	Same as for other AML-regulated entities

Source: Sumsub.com, ‘Security Token Offerings 2023: AML and KYC’, <https://sumsub.com/blog/kyc-legal-for-sto/>



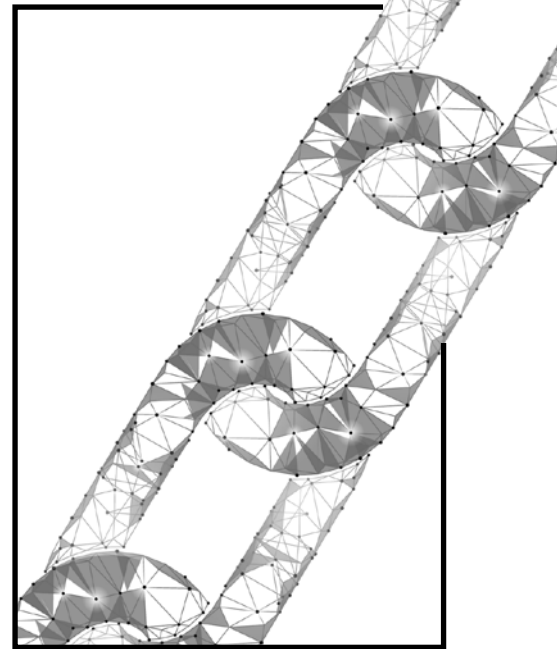
The exciting potential that security tokens can offer the industry is seen in the underlying technology. Today, several traditional exchanges are building or have launched new types of regulated exchanges for tokenized securities in order to combine the liquidity of capital markets with the speed, agility and potential returns of cryptocurrencies, as well as enabling the more efficient trading of traditional securities in digital asset form. Combining regulated instruments with the speed of blockchain is the key here, moving from a T+2 settlement cycle to near instantaneous, eliminating the illiquidity discount. Having a 24/7 system also removes the inefficiencies of the current process of daily market closures. However, given the need to comply with securities trading rules, security tokens need to embed more legal contract elements than a simple crypto currency, which is why building a security token exchange is no mean feat (unlike the many crypto exchanges we have in the market, which already had enough problems themselves).



**“Arf solutions are built on blockchain technologies which can move value quickly and securely, at approximately 100th of a penny and 2-4 seconds transmission time on-chain.”**



**Matthew Castricone**  
Vice President of Partnerships  
Arf

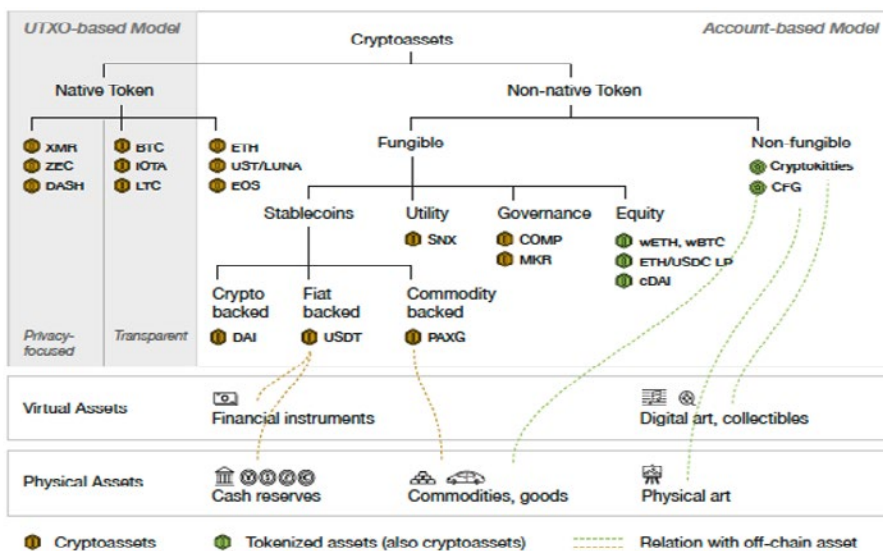


On the flipside, given the programmable nature of security tokens, compliance can be built into the token itself, alleviating the compliance burden through automation. The same principle applies to corporate actions such as dividends, where long-term holding could be incentivised by programming dividends to

increase with the length of the holding period. And indeed, voting rights can equally be embedded in the token itself, enabling better governance, encouraging longer term investors by providing them with greater voting rights than short term speculative investors.

The other benefit of programmable security tokens is the enablement of fractional ownership (where several entities or individuals can own part of the same thing, e.g. a piece of art or real estate), which in itself can increase market depth. This has already been proven in examples such as art or real estate, opening up the market to a much broader investor base and allowing for better diversification opportunities for all investors.

A recent paper from BIS ‘The technology for Decentralised Finance (DeFi), includes a helpful visual (which you can find below) that shows the different types of cryptoassets. ■



# New forms of central bank money: central bank digital currencies

Our fourth category of digital assets covers Central Bank Digital Currencies, or CBDCs. These have become an important concept in the discussion of the evolution of money over the past few years. Since then, various rationales for developing a CBDC have been highlighted by many research publications from organisations such as the International Monetary Fund (IMF), The Bank for International Settlements (BIS), The European Central Bank (ECB) and hundreds of national Central Banks and many more. Whilst the concept of CBDC initially emerged as a reaction to cryptocurrencies such as Bitcoin, the potential merits of a CBDC in improving financial stability, creating financial inclusion and enhancing efficiencies and resilience of payments have come to the fore, in particular due to the steep and secular decline in the use of physical cash. For several countries CBDCs are also becoming a geopolitically strategic imperative because they challenge the supremacy of the US dollar, which has reigned over global markets since World War II. CBDCs create an opportunity to create an alternative by leveraging technology and cooperation. Whilst some countries are looking for a hedge against the US dollar, some are also worried that certain emerging cryptocurrencies as well as CBDCs could destabilise their local currency. In fact, a number of smaller emerging market countries in addition to Japan have chosen to make Bitcoin a permissible payment instrument and accepted means of exchange – or even legal tender, such as El Salvador – as opposed to simply ‘property’ (as is currently the case in the UK).



Christine Lagarde, when she was the Head of the International Monetary Fund (IMF), made a public statement underlining the importance of central banks to reconsider their role as the money issuer in the digital age, emphasizing key principles and design considerations. Simply put, where cryptocurrencies allow for zero control, central-bank owned platforms would give regulators control back, making innovation in money issuance a key priority for central banks. It is no surprise, therefore, that a number of research and pilot projects have been developing over the last few years, with many central banks including the Bank of England and supranational bodies including BIS and IMF issuing research papers and results of Proof-of-Concepts (PoCs). It is also interesting to note

that the theme of CBDC gained further momentum during the Covid-19 crisis with different bodies calling for central bank digital cash in order to maintain financial stability and limit the mass-privatisation of money.

Next to the geopolitical drivers, the cost of cash and the continuing decline of cash usage in certain countries, together make the rationale for digital money more pertinent. Whilst Sweden has advanced in developing an e-Krona proposition, the Covid-19 crisis shows that cash usage can rapidly decline in developed markets such as the UK. In the UK a cash decline of 50% has been recorded, where the limit for contactless payments was raised from 30GBP to 45GBP and subsequently to 100GBP.

However, a major question is if CBDC is supposed to be a digital version of the cash bank note or a new retail payment instrument with broader properties and with less anonymity than cash. Cash is a bearer asset and users of cash stay anonymous whilst sending and receiving parties can be identified by payment service providers (PSPs) when using digital retail payment instruments. Certain payment instruments embed payment guarantee and chargeback mechanisms, which cash does not.

However, on the opposite end of the spectrum there is a very real risk that under certain stress events there could be a fully-fledged and very speedily executed run on the banks. Introducing a digital ('considered to be') risk-free asset to the market that is a debt to the central bank, just like physical cash, could in certain situations lead to significant demand, i.e. a flight – in the true sense of the word – from bank deposits into such an asset, triggering reduced bank funding and a consequential increase in lending rates. Central banks have yet to figure out how to mitigate this, before any meaningful CBDC at scale can be introduced.

CBDC will not likely solve any of the following problems:

- digitisation (we already have massively digital money/ payments)
- innovation (we already have significant innovation in payments)
- inclusion (no evidence that CBDC will do better than existing instruments)
- defend against crypto threat (Crypto is already being regulated with the Markets in Crypto-Assets Regulation, MiCa etc, so that threat is reduced)
- reducing fragmentation (it will result in the opposite: yet another payment instrument)

All stakeholders ranging from consumers to merchants, PSPs and commercial banks must see a

rationale and business demand if CBDC is to be adopted. Currently central banks are not able to clearly explain why consumers should adopt (and their recent pilot programmes all demonstrate this). Generally, the banks are not in favour of CBDC. This is because it will require much work, taking on risk, and it reduces their liquidity which attacks their core lending business. Merchants will also have another form of payment to integrate into the checkout and consumers, will have another dimension to consider when paying and being paid. Many industry thinkers believe CBDC to be a hype project which will consume masses of resources and achieve very little.

Here are a few recent examples of such thinking:

- House of Lords, Economic Affairs Committee, "UK Digital Pound is a solution in search of a problem", 13th January 2022, <https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notice/2022/january-2022/central-bank-digital-currencies-a-solution-in-search-of-a-problem/>
- Greg Baer and Paige Paridon, "The Waning Case for a Dollar CBDC", Bank Policy Institute, 18th February 2022, <https://bpi.com/the-waning-case-for-a-dollar-cbdc/>
- Peter Bofinger and Thomas Haas, "Central bank digital currencies risk becoming a gigantic flop", University of Würzburg, 1st February 2021, <https://cepr.org/voxeu/columns/central-bank-digital-currencies-risk-becoming-gigantic-flop>
- Review by former professor of economics and senior adviser at the Bank of England "Why central banks should not push ahead with CBDCs" in <https://www.ft.com/content/44015dbd-e28a-4be9-b690-ff309b80b890>

If CBDCs are to be developed, it is crucial that they enable the broader

***"Setting up a CBDC sandbox will enable players to test out different structural business models and connections, which could bring different ledgers together, thus removing the current complexity of fragmentation and the need to reconcile between securities and cash settlement systems."***



**Haydn Jones**  
Managing Director - Data  
Insights & Forensics  
**Kroll**

ecosystem including Fintechs/and Third-Party Providers (TPPs) to strive. For that to happen it is key that PSPs have access to CBDC wallets to read out data, initiate transfers and so on. This is also why Application Programming Interfaces (APIs) need to be on top of CBDCs. Some believe that all advanced functionality or programmability should be done by smart contracts, not APIs. Others believe that all advanced functions (such as programmability or refunds) should be built into the payment layer itself.

Here in the UK, the Bank of England has also recently launched its consultation on a digital pound. Please see following link: <https://www.bankofengland.co.uk/paper/2023/the-digital-pound-technology-working-paper>. The overall approach set up by HM Treasury and the Bank of England regarding their approach to a retail CBDCs and their commitment to partner with the private sector is very much welcomed by the PA, which seeks to act as a critical friend and partner in this process, helping to coordinate industry input and ensuring the long-term competitiveness of the UK. ■

# Security, crime and privacy considerations for digital assets

One could write a book on the flip sides of each of these three facets – security, crime and privacy of digital assets. One could discuss the cybersecurity of digital asset classes, the financial security of an investment in them, the criminal threat to such an investment, or their use to commit or abet crime, and the privacy threats and opportunities of them compared to other asset classes.

From a straightforward perspective of cybercrime against your digital asset, there are few differences to the vulnerability of a digital asset compared to fiat. Stealing money online will primarily involve the attacker masquerading as the genuine owner to transfer elsewhere, whatever form the store of value takes. As a general rule, the technical security of traditional banks should be more robust than the newer entrant crypto exchanges, but to no greater degree than a fiat 'neobank' or 'challenger bank'. Deposit insurance is also a key difference, but that is a regulatory rather than technical factor.

The use of digital assets to perpetrate or abet crime is the subject of a great deal of attention in the media, but can essentially be 'demystified' much more easily. Digital assets as a form of crime can be summed up in a few words – Ponzi and snake oil. As the Fed's Governor Waller notes, there is no intrinsic value unless enough people believe there is. ICOs have often been likened to Ponzi schemes – and much of the marketing literature chimes similarly – get in early and persuade enough others to invest and your investment will actually have value.

Marketing materials typically stop before the caveat – but only until the music stops – so you better know when to cash out.

Bitcoin is the preferred currency of ransomware or other cybercrime vector operators. The perceived anonymity of Bitcoin made it attractive, and the lack of cross-border AML controls in the early days allowed it to evade regulatory controls. But this is no longer the case. Since December 2019, FinCen (the United States Department of the Treasury Financial Crimes Enforcement Network) has extended AML controls beyond fiat transfers to 'any store of value'. And the anonymity originally hailed by criminal fraternities has subsequently started to unravel, with academics and now commercial applications building solutions for automating the tracking of criminal behaviour. Following the money in the un- (or less) regulated Wild West looks like it may be much easier for Law Enforcement in any country, ironically, from the criminals' perspective, because there is no need for intra-jurisdictional agreements on intelligence sharing. ■

## The case of the DAO

Until 2016, the US SEC appeared to ignore ICOs altogether. At that time, DAO – the Decentralised Autonomous Organisation – was the largest crowdfunded cryptocurrency in history with \$150m raised by DAO. Despite reassurance by Stephan Tual, one of DAO's founders, hackers stole \$50m, and the price of Ethereum dropped by 50%.

The SEC's report underlined the application of the 'fundamental principles' of US federal securities law to the 'new paradigm' of crypto, defined as 'virtual organizations or capital raising entities that use distributed ledger or blockchain technology to facilitate capital raising and the related offer and sale of securities.' According to the SEC, 'the automation of certain functions through this technology, "smart contracts," or computer code, does not remove conduct from the purview of the U.S. federal securities laws'. The days of the Wild West of cryptocurrencies are over.

***"Decentralised finance protocols are starting to behave like those by banks. The potential of blockchain and DLT is key in the space of securities as long as securities in that form are recognised in law"***



### Haydn Jones

Managing Director -  
Data Insights & Forensics  
Kroll







## What does this mean for the U.K.?

For the UK we do not believe that a holistic approach like MiCAR is the way forward. However, the UK aims to become a global hub for regulated crypto and digital assets activities. The recent HM Treasury consultations concerning stablecoins and the promotion of crypto assets, as well as the new 'Financial Services and Markets Bill', intend to create a new regulatory regime applying to 'digital settlement assets'. There is a clear need for new regulation in the sector and the recent focus by the government and by the regulators is welcome.

In addition, the UK's new Financial Services and Markets Bill aims to ensure that the regulatory framework facilitates the adoption of cutting-edge technologies in financial services.

Payments legislation is also being expanded to include the use of digital settlement assets, including forms of crypto assets used for payments, such as stablecoins backed by fiat currency by payment systems and service providers, bringing such new systems within the regulatory remit of the Bank of England and the Payment Systems Regulator (PSR). The Treasury will have the necessary powers to regulate crypto asset activities within the existing financial services framework and to foster innovation in this space through financial market infrastructure sandboxes, allowing firms to test these transformative technologies and practices for the underlying infrastructures are being brought in by the Bill.

An interesting dynamic on the 'politics of regulation' has recently been raised in a House of Lords debate on the Financial Services and Markets Bill, namely the extent to which regulators, to paraphrase Lord Frost, follow the letter rather than the spirit of legislation in their interpretations.

This, combined with the degree to which there are almost philosophical differences of opinion between individuals even within the same regulator as we have discussed, does not provide clarity on how businesses should expect regulators to react to issues if, or when, they arise.

We believe that there are too many voices supporting often contradictory policies, and this will be to the detriment of the UK's leadership in this important new field. To help to share knowledge and align the views of these disparate groups, The Payments Association, in partnership with TheCityUK, City of London Corporation, UK Finance, Innovate Finance and the Digital Pound Foundation have created a forum for sharing insights, aligning policies and educating stakeholders; called the **UK Forum for Digital Currencies**. By providing a common voice the UK FDC aims to reinforce the UK's potential for creating a hub of innovation and leadership in these new areas.<sup>1</sup> ■

“There is a clear need for new regulation in the sector and the recent focus by the government and by the regulators is welcome.”

<sup>1</sup> For more information on the UK FDC, contact [Riccardo.tordera@thepaymentsassociation.org](mailto:Riccardo.tordera@thepaymentsassociation.org)

# Conclusion

**T**his paper has set out to demystify programmable digital assets. But what does this mean for you, those operating in payments, those regulating money and those paying and getting paid?

We are proposing the following seven conclusions to help steer the debate and policy work.

**1**

## Regulation will wrap its arms around programmable digital assets

As the digital asset arena continues to evolve, regulatory measures are due to increase around the globe. Whilst some types of digital asset are easily classifiable as securities, other forms such as stablecoins should be regulated the same way as e-money and cryptocurrencies are often used as speculative tools.

**2**

## Business models will explode in use case and creativity

One thing is for sure, the nature of digital assets is bound to open up a new world of business models, with broader access, transparency, efficiency and speed. A particularly important development within this world is the concept of CBDCs and it remains to be seen where the journey ends up leading us and how far such a new form of money will bring socio-economic benefits as well as challenges to our western, digitally competitive payment landscape.

**3**

## Payments is at the heart of the change

From the payments industry perspective there is a general sense of both the incredible potential of these new technologies and asset classes but also, in particular with regard to CBDCs, the inevitability of continued developments, making the journey ahead an exciting one. Some players are already actively leveraging, for example, stablecoins to significantly improve the speed and cost of cross-border remittance transactions. Others see potential in providing ancillary ecosystem services such as ESG ratings for digital asset providers of any kind. Global infrastructures and networks are eyeing up different avenues with a view to being able to continue to serve an ever-evolving market.

**4**

## The gap between conventional and new payments systems and methods will close

There is a consensus amongst those interviewed for the purpose of this report that crypto and digital assets are here to stay and that the underlying technology of DLT and



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Ambassador  
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smart contracts will also find their way into traditional finance as well as other industries that can benefit from improved transparency and connectivity (e.g. the automobile industry). Leveraging DLT and smart contracts has the potential to significantly transform the currently fragmented landscape of securities and cash systems by connecting these onto one ledger and completely transform the post trade landscape. Testing new models out with the help of technology and regulatory sandboxes remains the right first step on this journey in order to ensure that both components are workable under the new paradigm.

**5**

## For payments, the basics still apply

For the payments industry it continues to be all about enabling users to spend their money the way they want. Providing choice means adapting to user needs and tastes, which continue to be heavily influenced by this nascent industry. We are moving into a world of affordable payments where access is more and more open. Apps for consumers will be more and more seamless and, in the future, it is likely that users will no longer need to deal with complicated private crypto keys.

The future of Web3 in combination with digital identity and different forms of digital asset instruments that can be used as money surrogates will enable us to do things we cannot do today. We are just at the beginning of a 30-year cycle of evolution in this space.

**6**  
**Programmable Digital Assets are a source of advantage for any country leading the way**

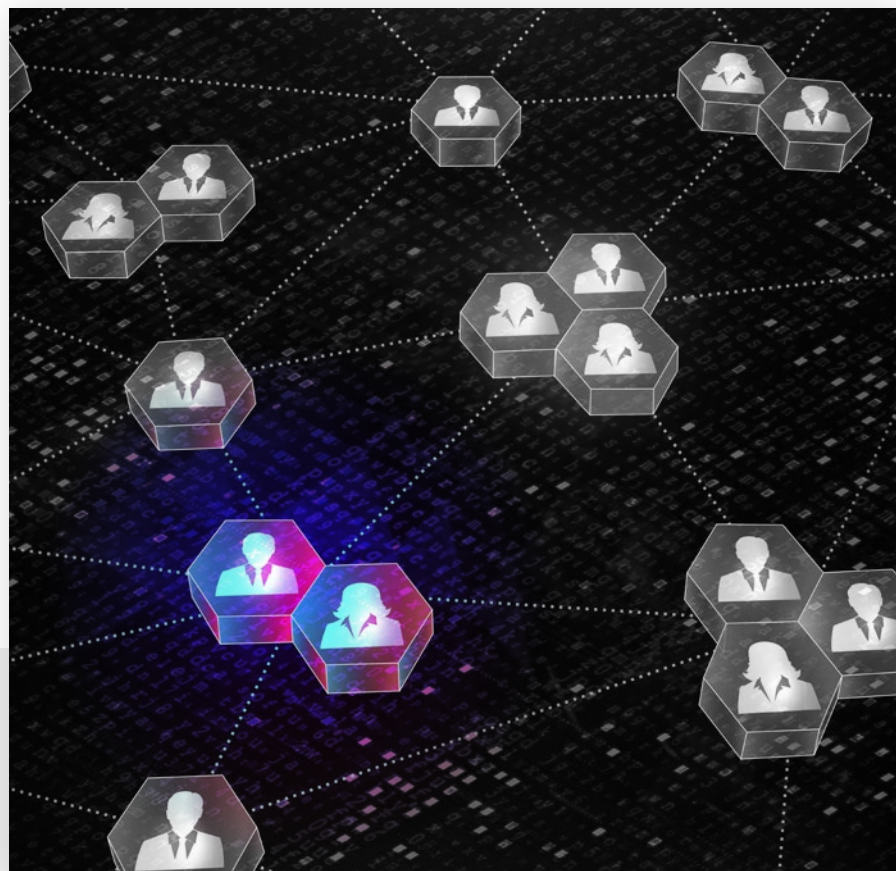
The Payments Association, which is part of the UK Forum for Digital Currencies (UK FDC) formed in 2022 with UK Finance, the Digital

Pound Foundation, the City of London Corporation, Innovate Finance and TheCityUK, supports the continued development of a diverse, effective and competitive ecosystem for both publicly and privately issued digital currencies in the UK, and for a legal and regulatory framework that promotes innovation whilst also balancing considerations of financial stability, consumer protection and market integrity.

This will support the UK government's plans to transform the UK into a global cryptoassets an technology hub. The UK has always been seen to be a global leader in security standards, and the requirement for developing new

**“**  
**“For the payments industry it continues to be all about enabling users to spend their money the way they want.”**

standards to prevent cryptoassets being used for sanctions busting and other organised crime transactions is an area where the UK is also looking to take a lead.



**7**  
**A common language, lexicon and standards are required**

In order to create alignment and support common positioning between the involved trade associations, UK FDC has agreed to collaborate in key areas such as the development of common terminology which embraces existing definitions used in the sector into a single lexicon, proposing high-level domestic standards and policies that can both influence and work in conjunction with the emerging international ones, and facilitating discussion and engagement between the UK's existing financial services industry and the crypto industry. This will help to reduce barriers between and increase mutual understanding of rules and processes and educate law and policy makers on the benefits coming from this emerging sector that can help the government to deliver growth and attract investments. ■



# Interviews - Members of The Payments Association

**Matthew Castricone**  
Vice President of Partnerships  
Arf

**Morten Nielson**  
CFO & Co-Founder  
ARYZE

**Charles Radclyffe**  
CEO  
EthicsGrade

**Haydn Jones**  
Managing Director - Data Insights & Forensics  
Kroll

**Christian Rau**  
Senior Vice President Fintech & Crypto Enablement  
Europe, Mastercard

**Sean Forward**  
CEO  
Payabl

**Nick Kerigan**  
Managing Director, Head of Innovation  
Swift

# Glossary of Terms

Note: You will find a short Glossary of Terms here below but it is worth noting that the industry has yet to agree on what different terms mean, which is why the UK FDC, co-founded by the PA in 2022, is producing a Glossary of Terms that can be read and understood by payments professionals for this new part of the payments industry in 2023. So, more materials to come on that front.

## Application programming interface (API)

An API is a set of routines, protocols, and tools for building software applications that essentially allows multiple systems or applications to 'speak' to one another. This allows customisation of applications, depending on the needs of the user and can streamline day-to-day processes. For example, in the UK we have a standardised API for Open Banking, which allows communication between banks and third party providers (TPPs).

## Blockchain

A blockchain is a type of distributed ledger that allows for the secure digital record of transactions. Each block contains data around an individual transaction such as date, time, amount and is designed to be difficult to alter. Blockchain is structured so that individual blocks, are linked together in a single list, called a chain. They are popularly used in cryptocurrencies such as bitcoin.

## Central Bank Digital Currency (CBDC)

CBDCs are mostly understood as a central bank issued digital form of money, that could be run for example on DLT technology. Retail CBDC is considered as a new form of central bank money for the execution of retail payments, whilst wholesale CBDC would be used for interbank settlement transactions.

## Cryptocurrencies

Cryptocurrencies had their origin with Bitcoin – all types after that are called altcoins. They represent a digital and sometimes decentralised type of asset that can have features of money. Cryptocurrencies represent a sub-class of crypto-assets. The value of a cryptocurrency is not controlled by a bank but is instead determined by supply and demand.

## Distributed Ledger Technology (DLT)

This is a type of data based that operates on the basis of nodes (independent computers which are spread across a geographical area) to replicate, share and synchronise transactions. Unlike traditional ledgers, there is no centralised ledger or central owner / administrator and the data is not stored or held in one particular place. The most known type of a DL is the blockchain system, but many new types of DLTs have been invented since the arrival of Bitcoin.

## ICO

An Initial Coin Offering (ICO) is a type of fundraising which uses cryptocurrency. Companies or projects sell cryptocurrency or 'tokens' to investors in exchange for money, with the hope that the token will have more value in future. ICOs are seen as the crypto twin of traditional Initial Public Offerings (IPOs); however there is no comprehensive regulatory framework that supports ICOs, unlike IPOs.

## Ledger

A ledger, is traditionally the primary book detailing economic transactions. The digital evolution of ledgers is represented by DLT, which operate on the basis of a consensus of digital data which is replicated, shared, and synchronised geographically spread across multiple institutions, sites, or countries.

## Native Token

Native tokens are a blockchain's foundational digital currency. Every blockchain has its own native coin used to reward miners and validators adding blocks to the blockchain and for payment.

## Non Fungible Token (NFT)

NFTs are types of crypto tokens that unlike bitcoin are not fungible, i.e. they are unique. NFTs can take many different forms,

## Security Token

Security Tokens are the digital form of what we know in the traditional financial world as stocks, bonds and other securitised assets.

## Security Token Offering (STO)

Akin to IPOs and ICOs, see above, STOs are a type of public offering where security tokens are sold through security token exchanges. Those tokens can be used to trade real financial assets, e.g. fixed income or equities, and use blockchain/DLT to validate and store token transactions.

## Smart contract

A smart contract is a self-executing piece of code that allows the processing and verification of a transaction. Typically, a smart contract runs on a decentralised ledger such as a blockchain, which monitors and enforces the contract.

## Tokenisation

Tokenisation is the method of replacing sensitive data with unique identification symbols, phrases or words, referred to as tokens. This process retains all of the sensitive information without compromising the security of the data. It can be used to enhance e-commerce transaction security without needing to incur additional costs for industry compliance and government regulation.

## Utility Tokens

A utility token is a cryptocurrency that serves a specific function in a crypto project's ecosystem. Utility tokens are not designed to be a medium of exchange for payment purposes, unlike stablecoins for example.

1 Note: Cryptocurrencies cover Bitcoin and all other altcoins, which followed.

2 Note: T+0 is transaction date whilst T+2 is the value date when the value gets settled.

3 If you sell a security on a Thursday afternoon, the transaction may not be settled until the following Monday (that's a total of 4 days). With thousands of securities transactions happening constantly, this inefficiency compounds. But when you remove these inefficiencies, trades can settle faster (minutes), and the illiquidity discount is eliminated.

4 BIS, "The Technology of Decentralized Finance (DeFi)", 17 January 2023, <https://www.bis.org/publ/work1066.pdf>

5 Lagarde, C., (2018), "Winds of Change: The Case for New Digital Currency", Speech at the Singapore Fintech Festival, 14.11.2018, IMF.

6 Finextra, "Cash usage in Britain drops by half", 25/03/2020, <https://www.finextra.com/newsarticle/35517/cash-usage-in-britain-drops-by-half>, (last accessed 01/07/2022).

7 10th January, [Financial Services and Markets Bill - Hansard - UK Parliament](#)

## Project Digital Currencies



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## About The Payments Association

The Payments Association is the largest community in payments. Founded in the UK in 2008, the association now operates communities in the UK, EU and Asia, helping almost 300 companies enhance their commercial interests, solve societal problems such as financial exclusion and evaluate new opportunities for innovation in payments.

Our purpose is to empower the most influential community in payments, where the connections, collaboration and learning shape an industry that works for all.

We operate as an independent representative for the industry and its interests, and drive collaboration within the payments sector in order to bring about meaningful change and innovation. We work closely with industry stakeholders such as the Bank of England, the FCA, HM Treasury, the Payment Systems Regulator, Pay.UK, UK Finance and Innovate Finance.

Through our comprehensive programme of activities for members and with guidance from an independent Advisory Board of leading payments CEOs, we facilitate the connections and build the bridges that join the ecosystem together and make it stronger.

These activities include a programme of monthly digital and face-to-face events including our annual conference PAY360 and awards dinner, CEO round tables and training activities.

We run six stakeholder working Project groups: Inclusion, Regulator, Financial Crime, International Trade, Digital Currencies and Open Banking. The volunteers within these groups represent the collective view of The Payments Association members at industry-critical moments and work together to drive innovation in these areas.

We also conduct exclusive industry research which is made available to our members through our Insights knowledge base. These include monthly whitepapers, insightful interviews and tips from the industry's most successful CEOs.



the payments association

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