



**rise**

Created by

 **BARCLAYS**

# Decrypting Crypto

**Rise Insights report**

**#HomeofFinTech**





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# Crypto is stepping up a gear

There's a new playbook for innovation that's asking fundamental questions of financial services.

**With the striking advances and huge interest seen in the crypto and blockchain sector this year, the Rise team has brought experts from our ecosystem together to review the trends impacting the industry. This report combines perspectives from traditional finance, FinTech founders, investors and technologists to review the latest innovations and look to the future.**

The global crypto phenomenon has emerged from truly open-source beginnings. Since Satoshi Nakamoto, the enigmatic creator of Bitcoin, published his whitepaper in 2008, developers, entrepreneurs and activists have been collaborating on a myriad of projects. The only requirements for anyone wanting to participate are a reliable internet connection, curiosity and time. They're taking part in a huge movement – a \$2 trillion<sup>1</sup> crypto-asset market has emerged with \$7 billion<sup>2</sup> funding invested in blockchain startups in Q1 2021 alone.

Adoption has been driven by an array of social factors. Beginning with curious programmers and passionate libertarians, crypto-investing has now become popularised, especially across social media. This year has seen an influx of institutional speculators, decentralised finance (DeFi), non-fungible tokens (NFTs) and the adoption of Bitcoin as a

national currency. Beyond all the hype and new acronyms, entrepreneurs are creating tangible value by applying distributed ledger technology in supply chains, wholesale payments and elsewhere.

During Fintech Week London earlier this year, Ron Kalifa observed that FinTech is transformative but still to fulfil its full potential. So far, major shifts, such as Open Banking, have been driven by policy makers or policy makers with industry collaboration. Crypto is different. It's asking fundamental questions like how a currency should work, what intermediaries are for and who decides – the government or people?

Traditional finance must engage in the discussion. It's only a matter of time before technological limitations such as scalability and interoperability are overcome. Beyond that point, a financial system built on blockchain may be unrecognisable by today's standards.

Early successes in DeFi saw its market capitalisation skyrocket to approximately \$100 billion in October. Despite this, among all the meme-coins and celeb-endorsed NFTs, a proposition designed for a wide user base, from early adopters to the mainstream, is yet to emerge.

Digital asset adoption is currently limited by complex user experience and lack of trust, regulatory uncertainty, immature infrastructure and controls. Collaborations between traditional finance and crypto and DeFi projects to design open infrastructure may be one solution to address some of the challenges. MoneyGram's recent partnership with Stellar is a great example that offers customers improved access and pricing.

Crypto is a focus area for governments and regulators who must protect consumers and competition while upholding the law and ensuring it's fit for purpose. Senior central bankers are warning of possible systemic impacts if the crypto asset market were to collapse. Central Bank issued digital currencies will support government-led agendas where other projects may not. Many crypto projects aim to be trust-less by design, avoiding the financial intermediaries who, today, adhere to stringent regulations that protect market stability.

Rise, created by Barclays, remains closely connected with the crypto and blockchain FinTech ecosystem. And Barclays continues to work closely with regulators, central banks, clients and startups.

On a personal level, I hope that, through close collaboration, traditional finance and the crypto community can together apply these new technologies and commercial models in a way that is sustainable, inclusive and reduces social inequalities. If not, what have we achieved that really matters?

To learn more about Rise, participate in our community of innovators and get industry news, insights and other content, [visit our website](#).



**Charlotte Kanagasabapathy**  
Global FinTech Platform  
Director, Barclays







c-kanagasabapathy



# Macro landscape

Innovation driven by crypto-native companies and FinTechs is disrupting core technology, infrastructure, policy, regulation and a host of financial services use cases. Here are some of the startups driving change in digital assets.

## Cryptocurrency ecosystem

Cryptocurrencies	Infrastructure providers	NFT/Creator platforms	Exchanges	Wallets
 <b>bitcoin</b>	 <b>ethereum</b>	 <b>OpenSea</b>	 <b>BINANCE</b>	 <b>Trust Wallet</b>
 <b>tether</b>	 <b>SOLANA</b>	 <b>ENJIN</b>	 <b>coinbase</b>	 <b>METAMASK</b>
 <b>USD Coin</b>	 <b>BINANCE SMART CHAIN</b>	 <b>Rarible</b>	 <b>FTX</b>	 <b>EXODUS</b>
 <b>BUSD</b>	 <b>AVALANCHE</b>	 <b>Nifty Gateway</b>	 <b>kraken</b>	 <b>Ledger</b>
 <b>litecoin</b>	 <b>Polkadot.</b>	 <b>Chainlink</b>	 <b>crypto.com</b>	 <b>TREZOR</b>
 <b>Dash</b>	 <b>CARDANO</b>	 <b>AUDIUS</b>	 <b>Huobi</b>	 <b>celsius</b>
			 <b>GEMINI</b>	

# current state

New marketplaces and disruptive technology mean exciting opportunities, but not without challenges and inevitable impacts on people and processes.

## Challenges in crypto-asset regulation

Blockchain and crypto-assets have changed the way people think about money, and this technology is a focus area for policymakers globally.

To date, there are over 6,500 different types of crypto-assets, with no precise definition of what that term implies. Instead, a variety of terms are used to describe more or less overlapping phenomena. Unsurprisingly, the understanding in regulatory terms of what we are dealing with also varies. Some current, commonly used classifications are too broad. For example, EU policymakers, who are hoping to implement one of the most comprehensive frameworks for crypto-assets in the world, currently propose 'crypto-assets' (as a catch-all category), 'utility token', 'asset-referenced token' and 'e-money token'. The challenge is to balance a desire for specificity and a desire to keep a taxonomy future-proofed and neutral as far as possible when it comes to, for example, the issuer of the crypto-asset and its use case.

Today, the United Nations recognises 180 currencies worldwide that are used to buy goods and services. The value of most of these currencies is subject to minor changes on a daily basis. For instance, a pint of milk will typically cost £1 in the supermarket and one does not have to worry that it will be £2 on any other day that same month. However, one of the criticisms of a number of cryptocurrencies, a sub-type of crypto-assets, as a means of payment is the volatility in price fluctuations – the same pint of milk could cost the equivalent of anywhere between 20p and £10 in a given week.

'Stablecoins', another type of crypto-asset, have a stabilisation functionality due to an underlying or reference asset and are therefore less subject to price fluctuations, making them in principle a more suitable currency. What that asset is varies from coin to coin. To date, the key distinctions among stablecoins have been the governance and the mechanisms for maintaining stability. It's also important to note that there are many different types of so-called stablecoins, some being neither stable nor coins.

That aside, the main benefit generally associated with stablecoins is that depending on how and what they are pegged to, they may not be subject to the extreme price volatility that other crypto-assets are affected by. In addition, they could potentially support a decentralised currency model, and in some cases global reach, with the ability to help the unbanked. As a result, this class of crypto-assets is seen by some as an attractive means of payment.

The use of stablecoins is the subject of considerable debate, particularly from a policy perspective. However, the majority of industry participants have not yet launched such assets, primarily because of the lack of regulatory clarity on how they should be treated.



There are benefits to stablecoins that warrant consideration, but the risks should be examined too. These include:

- Reduction in consumer protection, data privacy and financial stability
- Promotion of illicit activities
- Threats to weaker currencies

As a broader range of firms from a diverse range of sectors participate in the payments ecosystem and potentially offer new forms of digital money (using stablecoins), there is a need to ensure that consumers are provided with the same level of protection, and that all participants who offer the same service undertake the same activity or expose consumers to the same risk are subject to equivalent regulatory requirements on a proportional basis, so that both small participants (small, low-risk FinTechs, say) and large institutions have a level playing field.

There's a danger that the above emerging risks posed by significant market changes in the wider digital ecosystem will not be recognised by a 'perimeter-defined' approach to regulation – the perimeter needs to be widened to include more parties. For example, in the UK, the Financial Conduct Authority's (FCA's) 'perimeter' determines what services require authorisation and how consumers can expect to be protected.

The global nature of stablecoins and other digital assets provides another call to action for worldwide regulators. It's important, given the cross-border nature of many types of crypto-assets, that the industry and policymakers work together across jurisdictions to build agreed definitions and regulations that minimise the risks and maximise the benefits. As they do so, it's also important to recognise that crypto-asset-related risks in the financial ecosystem come not just from traditional, large participants but also from new, small entrants if they occupy a strategic position within the market.

### A final note of regulatory caution

The uncertainty in financial markets brought on by the COVID-19 crisis may be changing habits across society as investors and consumers seek technological 'safe havens'. As a result, the debate around and support for certain crypto-assets may have accelerated, but we still need a measured and strategic response to them so that regulation continues to function properly – by maintaining a stable financial system and protecting customers' and clients' money.



Nicole Sandler  
Head of Digital Policy,  
Barclays

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"Crypto-assets can display different characteristics through their life and can be used for different functions. This in turn can create uncertainty as to which crypto-assets fall within the perimeter, and therefore where firms might need FCA authorisation."

The FCA's Perimeter  
Report 2019/20'



# Blockchain: Linking the future

Although “Bitcoin” has been the buzz in finance and technology, the underlying technology, blockchain, is perhaps the real value opportunity.

**In a nutshell, this ground-breaking innovation will disrupt almost every industry. And when automated with machine learning or artificial intelligence technology, it becomes even more powerful.**

The thing is, blockchain isn't a new technology. It's been in existence for 13 years. But its application and implementation is proliferating at pace and leaves us asking: where is blockchain now and where is it headed next?

Blockchain technology is typically associated with cryptocurrencies such as Bitcoin, but it is so much more than that – it creates digital records that can be stored, shared and amended. Every record, which is usually a transaction, is quickly validated, documented and encrypted for security. And here is the key to blockchain: no third parties are needed because it's a shared process, secured by cryptography. Result: intermediaries are no longer needed and trust, transparency and efficiency improves across all organisations. The benefits are so great that economists expect<sup>1</sup> most businesses to be using the technology in some form by 2025.

## Not only a finance game

In a recent survey by the World Economic Forum (WEF), a majority of experts expected at least 10% of global GDP<sup>2</sup> to be stored on blockchain platforms by 2025. And while the WEF doesn't expect the tipping point for the technology to occur until around 2027, that adoption will occur much faster as a multitude of applications emerge in different sectors.

Outside of cryptocurrency and finance, we can already find areas where blockchain is actively shifting the standards.

**Identity:** Blockchain can safeguard valuable personal credentials online, bringing vast cost efficiencies and helping to curb fraud and identity theft. Take the following examples:

- Drivers' licences, professional credentials and certificates
- Digitisation of the education space, particularly in light of the COVID-19 pandemic, to move away from insecure, inefficient, paper-based credentials systems
- Streamlined government processes. A good example here is the small city of Zug, Switzerland, known as Crypto Valley. Zug leveraged uPort, a decentralised identity platform, to create the world's first government-issued identity<sup>3</sup> project on the Ethereum blockchain

1. gartner.com

2. WEF

3. decentralized-id.com



**Supply chain and tracing:** Blockchain strengthens transparency in any supply chain – fraud, contaminations or counterfeits can be pinpointed immediately. For example, in 2015 Everledger (graduate of the London Barclays Accelerator) partnered with IBM to build a blockchain that interfaces with scanning, modeling, and cutting equipment used in gem manufacturing to automatically generate and store data relating to the manufacturing process.

"Blockchain reduces the cost of verification and the cost of networking."

Christian Catalini, MIT,  
and Joshua S. Gans, University  
of Toronto<sup>4</sup>

4. nber.org

5. ascribe.io

6. github.com

## Blockchain, unchained

Despite the industries in which blockchain has been successfully implemented, other industries have yet to reap the benefits.

Blockchains could serve as the official registry for government-licensed assets or intellectual property owned by citizens and businesses, such as houses, vehicles and patents.

While blockchain isn't widespread in the media industry yet, it has the potential to connect authors, musicians and videographers directly with consumers, as shown by how Ascribe<sup>5</sup> went fully open source.<sup>6</sup>

**Cloud storage:** Leveraging blockchain technology provides more security against attacks. The technology cannot be a substitute for the cloud due to the limited computing and it offers. However, through blockchain, all services performed in the cloud are recorded and verified, while payments are automated accordingly upon successful completion.

**The law and disputes:** Legal firms are experimenting with blockchain for contracts and dispute resolution. Contracts using blockchain are known as ‘smart contracts’ because they can synchronise the release of payments with the delivery of goods, services, or even financial instruments, and most importantly don’t need to be signed in person.

## Rewriting entire operations

Let’s go back to supply chains: the pandemic has accelerated the shift towards more digital ways of working, communicating, transacting with customers and honouring ESG standards. For these reasons, energy trading firms are dealing with greater requirements for reporting, transparency and dissemination of data. On a trade floor, the robotrader executes a trade with an industrial customer. One of the robot’s trading algorithms scans available market interest and optimises its search for the best deal to meet the customer’s volume and tenor requirements for a given period. Once the robot’s proposed deal terms are approved by the customer, the trade is executed and recorded on the blockchain.

The deal terms are automatically confirmed and nomination information is recorded on the blockchain. As consumption flows throughout the month, physical settlement occurs daily with payments initiated immediately. All activity added to the blockchain is readily available to the seller, buyer, pipeline and bank. This is already possible using technologies available today.

## APIs: Another link in the blockchain

API and blockchain are conceptually similar technologies: they interconnect different sources and devices. But blockchain can enhance the API space by facilitating communication with APIs. This allows for decentralised and authoritative methodologies of securing transaction histories, including the ability to prove that a previous transaction, such as key exchange, did in fact occur and was legitimate. In other words, a network of devices running a secure blockchain implementation could form a sort of federated network of trusted devices that tracks and manages these relationships over time in a way that does not require a centralised authentication authority or tracking system.

When using blockchain with APIs, consider the following:

**Security:** All the interactions on the blockchain network are encrypted, which minimises attacks. This impacts the operation of nodes, which verify sets of network transactions in the blockchain. If just one node is compromised by data from an API, other nodes will reject it or, if the node allows, it will be forced to update. Once the node updates, the record correction process will initiate, and the network will again be resecured.

**Processing:** Blockchain can work as a token-based system for “renting” computation and verifying the results of those computations, which APIs can facilitate readily. By pointing accepted transactions to the API, which has

segmented the content into bite-sized pieces, computing can not only be orchestrated, its results can be verified and trusted across the network.

**Chain management:** Being able to log each transaction to a specific user, time and environment can result in a powerful record that not only promotes staff responsibility, but can aid in investigative procedures to resolve issues.

**System unification:** Assume we integrate an API and a blockchain together in a car manufacturing network. By leveraging the blockchain, APIs can track each individual part from creation to installation, as well as the transactions regarding their maintenance, replacement, recall status and more. Case in point: Boeing has used a combination of Internet of Things (IoT) and APIs to drive operational improvements, reducing cost, improving reliability and delivering exceptional value.<sup>1</sup>

## Connecting the future

Despite all the applications in which blockchain is already being used, the technology isn’t static – it will continue to evolve. And just as the global pandemic forced societies at large to change, blockchain will reshape the societal norms and dynamics of the near future in its own way.

The digitalisation of physical assets into crypto-assets, coupled with the fast development of IoT, is the first trend. Specialised institutions will be required to act as custodians of these assets and treat them as tradable instruments.

Good examples of companies leveraging blockchain in this space are Anchorage<sup>2</sup> and Knox Custody<sup>3</sup>, which is an institutional custody provider.

The second trend will identify countries where blockchain technology can provide a platform for sharing data on global issues. Think climate change and how it transcends borders and the need for trust between countries must be facilitated. But the key is that blockchain is a team sport. It works best when entities and organisations come together, even competitors within the same industry, and lay the groundwork for the technology in terms of processes, sharing data and automation via smart contracts.

Finally, we cannot ignore the explosion and role of non-fungible tokens (NFTs), which represent real objects, such as art and music, with digital assets. This exciting development opens new markets for artists and gives buyers access, speculation opportunity and access to usage rights.



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# Use cases in finance

Blockchain isn't limited to financial services, but there's widespread opportunity for its application in that typically traditional sector.

## Digital currencies: The next generation

Adoption of digital currencies by traditional financial services has been on a slow burn for some years.

The underlying technologies have been studied and piloted by central banks and financial institutions. They've been developing their strategies for deploying the relevant technologies, such as distributed ledger technology (DLT) and associated infrastructure, such as APIs, for when the time is right. As an indicator of the attention digital currencies are receiving, 86% of central banks are actively engaging in some form of central bank digital currency (CBDC) work, 60% are conducting experiments or proofs-of-concept and 14% are moving forward to development and pilots<sup>1</sup>. In contrast, the wildfire of FinTech disruption in the digital currencies space is happening quickly and with zeal. New solutions and startups are emerging at pace in the ecosystem.

### Innovation is key

From an enterprise perspective, an excellent way of tackling the challenges that arise from FinTech disruption is through innovation. New technology can only be effectively researched and properly accommodated by major financial institutions with a commitment to its transformative potential, and with teams embedded at the heart of an enterprise.

Barclays has a long history of innovation in every corner of its business, and is actively exploring new technologies, such as blockchain, and ground-breaking advances, such as quantum computing. We bring innovation in from outside, leverage the speed and dynamism of FinTechs in the Rise ecosystem and collaborate with trailblazers and regulators. We also allow innovation to flourish on the inside, empowering our colleagues to reimagine the status quo and improve the way things get done.

At Barclays, we're researching and collaborating with regulators, central banks, financial institutions and FinTechs on several next-generation digital currency initiatives. Here's a taste of our work.

## Key features of digital currencies

Central banks, financial institutions and FinTechs are actively researching, experimenting with and building new forms of digital currency. Barclays has researched the key features that differentiate the variety of digital currencies being explored and built,<sup>2</sup> namely:

- **Operator:** An identifiable entity that directs the governance mechanisms of the digital currency, even if issued via a decentralised 'smart contract' or an approved intermediary
- **Claim, Right or Interest:** The nature of the claim, right or interest arising from ownership or control of the digital currency
- **Asset Linkage:** The nature of the linkage, if any, between the value of the digital currency and an underlying asset or basket of assets
- **Type of Linked Asset:** The type of asset linked to the digital currency
- **Redemption Rate:** The rate at which the digital currency is redeemed by the operator or an approved intermediary into fiat currency
- **Denomination:** The unit of account used to quantify digital currency ownership
- **Accessibility:** Accessibility distinguishes between digital currencies that are available everywhere to everyone and those that are restricted to certain agents or uses

The following figure summarises the potential options for each of the key features of digital currencies. A wide variety of digital currencies can be conceived based on these key features and options, two of which are examined in some detail in the following sections.

Operator	Claim, Right or Interest	Asset Linkage	Type of Linked Asset	Redemption Rate	Denomination	Accessibility
Central bank	Claim on operator	Asset backed	Cash	Fixed	Fiat currency	General purpose
Regulated financial institution	Right or interest via operator	Asset pegged	Non-cash financial asset(s)	Variable		
Other	No claim on, right or interest via operator	Asset referenced	Non-financial crypto-asset(s)	Not applicable	Other	Wholesale
None		No asset linkage	Other intangible asset(s)			
			Tangible asset(s)			
			Hybrid			

## Central Bank Digital Currencies

A Central Bank Digital Currency (CBDC, also known as a digital fiat currency) is a digital payment instrument, denominated in a national unit of account that is a direct liability of a central bank. At present, physical currency notes are the only form of direct claims on central banks available to consumers - CBDCs would provide consumers with a trusted and stable source of digital currency.

### Features of CBDCs

- **Operator:** Central bank
- **Claim, right or interest:** Claim on central bank
- **Asset linkage and type:** None, backed by the central bank
- **Redemption rate:** Not applicable, are another form of fiat currency
- **Denomination:** Fiat currency
- **Accessibility:** General purpose, primarily for retail use cases

Currently, five Caribbean countries have live CBDCs based on the Eastern Caribbean Central Bank's DCash token. China's Digital Yuan is the most advanced pilot (launched in selected cities) but Sweden, South Korea and many others are not far behind, with work taking place in over 110 countries on CBDC pilot projects.

As instruments issued by central banks, CBDCs are designed with broad societal protection at their heart. For example, they should do no harm, work with - not against - other means of payment and be secure, stable, private and accessible.

But it's not just the currency itself that needs to be created with these principles in mind. A central bank must design a platform on which its CBDC can be transferred using interoperable and extensible services provided by others, including FinTechs.

Lee Braine (Managing Director, Chief Technology Office, Barclays) is a member of the Bank of England's CBDC Technology Forum<sup>3,4</sup>, and Barclays is part of the wider debate with UK regulators and government bodies, as well as US and European authorities, to inform the design of CBDCs.

The technology implications of CBDCs in retail banking are succinctly documented in the figure on the following page from the Bank for International Settlements (BIS). To take just one consideration, in order to meet consumer needs of privacy and accessibility, should access to CBDCs be tied to an account-based identity system or a digital token-based cryptographic scheme that does not require identification?

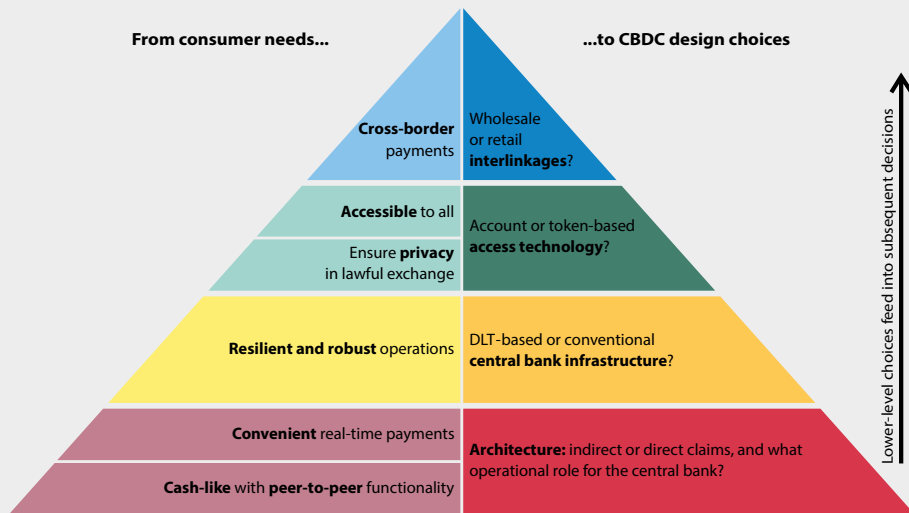
Barclays will run proof-of-concepts with CBDCs and publish whitepapers to share our research with the wider banking and technology community - this is key given the significance and the complexity of developments in this area. The nature of money is evolving, which has implications for us all.<sup>5</sup>

3. BoE, August 2021

4. BoE, September 2021

5. BoE, June 2021





Source: 'The technology of retail central bank digital currency', BIS Quarterly Review, March 2020, BIS

## Efficiencies in wholesale payments

Collaboration and exploration are also strategic in wholesale banking. Ventures such as the R3 consortium<sup>5</sup> and Finality International<sup>6</sup> allow banks, including Barclays, to develop technology for the future of financial services, including wholesale payments. These collaborations are important given the lead times for implementation of CBDCs and their focus on retail use cases.

The Finality Payment System (FnPS) is a wholesale inter-bank payment system managed by a regulated operator in each

currency jurisdiction. The UK would be the first of these jurisdictions where FnPS GBP, supervised by the Bank of England, will perform settlements using a settlement asset that is fully backed by funds deposited at the Bank of England under its new omnibus account policy.<sup>7</sup> The settlement asset used, which is a form of digital currency, is implemented on a permissioned DLT platform. It can be used by authorised financial institutions to carry out direct transfers 24x7, and can be integrated with other digital currency and securities platforms to perform atomic settlements.

5. R3  
6. Finality  
7. BoE

### Features of Finality's settlement asset

- **Operator:** Regulated FMI
- **Claim, right or interest:** Right to funds held at central bank
- **Asset linkage and type:** Fully backed by funds at the central bank
- **Redemption rate:** Fixed rate (1:1) redemption in central bank money
- **Denomination:** Fiat currency
- **Accessibility:** Targeted at wholesale use cases

This is a long way from current back-office settlement systems and processes, which can be slow and expensive. Typically, securities settlements take about two business days and involve a number of intermediaries. Integrating FnPS with digital asset platforms can deliver instant 24x7 atomic settlement of cash and securities, thereby reducing settlement risks such as replacement cost risk, liquidity risk and credit risk. Reducing these risks has the potential to unlock risk capital, while the simplified operational processes can deliver cost savings. Similar benefits can be obtained on FX settlements by integrating two FnPS (e.g. integrating FnPS GBP and FnPS USD to settle USD-GBP trades).

These two examples demonstrate the benefits of digital currencies to banks in wholesale payments and how the technology is poised to deliver significant value. Many other uses cases for digital assets are generating great interest among enterprises, which you can read about in later pages of this report. Crucially, turning them into workable solutions will require enterprises to innovate alongside FinTechs, central banks, regulators and even competitors.



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**FNALITY**

## A case study: The challenges of crypto-assets in business cash transactions

Transactions involving crypto-assets present similar challenges and risks as those involving other assets or financial instruments, but what's really different is that the law and regulation governing crypto-assets, their market terminology and their documentation are still developing. As a result, as well as working through the evolving documentation, market participants need to ensure any legal advice is up to date so that they remain in step with developments in this rapidly evolving space. This is particularly true with cross-border transactions.

The last few years have seen rapidly increasing interest from clients considering dealing in crypto-assets and derivatives referencing crypto-assets. The themes and lessons learned are clear.

One key issue is how to cope with the **developing regulation**, the lack of certainty around legal status in some jurisdictions and even outright bans. Where crypto-assets are not regulated as financial instruments, increasing regulatory focus and the conduct of participants in crypto-assets, it's often best to approach their trading as though you were trading a financial instrument (for example, you may need to control inside information).

Once you've established the regulatory and legal treatment of the assets and their trading, so you can enter into trades, how do you **document your transactions**? There are currently no standardised industry documents or terminology for crypto-assets, so participants have been developing their own templates. As a result, even where these templates follow standard industry approaches for similar assets, participants will need to review different versions of legal terms, or even face a 'battle of the forms' to reconcile their documents with their counterparty's terms.

In documenting your transactions, consider carefully the need to:


- Define the crypto-assets appropriately
- Clarify the obligations of the parties. Under the International Swaps and Derivatives Association (ISDA) Master Agreement, obligations differ on each side so it's critical to determine if your delivery of a crypto-asset will be treated as a payment – not a delivery
- Identify the appropriate life cycle events. Derivatives include events that will trigger adjustment or termination of a transaction, but (unlike in many jurisdictions and with other types of asset) no standard currently exists for the events in cryptoasset transactions. As you develop templates and manage perceived risks, the triggers and consequences can differ significantly.

Finally, it's important for financial institutions engaging in crypto-assets to review their requirements for **legal advice**, as industry 'netting opinions' and 'collateral opinions' only cover standard documents and specific transactions and collateral types.

While associations such as ISDA work to standardise the industry's approach to trading crypto-derivatives, it's unlikely that all answers and standard documentation will be available soon. Until they, and the law and regulation of crypto-assets, become more settled, market participants (and their lawyers) will need to adapt to developing circumstances.




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C L I F F O R D  
C H A N C E



## Company spotlight: Chainalysis reduces risk and promotes more financial freedom by building trust in blockchain technology.

### The company

Cryptocurrencies like Bitcoin are inherently transparent; the entire history of transactions is captured on public, immutable blockchain ledgers. Chainalysis is the blockchain data platform that helps governments, financial institutions and cryptocurrency businesses make sense of these ledgers

to understand risks and opportunities in this new asset class.

Today, the New York-based company is backed by Accel, Addition, Benchmark, Coatue, Paradigm, Ribbit and other leading firms in venture capital, and is valued at more than \$4 billion.

### The proposition

The cryptocurrency marketplace is expanding rapidly. There has been an 881% increase in global adoption YoY<sup>1</sup> and \$60 billion in total value is locked in decentralised finance (DeFi). However, despite the exciting growth for investment the crypto-market offers, more than 1% of the transaction volume is associated with illicit use.

As cryptocurrency becomes more mainstream, financial institutions are experiencing unprecedented demand for it, government agencies are prioritizing threats like ransomware that abuse it, and cryptocurrency exchanges are seeking a competitive edge. Blockchain

data is the asset that can help public and private sector organisations mitigate risks, seize opportunities, and promote cryptocurrency adoption safely and responsibly.

Since 2013, Chainalysis has systematically collected information that links real-world entities to blockchain transactions. In doing so, we have become a leading provider of investigations and compliance software that enables government agencies and private sector businesses across the world to detect and prevent cryptocurrency crime and money laundering.



### Key features

#### Data

Cryptocurrency addresses mapped to their real-world services

#### Software




Tools for investigations, compliance, market intelligence, and customer insights

#### Access

APIs so customers can combine Chainalysis data with other data sets

### Working with Barclays

In 2015, Chainalysis enrolled in the first New York Accelerator, powered by Techstars. Barclays' Financial Crimes team uses Chainalysis' tools to monitor crypto-transactions and collaborate together to engage with Barclays' employees on risks surrounding the crypto-market.

 [chainalysis.com](https://chainalysis.com)  
 [chainalysis](https://www.linkedin.com/company/chainalysis)  
 [@chainalysis](https://twitter.com/chainalysis)

### The team



**Michael Gronager**  
Co-Founder and CEO

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**Jonathan Levin**  
Co-Founder and Chief Strategy Officer

 [jonylevin](https://www.linkedin.com/in/jonylevin)

# Driving enterprise adoption of blockchain

From securities settlement to trade finance, financial institutions face one common problem: reconciliation. This is as true today as it was 20 years ago.



**Digitisation compounded this problem. Enterprise IT systems within businesses became endlessly out of sync, requiring armies of people to re-key and verify information. The solution to this problem was enterprise middleware: software that literally sat in the middle of applications and connected them to one another.**

Today, we have approached the next stage in interconnectedness: distributed ledger technology (DLT) takes the journey from common data sharing to common data processing at the market level. And R3 is right there: we are a provider of enterprise technology and services that accelerates direct, digital collaboration in regulated markets – banking, capital markets, global trade and insurance – where trust is paramount.

Moving from a world where everybody builds and runs their own distinct applications, to one where everybody is using a shared market-level application, dramatically drives down deviations and errors. We've already seen the changes. In trade finance, a transaction that previously took 10 days can take 10 seconds. In capital markets, an entirely new class of assets is being traded. And the settlement of securities has accelerated from T+2 to the possibility of T0 in just a few years.

In banking, the Spunta Banca DLT solution<sup>1</sup> was built on R3's next-gen blockchain platform, Corda. Using DLT, we eliminated many of the inefficiencies that plague legacy processes. Previously, banks reconciled accounts with each other on a monthly basis. Using DLT, Spunta Banca now reconciles every night, with 97.6% of transactions automatically matching. Communication about differences is integrated within the platform.

In all use cases, DLT is making legacy processes more efficient with its ability to identify and eliminate all the places where disagreements, ambiguity and doubt can enter the process. DLT allows the rest of the process to be executed like a train on rails.

But implementing DLT is a huge undertaking for any business to pivot away from after years of dependence on legacy processes. This means two things.

First, for the foreseeable future, blockchain will need to interact with outdated, legacy systems. This gives rise to the second fact: interoperability is a critical feature of large-scale DLT platforms. At the simplest level, interoperability offers the promise that "I want to ensure that the solution I deploy can work well with solutions other people deploy, even if we've made very different technology choices". The importance of choosing a DLT platform that is interoperable is therefore crucial.

Corda<sup>2</sup> was designed from the ground up to bring the benefits of DLT's "I see what you see" promise to businesses across a universally interoperable network.

Take, for example, a typical supply chain. You may have an ERP system to manage supply chain operations and other day-to-day activities; a treasury management platform to manage working capital; your bank provides a portal to finance your trade activities, which may even be on a DLT platform.

But a roadblock arises when your logistics providers are also rolling out a global 'track and trace' solution using a totally different technology. This may drive efficiency in one part of the supply chain, but constrains you to the technology choices of your vendors and partners.

To realise the full promise of enterprise DLT and eliminate the formation of new 'digital islands', interoperability is critical.

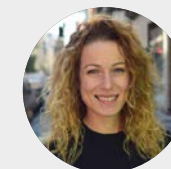
**To dismantle the roadblock, architects and developers need to:**

- Integrate with existing systems
- Initiate transactions on other networks and 'rails'
- Transact interchain with solutions on other technologies
- Transact intrachain with solutions on different deployments of the same technology
- Reduce buyer's remorse by making it easy to interchange one underlying platform for another.

Some of these will be harder to achieve than others, but DLT platform providers should be able to fulfil each. Platforms that offer the highest levels of privacy, along with interoperability, will become the frontrunners as adoption gathers pace. This is where R3 comes in.

Expecting businesses to pivot away from years of dependence on legacy processes to any new technology is no small feat.

DLT's scope of application and potential is virtually unlimited and warrants discussion well beyond the points outlined in this article. As the technology is adopted at scale, the underlying design and infrastructure will become increasingly important.



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# Building a bridge to the crypto-economy

How best-in-class infrastructure led to new opportunities for institutional allocators.

**With more than \$200 trillion in assets under management, institutions represent one of the largest pillars in building the crypto-economy. Institutional investment in crypto accelerated in the first half of 2021,<sup>1</sup> with clients transacting in record numbers.**

Institutional investors look for the platforms they use to be secure. After the hack of Mt. Gox,<sup>2</sup> Institutional investors were hesitant to invest in digital assets due to the unsecure reputation and lack of regulation. Further, the appropriate infrastructures did not exist to hold a large amount of Bitcoin at scale, consequently not meeting the security and regulatory needs of institutional investors. Highly secure platforms like Coinbase had massive potential to enable universal participation in the crypto-economy for institutions and corporations.

Ideally, platforms should meet the same compliance, security and capital requirements as traditional fiduciary custodial businesses like the Depository Trust Company (DTC), so that customers know it has the rigorous banking standards of New York State Department of Financial Services (NYDFS) regarding capitalisation, anti-money laundering procedures, confidentiality, security and storage. Once security standards were established, institutions were more comfortable holding digital assets and engaging in the digital economy in a more meaningful way.

coinbase

But as with any fast-growing market, there were other concerns: liquidity, counterparty risk and trade settlements. Successful platforms must ensure deep and diverse liquidity as well as apply rigorous due diligence, KYC and AML standards. In a best-case scenario, the client would only face the platform from a counterparty and a credit perspective, while the platform would face the rest of the marketplace to execute and settle trades.

But how do you manage a 24/7/365 crypto-market in which trades settle instantaneously? Trades need to be pre-funded and maintain fiat or crypto-assets on the platform in order to participate in the market.

The crypto-economy is still in its early stages, but we are seeing crypto investing quickly mature from its initial use case of trading Bitcoin to the trading of thousands of new assets, and the adoption of new use cases like decentralised finance (DeFi), non-fungible tokens (NFTs), smart contracts, decentralised autonomous organisations (DAOs), and more.

In 10 years, we think the most successful institutions in crypto will be using infrastructure from leading crypto-native technology to stay at the forefront of the market, allowing them to move quickly and keep up with demand growth.

Coinbase's goal remains the same: to provide easy access to institutions and the bridge to enable universal participation in the crypto-economy.

As of 31 June 2021, Coinbase has more than 9,000 institutional clients, \$180 billion of assets on platform (representing 11% crypto-asset market share) and \$335 billion in quarterly volume traded. 10% of the top 100 largest hedge funds by reported assets under management (AUM) have chosen to onboard with Coinbase.



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# Tokenisation and blockchain-enabled securities

Blockchain may have a big impact on traditional securities because, with digital signatures that prove ownership, there is no longer a need for legal paperwork issued by financial institutions and intermediaries. This could greatly reduce costs and accelerate the investment process.

Bitcoin, Ethereum and now DeFi have allowed people around the world to participate in a financial revolution. But how do you bridge the gap between the traditional finance world so that people trust in the new platforms and are willing to invest through them? Most crypto-assets are freely tradable between any two parties. For securities, this creates a problem. Issuers of these assets have no idea who the holders are or where they reside. What's needed are platforms that allow issuers to restrict transfers of assets to authorised participants only.

Issuers and investors still face some challenges due to blockchain's complexity, but the opportunities to take part in and innovate in this area are significant. Blockchain and the way that it works to eliminate the need for trust has widespread, as yet untapped, uses in the wider economy. One effect that this technology could have is to decimate costs of operating across borders or transactions more generally.

## What is tokenisation?

Tokenisation is the process by which ownership of real-world assets are definitively established in the digital world. Investments in tokenised securities are done via security token offerings (STO), whereby the investor receives a security token. STOs are similar to the popular initial coin offerings (ICOs), however they have restrictions built in to the smart contract to better comply with securities regulations.

Tokens can be processed in various ways, including with smart contracts (see next page), which automate the agreements between investors and asset owners using blockchain.

**"Blockchain and the way that it works to eliminate the need for trust has widespread, as yet untapped, uses in the wider economy."**

William Hobbs  
Chief Investment Officer,  
Barclays Wealth & Investments

## Regulating tokenised assets

Securities regulations are evolving with the advent of digital securities and other assets. FinTechs must conform to them so the technology remains applicable and future proof.

Because STOs are backed by real assets, the issuer needs to ensure they comply with existing regulations. Companies wanting to issue an STO will have to carry out considerable work to comply with the applicable local or international regulations. FinTechs such as Polymath have tools that make it easier to comply with regulations.

## The benefits of smart contracts

Cross-jurisdictional transfers are time-consuming and costly in traditional finance. Smart contracts can remove a number of intermediaries and make the process much more efficient.

**In addition, smart contracts can be applied to other scenarios:**

- Borrowing and lending of securities
- Bundling of assets, particularly in real estate
- Improving the flexibility and availability for leverage and options

POLYATH

## How will blockchain-enabled securities continue to add value?

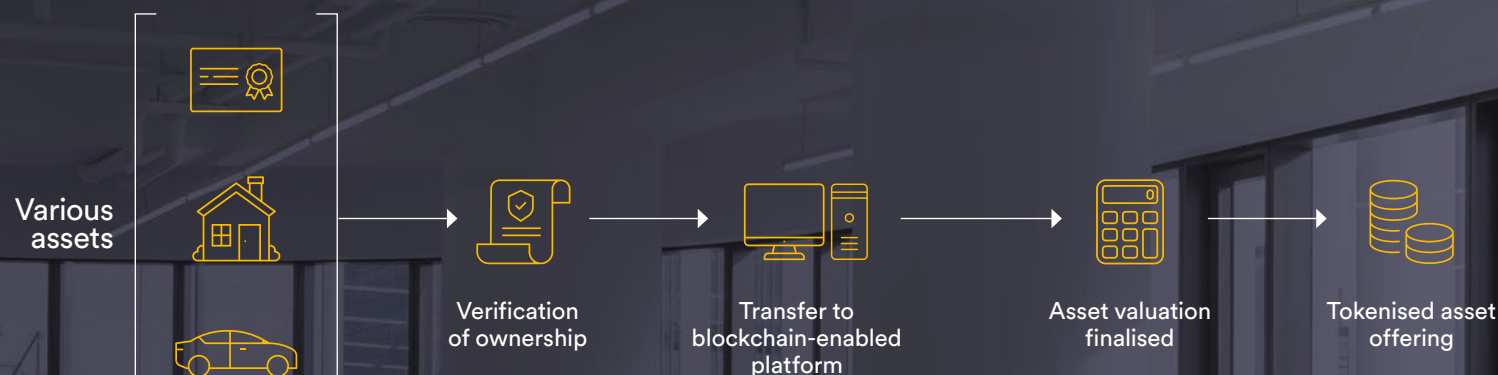
With the proper restrictions in place, tokenisation allows for the easy transfer of assets between jurisdictions. Shareholder voting can also be done 'on-chain' using governance features that allow holders to more easily exercise their rights rather than delegating their votes or showing up to a board meeting.

In addition, tokenisation can simplify dividend payments. A snapshot of token holders (shareholders) can be taken at any time, and on-chain dividends distributed accordingly with the click of a button. Form filling and bank wires would no longer be needed.

Liquidity is an additional and exciting factor to consider. By digitising an asset, it can more easily be split up and sold to fractional investors who can't afford to buy the entire asset, such as in real estate or fine art. Opening up securities that way changes the face of those sectors and makes them increasingly global. Restrictions and rules will still apply across different jurisdictions, but so long as those are properly enforced by smart contracts, greater liquidity for the tokenised assets should result.



## Asset tokenisation process



## How can financial services organisations take part?

The crypto-market may enable people custody of their own assets, essentially empowering them to be their own bank. However, the technology is still very hard to master, and assets are at risk of permanent loss if owners' security measures aren't adequate. In their pivotal position at the heart of society and the economy, banks and other financial institutions are experts at responsibly safeguarding their customers' money.

Traditional finance can also offer point-and-click tools to allow users to interact with the underlying blockchain infrastructure, giving users the ability to participate in STOs and borrow or lend their assets to generate yield.

If they issue assets, financial institutions will need to enforce transfer restrictions and continually monitor the holders of each asset. With platforms like Polymesh, all users must go through a KYC verification process, therefore making it easier to enforce transfer restrictions based on their jurisdiction, accreditation status, or a host of other features issuers can select.

The two innovations covered in this article – blockchains built for securities and tokens built on smart contracts – form the basis of how traditional financial institutions can adapt to the growing interest in new forms of investing, and how they can take advantage of the inherent cost savings and process simplification.



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# future states

In an industry that's developing at lightning pace, tracking what comes next in crypto will be key to innovation and evolution.

## Perspectives on raising capital

We asked experts in the Rise ecosystem about how new funding mechanisms are emerging for companies involved in the growing area of crypto-assets. Alex, Rezso and Kester share their thoughts.



**Colin DeLarso:** What category of blockchain or crypto-company has raised the most capital or captured the most attention?

**Alexander Ross:** Illuminate Finance is seeing a lot more IPOs in the mining space and big deals in the exchange space, whether it's Bitpanda or FTX who raised \$18 billion. They are the goliaths at the moment in the retail space. Traditional institutions can step into this industry in a more material way, with a route towards products. The most interesting deals in that space are Fireblocks and what happened with BNY Mellon.

Custodies of your base layer (the underlying protocol on which dapps run) is where we're seeing activity. You need to solve that before you can do anything on top of that layer. I think Talos is also interesting – it's a portfolio company that Andreessen Horowitz invested in along with PayPal and NYDIG.

**Kester Keating:** DeFi has exploded over the past couple of years and is fast becoming a meaningful part of the financial ecosystem. For example, the cryptocurrency Tether now has approximately \$70 billion outstanding (that is, coins in circulation) and the top three decentralised exchanges (DEXs) traded \$78.33 billion as at August 2021.<sup>1</sup> I certainly see continued opportunity there, and we're still relatively early in that market. However,

regulation is likely to lag. The issues vary widely by protocol but some of the stablecoins, for example, are effectively operating as unregulated banks without formal capital requirements or disclosure.

**CDL:** How did the DeFi boom of the past year contribute to the overall market sentiment?

**AR:** With the internet boom and bust, you had the same thing – a big spike, a collapse and then long-term growth. People overestimate the power of technology in the short term and underestimate it in the long term. I think that this technology has an incredible power. And, as it's applied to new use cases, you get that hype cycle. Then you get the bust, as I assume will happen with NFTs as it's all got a little crazy and needs to return to the longer-term fundamental growth path.

**Rezso Szabo:** On the big picture level, there is a big hype cycle that's already well underway - through the high, down through disillusionment, and is now delivering really useful technologies. We can compare it to the .com bubble and the internet appearing as a technology through the late 90s. There were lots of ideas that emerged and disappeared, but they included e-commerce and Amazon.



**CDL:** What are some of the areas in crypto not getting as much attention both generally and in terms of capital investment? What do you think has the biggest potential over the next several years?

**RS:** If you look at regulation coming into the space, we think that's definitely underinvested. Sophisticated institutional investors and market participants are already regulated and therefore they will be held up to a higher standard. That is a new market need that didn't exist for a long time and we didn't expect early-stage technology vendors to react to that need. That's an area that's definitely underinvested.

**AR:** Looking forward, there's a lot of retail capital flowing into some DeFi initiatives that actually hold some of the greatest promise. But you don't fund them in the same way that you would traditional, equity-based businesses: you have YooShi tokens, liquidity providers, trading fee generators, and lending and borrowing fee generators. In addition, you've got all of those 'picks and shovels' around the market, whether it's tax, accounting, Know Your Customer (KYC) or Know Your Transaction (KYT) – there's a long list.

Node management, which is another one we invested in, infrastructure, custody, execution, risk management and different types of financial products. Then, outside of capital markets, you've got payments.

**CDL:** Considering private equity in blockchain technologies currently accounts for less than 1% of global VC, what is the future potential for investment in these new solutions?

**KK:** I've seen a lot of investment into brokers and market makers facilitating institutional investment and activity in the crypto-market over the last three years. In my view, the likely direction of travel is the continued build-out of market structure, similar to what we saw when electronic markets started to take over in equities and then fixed income and credit. I think it's likely there will be significant opportunity in many digital systems on centralised servers or systems.

**CDL:** Where do some of the biggest opportunities lie for traditional banking and finance firms, and non-crypto FinTechs in the space? What are the biggest areas of disruption or threat?

**KK:** Improving the customer experience is going to be absolutely key for all crypto firms in retail. I think it's a huge opportunity for companies with an already-active retail base in trading, payments and others sectors (such as Square, PayPal or DraftKings), who will be able to cross-sell and expand into that existing client base, especially if they can create a compelling user experience as part of their existing platform.

**AR:** One use case I discussed with my team the other day was payroll. For example, say I have three entities – in London, New York and Singapore – and one team moves money to whatever accounts and dates are provided by a second, payroll team. A third team (my payroll provider) can then distribute the money to individuals but also has to calculate and send tax to the right people in the right

LONDON

NEW YORK

“We’ve seen a significant increase in late-stage private capital and public market activity to accelerate innovation in the crypto space and push market-leaders to greater scale, especially in financial market infrastructure for digital assets, where institutional adoption is on the rise.”

Lucy Demery, Managing Director of FinTech Investment Banking, Barclays

“There’s been a massive rush of institutional capital into the crypto and blockchain sectors over the past year, first in the private market and more recently also in the public market. I expect investment in the sector to accelerate, particularly on the public market side, followed by a wave of M&A activity.”

Tad Homchick, Director FIG Banking, Barclays

jurisdictions. Imagine if, instead, you could just have a stablecoin wallet and programme a piece of code to sign the transaction in perpetuity. It controls the distribution of money from one source to many payees – in one transaction. You can download the piece of code that tells you where to send the tax dollars, which could be managed by the IRS or HMRC. You can programme your cash to do what it needs to do at the right time rather than relying on a series of manual processes (finding account numbers, reconciliation, sign-off, etc).

That's just a basic example. What about using the technology to attach a bearer instrument to an order? Send an order and, if it matches, it executes. This model is what enables a decentralised exchange.

**CDL:** What influence does the more volatile crypto-market have on investing in companies or projects? Is it more difficult to hold a long-term perspective compared to traditional markets?

**AR:** This has a long way to go in terms of growth. Step number one is traditional financial institutions participating in crypto-assets. Step number two is those institutions issuing securities on these rails, so that you can trade an equity of bonds, a piece of real estate, or an LP ownership on a network on Solana, for example.

We built trust with these organisations, both strategic partners as well as other banks. Since investing in Curv and Copper, especially at the custody layer, all of a sudden it's gone from being something

that's looked a bit dodgy, with institutional players skeptical of nefarious currencies and viewing the activities with suspicion, to the same players talking to us and others. So the stance is changing. Institutional players are now talking to us and others. We see that through the lens of our investments in Curv and Copper (and other assets) and the diligence we carried out for those. But it's early. None of the big sell-side organisations have deployed any custody solution into production for their clients. You've got some more innovative buy-side firms starting to use new custody players like Ledger, Copper, Fireblocks, etc, but it's got a long way to go.



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## A case study: A Web3 token in every portfolio

We are now entering a new, macro phase called Web3 – an internet built on blockchains. In this ecosystem, value and assets can flow just as seamlessly as information travels in the internet.

Arch recognises an opportunity to open up Web3 investing. Every day, millions of people across the globe access decentralised finance (DeFi) protocols and exchange billions of dollars in seconds, with unprecedented degrees of control, full transparency, and no intermediaries. And no, there are no bank holidays or closing bells.

It is no overstatement to say this is one of the most significant revolutions in finance since the internet. An entirely new financial system is being built from the ground up, on new rails. DeFi users borrow on Compound, lend on Aave, trade on Uniswap, seek insurance on Nexus Mutual – essentially, all services found in traditional finance are being provided by protocols instead of companies, smart contracts instead of humans.

But as with anything new and revolutionary, there are successes but many more failures – it's a steep learning curve. Which is why Arch is taking the opportunity to bring clarity, usability, and opportunity to all investors.

The startups building these DeFi protocols have become hugely successful. While their FinTech and Silicon Valley counterparts can often struggle to turn a profit even with larger teams and more funding, DeFi builders are generating billions of dollars in annual revenue as millions of dollars churn through their platforms daily.

DeFi is only one piece of a major shift in the way applications and communities are structured. Web3 is fundamentally reimagining everything from digital property (NFTs), to social networks (Bitclout), and even central banks (MakerDAO). These platforms provide native cryptocurrency tokens which carry utility and also voting power. Speculators have rushed to buy these tokens as a way to participate in governance and benefit from their potential upside. Token holders endure wildly volatile markets in exchange – potentially – for double- or triple-digit returns, as well as the chance to own a piece of the future of finance.

So far, the market has been dominated by experienced traders, but why should only insiders benefit? As more activity moves into Web3, institutional and passive investors looking to diversify their portfolios may make the leap to the crypto-market.

However, for most – from individual investors to FinTech companies and institutions – the chasm seems unbridgeable because of the sheer proliferation of assets, lack of reliable data, and an intimidating user experience.

At Arch (graduate of the 2021 New York Barclays Accelerator, powered by Techstars), we followed a three-pronged approach to tackle these challenges.


First, we introduced a family of comprehensive market indexes for Web3. We organised the space into sectors, sizes and asset classes to help benchmark risk and performance.

Second, we've leveraged DeFi protocols to enable participants to transform our indexes into investable tokens, essentially creating portfolio building blocks that enable investors to express their investment strategies and risk appetites, while mitigating individual asset-level risk.

Finally, we are building a user-friendly platform for newcomers and passive investors to build and manage their Web3 portfolios.



**Chris Storaker**  
Co-Founder and CEO,  
Arch

 christopher-storaker

# Building scalable solutions for the future: Under the hood with Solana



With the growth of digital assets, including crypto-assets, it's vital that the decentralised apps (known in the industry as 'dapps') supporting their use are scalable. If they can't process tens of thousands of transactions per second over a standard network, the dapps and the infrastructure they run on or support will be compromised.

That requirement comes with a problem – the scalability trilemma.<sup>1</sup> This is the idea that, with decentralised systems, you can only optimise two of three features, not all three, at the same time: security, decentralisation and scalability. No blockchain has been able to solve the trilemma. Until recently.

If we're aiming to maximise scalability (the number of transactions a system can process), how can we simultaneously optimise decentralisation and security? The starting point is to define a quantitative measure of decentralisation. One commonly accepted measure is the Nakamoto Coefficient,<sup>2</sup> which, in basic terms, calculates the minimum number of components in a decentralised system that need to be compromised by an attacker in order to take control of it. The higher the value of the Coefficient, the more decentralised a system.

With this measure in place, we can determine the impact of system modifications on performance (that is, the design of software algorithms and architectures) to optimise scalability.

## Timing is everything (to scalability)

There's something that limits the scalability of blockchains – trusting a time source. Why is this a problem? Blockchains rely on consensus to definitively order all transactions, and any unexpected action on the network that contradicts the blockchain protocol is considered malicious. Even if it's not malicious, it has to be treated as such – by design. Resolving it slows any timestamping operation on the network, and therefore reduces the overall speed of processing.

Considering the number of nodes in a typical blockchain and how they're all connected, a multitude of checking, saving and sharing actions might take place every second. The sharing actions in particular, called synchronisation, are especially important because it is the coordination method by which nodes agree on the validity of transactions. Any delays, however small, that impact the synchronising of the computers in a blockchain therefore have a detrimental effect on speed and scalability.

Solana is a blockchain built to enable scalable decentralised apps. It has many features in common with other platforms, such as 'validators' that use the information encoded in the distributed ledger to ultimately determine whether a transaction is valid or invalid. Solana's core innovation is Proof of History which solves the timing problem by creating a historical record of when an event occurred. This feature might not sound revolutionary but it removes the need for synchronous coordination that other blockchains like Bitcoin and Ethereum require. And by removing it, transaction capacity can scale highly.

## What scalability means in practice

Back to the Nakamoto Coefficient, a measure of decentralisation. Bitcoin and Ethereum have a Coefficient of 1, while Solana scores 18 by the same measure. This is down to the different approach to scaling (specifically, it's a result of how well Solana's SOL tokens are distributed amongst the validators on the network).

In terms of scalability, that means Solana can handle a theoretical throughput of 65,000 transactions per second (tps) compared with 7 and 30 tps for Bitcoin and Ethereum respectively. This is equivalent to the theoretical capacity of current non-blockchain systems.<sup>3</sup>

## A healthy, decentralised future

An increasing number of applications, assets and scenarios are now being decentralised, creating opportunities for application developers, platform providers, organisations and individuals.

## DeFi

An issue with many decentralised finance (DeFi) platforms is their complexity and the need for specialist, technical know-how to interact with them. This is a real barrier for non-technical customers. Demystifying their operation and providing simpler user interfaces is something that FinTechs excel at.

Solana's decentralised central-limit order book, Serum, is a good example. Serum makes DeFi more familiar for people from the traditional world of finance. It functions like the order book in standard equity brokerage accounts and there's no need to learn computer science terminology to use it.

Serum is the only decentralised central-limit orderbook exchange in existence. Since its launch in summer of 2020, Serum has done almost \$8 billion in volume and boasts typical daily trading volumes of \$100-\$200 million. Serum allows users to trade on decentralised systems with a similar product offering as they would get from their traditional brokerage service. This is important because, in order to onboard the next billion users into crypto, it is imperative that we make products simple and easy for non-technical persons to use.

1. medium.com

2. [news.earn.com](http://news.earn.com)

3. For example, Visa



## NFTs

Non-fungible tokens (NFTs) weren't just a craze that died after wide exposure in the first half of 2021. New NFT applications and marketplaces based on blockchain are still emerging. In fact, thousands of new collectibles appear and are auctioned each month, suggesting that NFTs are here to stay.

Solana's NFT ecosystem was kickstarted by the creation of Metaplex,<sup>4</sup> a Wordpress-like solution that creates NFT auctions, secondary sales and minting interfaces. Since its creation, Metaplex has spawned over 300 customisable storefronts. We've seen an explosion in generative art NFT projects, including Sollamas,<sup>5</sup> Bold Badgers<sup>6</sup> and Degenerative Ape Academy<sup>7</sup> which at launch sold 10,000 NFTs for a total of \$2.5 million in eight minutes<sup>8</sup>.

## Gaming

Even before the pandemic, the gaming industry was huge. And a period of outstanding growth in 2021 has seen Microsoft and Sony post record growth figures in this sector.<sup>9</sup>

Gaming applications are increasingly being decentralised as shown, for example, by growing numbers of games on Solana's platform. It started with Star Atlas,<sup>10</sup> an intergalactic space exploration game. More recently, we've seen others emerge including Aurory,<sup>11</sup> GenoPets,<sup>12</sup> and OpenEra,<sup>13</sup> a multiplayer online RPG game that mixes augmented reality with provable ownership of NFTs. Solana's innovative layer-one protocol has opened a new door within decentralised systems, allowing game developers to feel confident in building their applications without the worry of future scalability bottlenecks.

# Perspectives on DeFi

## What is DeFi?

Decentralised finance (DeFi) is built on the principles of free market access, autonomy and transparency without the need for trusted intermediaries such as banks and brokers. It's the latest evolution in blockchain and aspires to achieve decentralisation on a governance, operational and capital level.

DeFi uses smart contracts to codify the characteristics of existing financial instruments and to execute financial transactions without a central intermediary. Its peer-to-peer nature allows users to issue, own and transfer financial assets. In many instances, decentralised autonomous organisations (DAOs) govern DeFi projects through a community-led approach.

Some of the most prominent 'distributed consensus' models that operationalise DeFi on a technical level include Ethereum, Avalanche and Solana.

alternatives to standard financial products (for example, loans).

While institutional activity in DeFi lags behind the wider crypto market, likely due to a lack of infrastructure, fragmented liquidity and limited controls, data suggests that experienced crypto-traders and hedge funds are the biggest drivers for larger scale transactions in DeFi.<sup>2</sup>

## What are the opportunities?

While the benefits of blockchain technology applied to centralised finance are expected to be transformational, DeFi could drive more significant structural changes.

### Transparent and robust global marketplaces

DeFi's inherent transparency makes it possible to audit capital exposure in near real-time, improving market robustness and the effectiveness of risk management. Decentralised (and permission-less) markets can also improve liquidity and reduce transaction costs.

### Asset ownership and eliminating counterparty or credit risk

As DeFi is built for peer-to-peer systems, self-custody of assets may become more prevalent. For example, clearing and settlement transactions could be automated using smart contract-based decentralised applications ('dapps') instead of going through a trusted third-party.

### Alignment of incentives

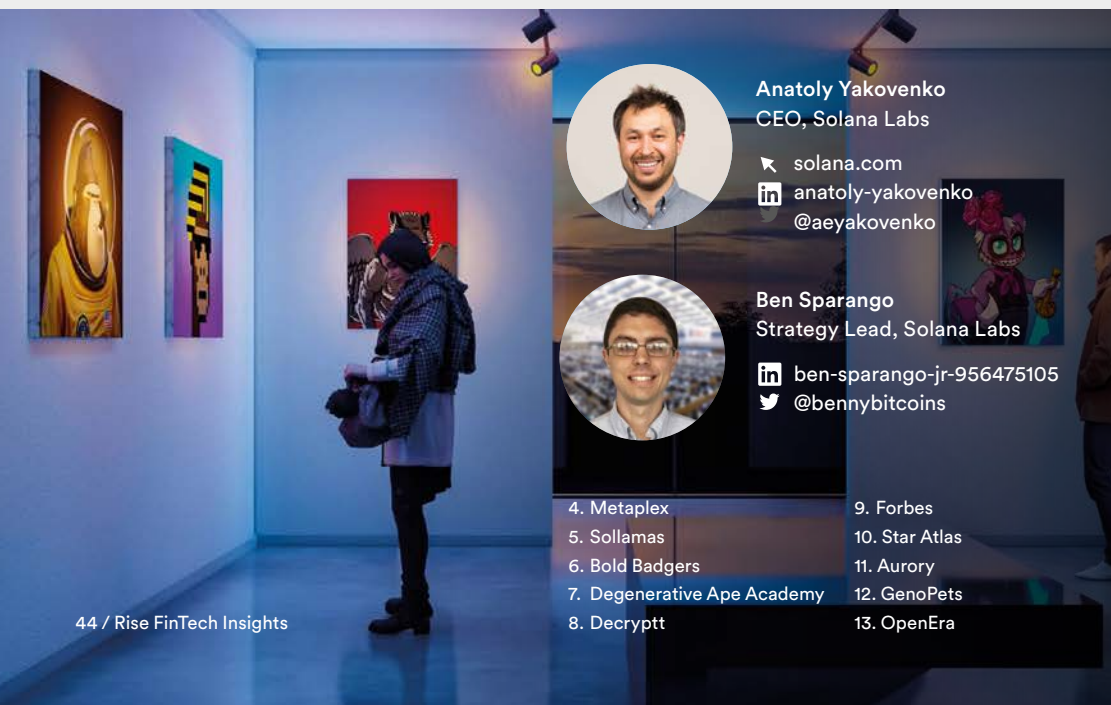
Community-based governance and the ability to build in forms of recourse through smart contracts has the potential to alter the relationship between principals and agents, for example empowering company shareholders to also hold management financially accountable for mistakes.

## Market context

DeFi adoption has jumped over the last 18 months, driving the total value locked (deposited by users in the different protocols) by 1,000%, from less than \$10 billion during the first half of 2020 to \$100 billion in October of 2021.<sup>1</sup>

Declining trust in certain centralised institutions and the evolution of the digital economy are long-term trends driving broader adoption of DeFi. Low interest rates and speculation have further accelerated this trend in 2021.

Lower barriers to entry and record funding levels have also created a multitude of competing ecosystems such that, today, many decentralised applications offer



### Open innovation and mobile-first products driving financial inclusion

Today, disproportionately more people can access the internet on a mobile phone than can access financial services. DeFi fosters financial innovation and broader competition with the potential to support more inclusive customer needs.

### What are the challenges?

#### Friction in the user journey

The funding of dapps is complicated and liquidity is fragmented due to limited cross-chain interoperability between exchanges. New opportunities to generate returns on assets, such as through staking, require a higher technical understanding compared to traditional finance.

#### Vulnerabilities in open source technology

The lack of regulation and audit processes for smart contracts and DeFi protocols has caused quality concerns in certain instances, for example the recently misdirected \$90 million of funds on a popular DeFi platform.

In the absence of any consumer protection, there is no recourse for misplaced or stolen assets compared to the safety nets in traditional finance (for example, FDIC and FSCS schemes).

#### Financial stability

The evolution of a new financial system without regulatory guidelines may present a risk for financial stability. Given its global, open source and decentralised nature, within its framework and in the absence of clear regulations for DeFi, regulated financial institutions are struggling to innovate. However, policymakers are making progress in developing official guidelines.<sup>3</sup>

### Is DeFi the future?

DeFi is a significant milestone in the evolution of blockchain infrastructure thus far and has potential to disrupt existing financial systems. But it's uncertain to what extent policymakers will support the broader adoption of decentralised financial marketplaces without providing further mechanisms for consumer protection.

It remains to be seen which DeFi use cases will reach sufficient scale to support current asset valuations in the long term, and where they might find applicability within traditional financial markets.



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Rise Insights Report Lead,  
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Barclays

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## Decentralised finance (DeFi) ecosystem

### Order book exchange



### Layer 1 transaction



### AMM pools



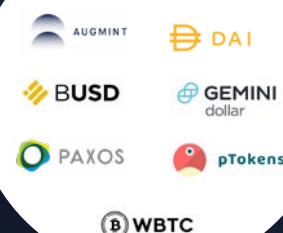
### Asset tokenisation



### Payments



### Stablecoins





# From our Rise, created by Barclays, sites

## Rise London

London continues to push on with one of its best years for FinTechs. Rise members have raised some huge investments, including a whopping \$118 million for Spendesk<sup>1</sup> and \$35 million for Cutover.<sup>2</sup> As the industry continues to innovate, it's extremely exciting to see the application of blockchain technology in financial services stepping into the limelight this year.

Barclays has been experimenting in the background with its use cases for some time. Everledger, an alumnus of the first Barclays Accelerator, powered by Techstars (in 2015), are an innovative digital transparency company, apply blockchain to the provenance and asset management sector with diamonds as the first use case. In 2018, Barclays also supported the UK's first fully digital mortgage settlement,<sup>3</sup> using ShieldPay's<sup>4</sup> instant digital escrow facility. ShieldPay was crowned as the 2018 Rise FinTech Company of the Year.

Blockchain has the ability to fundamentally change the way financial services operates; the next step is unlocking mass market adoption. We're at a critical point where industry players can collaborate to make that a reality.

So how has the digital currency ecosystem progressed this year?

Consumer adoption is already on the up. The rise in popularity of cryptocurrencies has resulted in 2.3 million people aged over

18 now holding crypto-assets in the UK.<sup>5</sup> This has led institutions and governments starting to sit up and take notice. Back in April, the Kalifa review set out recommendations for the UK to develop a Central Bank Digital Currency (CBDC), which then saw Rishi Sunak float the idea of introducing a digital currency for the UK, by implementing blockchain technology. Meanwhile, Scotland has already started work developing their own native 'Scotcoin'.

We think it's fair to say that innovation and adoption is outpacing the regulatory system. The FCA continues to address security, risk and conduct breaches, acknowledging crypto as property but not legal tender.

Making the headlines earlier this year was the FCA's decision to ban crypto-exchange Binance from conducting all regulated activity in the UK. Going forward, the FCA has implemented new policies to regulate the space, including a digital asset licence and heightened policies relating to KYC, AML, and Combating the Financing of Terrorism (CFT).<sup>6</sup>

With the rapid growth of crypto and blockchain technology, there is no doubt that this area will continue to grow at pace next year. Mainstream adoption is starting to creep in across the globe with countries, such as El Salvador, now using Bitcoin as legal tender and global governments confirming frameworks to regulate and standardise the industry.

- |                 |                              |
|-----------------|------------------------------|
| 1. Spendesk     | 4. Shieldpay                 |
| 2. Cutover      | 5. international-adviser.com |
| 3. finextra.com | 6. investopedia.com          |

You may ask, what's all the fuss about? Why do we need digital currencies? Well, digitalising finance can increase financial inclusion and accessibility as well as security and risk against fraud. It can increase competition – and with it, options for consumers – and create enhanced savings, investment and lending opportunities. Through digitalising finance, we can and will create a better and fairer society.

Digital currencies, smart contracts, NFTs, DeFi protocols and DAO's are the next game-changing technologies. How FinTechs and financial services bring it to the mass market in a secure, accessible and beneficial format that favours financial inclusion and better serves the wider public is a challenge that we're excited to be a part of.



Clare Whitehead  
FinTech Platform Lead,  
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## Rise India


The dynamic Indian startup ecosystem continues to deliver on its potential. According to Inc42, \$26 billion has been raised in the first eight months of the year and is already twice the highest recorded total of annual startup funding of \$13.2 billion (in 2017).<sup>1</sup> And it's with great pleasure that we can share one of those successes; CreditEnable, has won this year's Rise FinTech Company of the Year Award. CreditEnable is a managed digital marketplace for SME finance start up from the Rise India ecosystem.

The COVID-19 pandemic and its aftermath affected every financial market, whether it was stocks, commodities or cryptocurrencies. Happily, the past year turned out to be a significant one for cryptocurrencies and blockchain. According to the 2021 Chainalysis Global Crypto Adoption Index, worldwide adoption jumped over 880% with P2P platforms driving cryptocurrency usage in emerging markets.<sup>2</sup> In India, crypto is finding favour among young citizens who are looking to diversify their investment options.

NASSCOM expects the Indian crypto-tech industry to create over 800,000 jobs, touch \$241 million by 2030 and support strengthening of "key priority areas such as healthcare, safety, digital identification, trade and finance, and remittances and help in addressing pandemic-induced challenges." Over 230 startups are currently operating in India in the crypto-tech space.



**Lincy Therattil**  
Head of Rise India

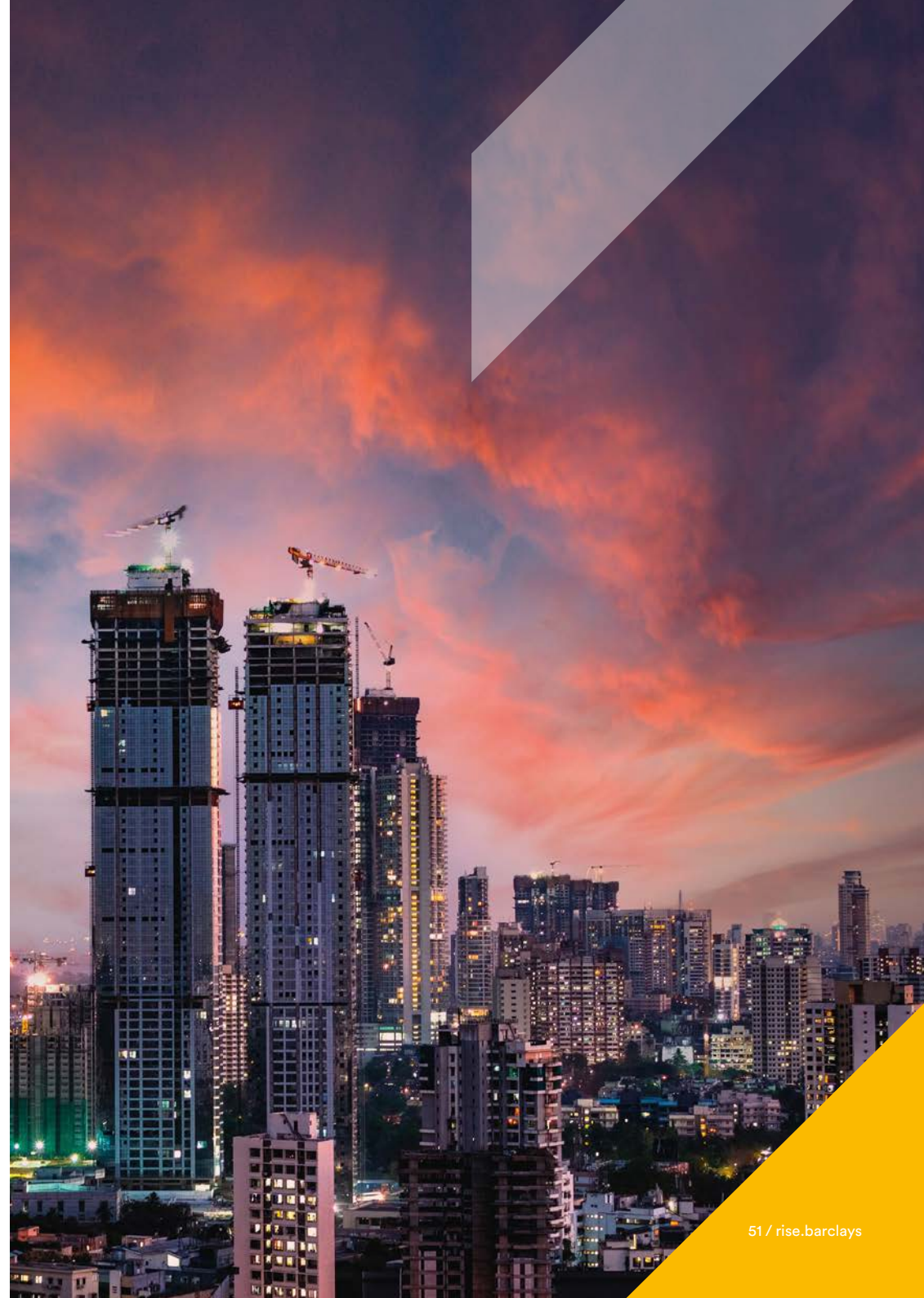
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**Ayush Singh**  
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1. inc42.com  
2. blog.chainalysis.com





## Rise New York

As we move into the fall and look ahead towards 2022, Rise New York is excited to see the continued growth of FinTech industry-wide. This positive climate for founders is fostering increased collaboration, expansion and leadership opportunities across the sector and around the world.

Amid this landscape of change and movement, Rise has undergone significant shifts as well. In July, Rise bade farewell to Alexandra Gheorghe who served as the FinTech Platform Manager on the team for over two years. Alex is now enrolled as an MBA candidate at the Kellogg School of Management at Northwestern University, and we are excited to see everything she will accomplish on her return to FinTech as an Operator!

Blockchain and crypto-assets have long been mired in controversy, while synchronously exploding with potential. Questions such as ‘can there ever be a reputable use for something intentionally deregulated?’ or ‘how can we trust data that lives forever but has no oversight?’ have been spoken in the same breath in bewilderment of the technology’s potential to do good.

As far back as 2018, the Department of Homeland Security identified several areas that blockchain technology will almost certainly impact: the way humans secure data, manage supply chains and interact with currency, not to mention the potential for scaling transactional activities and increasing task-driven efficiencies.<sup>1</sup> Then in July 2021, the Biden administration proposed changes to cryptocurrency reporting as part of the President’s American Families Plan, requiring businesses and crypto-exchanges to report

any transactions with a fair market value of \$10,000 or more to the IRS.<sup>2</sup> In a short span of years, blockchain and crypto have gone from forecast to concrete fixture in the global financial consciousness.

Some of the early winners in the battle to get blockchain adopted have been data companies, crowdfunding platforms and exchanges.<sup>3</sup> Rise New York member company Realblocks has built a blockchain platform connecting advisors and investors to alternative investment managers, and their client list already includes some of the largest fund managers in the United States. Other industries such as energy and insurance are also eyeing the technology as a possible game changer to drive increased transparency and accountable decentralisation when paired with budding anti-money laundering and compliance technology solutions.<sup>4</sup>

As a result of market whiplash, these topics have no clear end in sight. The undeniable fever surrounding them is good for the FinTech industry at large; discussion around payment technologies, efficient market data practices and even the potential for crypto as a currency or asset class pushes us all to think more critically and inventively about blockchain-driven innovation.



**Brian Luciani**  
FinTech Platform Lead,  
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1. The White House  
2. Business Law Today

3. [cbinsights.com](#)  
4. [cbinsights.com](#)







# Female Innovators Lab

By  **BARCLAYS** and  **anthemis**

**British universal bank, Barclays, and leading global FinTech investor, Anthemis, have partnered to bring more women into entrepreneurship.**

The Female Innovators Lab by Barclays and Anthemis is a New York City-based studio dedicated to cultivating entrepreneurial talent in women from all sides of the financial services ecosystem and its adjacencies. The Lab's mission is to identify female founders at the earliest stage of their journey, provide them with an initial investment and match them with the resources and mentorship required to bring a business concept to market. With a commitment to tackling the female funding gap, Barclays and Anthemis will support these entrepreneurs to confront, challenge and disrupt the status quo in the financial services industry.

The combination of Anthemis' track record as early-stage FinTech investors and venture builders, coupled with the power and global footprint of Barclays, makes this an exceptional opportunity for prospective founders to progress their business ideas.

There is no formal application process, and inquiries are accepted on a rolling basis.

Find out more about Female Innovators Lab at: [barclays.com/femaleinnovatorslab](https://barclays.com/femaleinnovatorslab)

For any additional questions, email: [femaleinnovatorslab@anthemis.com](mailto:femaleinnovatorslab@anthemis.com)

## **How is the Lab different from other incubators and accelerators?**

The Lab is a studio, not an incubator or accelerator. Our focus is at the earliest stage of venture building. The Lab welcomes teams or solo entrepreneurs before they have brought a business to market. There is also no cohort cycle associated with the Lab.

## **At which stage are companies eligible for the Lab?**

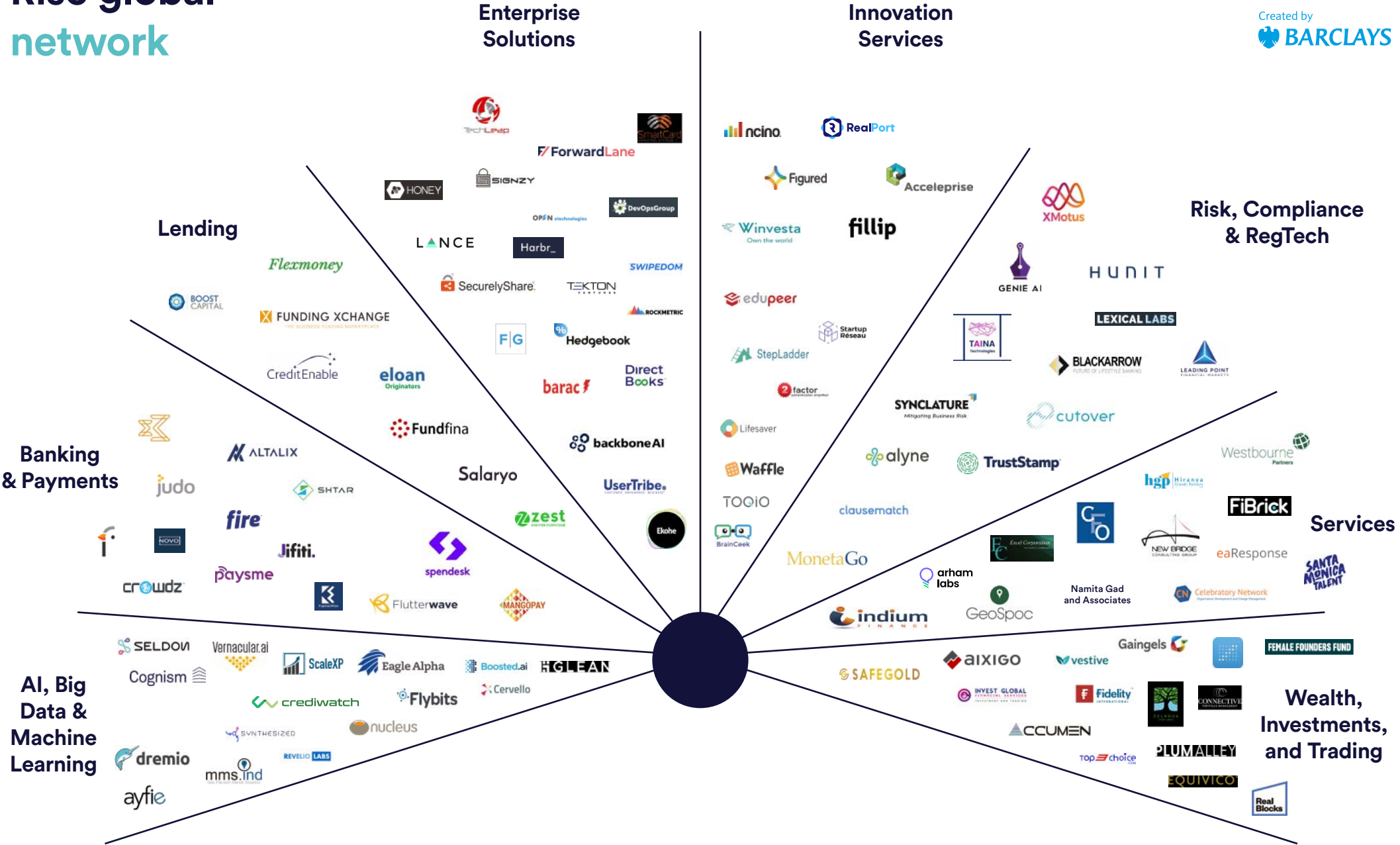
The Lab is best suited for founders who have an idea they would like to refine and need help turning it into a venture-backable business. We also encourage founders who are a little further along in that process to connect with our team.

## **What kind of support will the founders receive?**

Entrepreneurs who join the Lab will receive human, intellectual and financial resources, backed by an extensive network of advisors and experts from Anthemis, as well as access to Barclays' teams and expertise. Additionally, entrepreneurs will receive mentoring, which will focus on helping founders fully develop their concept and refine it in advance of pursuing additional funding.



# Rise global network



This infographic shows companies resident at our Rise locations. The information is accurate at the time of publication.

## Notes





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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**To join our community, or keep in touch with the latest from Rise, visit or follow us on:**

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### #HomeofFinTech

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