

Hyper Real

An Overview of Global
Blockchain Industry Trends

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Foreword

We live in a world of rapid and constant change, which demands in-depth research to understand innovation and identify opportunities and challenges.

As a leading independent, global asset manager, Invesco places great importance on driving thought leadership. From 2019, we have been committed to supporting fundamental research activities in long term asset management, alternative finance, and data analytics at Cambridge Judge Business School. The University of Cambridge's reputation for research excellence is world-renown.

We hope the knowledge and ideas that have been fostered through this collaboration are of value to our clients and are pleased to share our latest research: a broad overview of recent blockchain industry developments and the key trends that will shape Blockchain's long-term trajectory.

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Executive Summary

1. The blockchain industry and broader ecosystem have evolved at remarkable pace in the last 18 months, given the power of blockchain to transform the management of digital records and assets between different organisations.

Blockchain networks

2. Organisations have begun commercialising enterprise blockchain networks across multiple sectors such as insurance, banking, trade financing and shipping, and in many cases have now achieved scale.
3. A number of new permissionless blockchain networks have recently launched to address enterprise applications, and there is increasing cross-over between permissionless and permissioned tracks.

Digital assets

4. While most of the popular focus is on cryptoassets, other blockchain assets are growing, including digital fiat currencies, digital tokens that are modernising capital markets, and broader asset tokenisation of existing physical assets.
5. The market infrastructure around digital assets is increasingly fit for institutional purpose.

Applications, services and supporting infrastructure

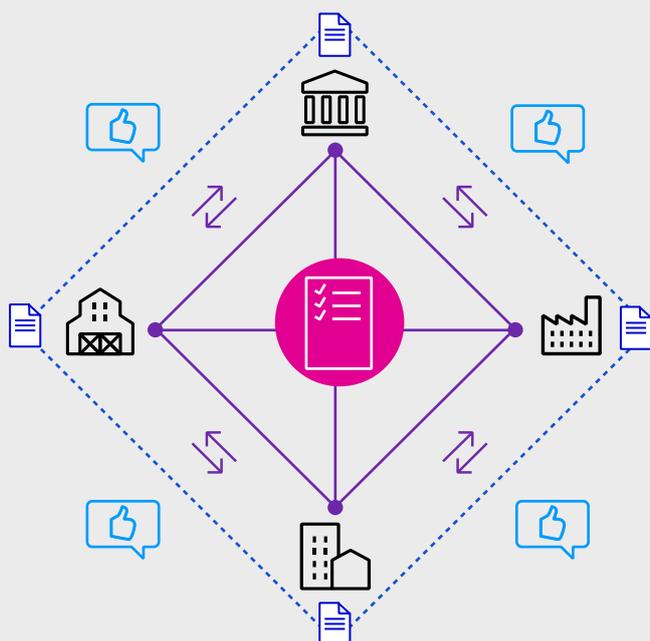
6. What has been a retail-driven market is becoming more institutional, as unicorn start-ups, brokerages, custodians, institutional trading platforms and global banks build a range of digital asset products and services.
7. Decentralised and enterprise blockchain applications are also on the rise, supported by the growth of extensive software libraries and developer tooling.

01. Setting the Scene

What is blockchain technology?

Blockchain technology is an umbrella term covering a set of tools, methods, and processes for electronic recordkeeping between multiple participants. Blockchains are peer-to-peer (P2P) networks composed of different entities that collectively maintain and update a shared set of records. This collection of shared records is often referred to as the distributed ledger, which represents a single agreed-upon version of the “truth”. The power of blockchain technology is that through a combination of cryptography, distributed consensus algorithms, and socio-economic incentive design, a blockchain system enables all participants to agree on the validity and order of shared records without relying on a central authority for reconciliation.

Figure 1
“I see what you see” – a blockchain network in action



1. Every participant in the network operates a **blockchain node**.
2. The peer-to-peer network **connects nodes directly with each other**, enabling secure communication and continuous data exchange.
3. Each node maintains **an internal ‘copy’ of the ledger** which records all transactions that have ever been processed by the system.
4. Through a distributed consensus process, the blockchain network **reconciles these individual copies** so that they always converge towards a single accepted version – **the shared ledger**.
5. Every node can **cryptographically verify** that ‘what they see is what everyone else sees’, without having to rely on a trusted third party.

An update on the blockchain industry

Since our initial engagement on Blockchain with Invesco more than 18 months ago, the industry and the broader ecosystem have evolved at a remarkable pace. Cryptoassets have gradually established themselves as an alternative asset class. New blockchain networks, products, services, and applications are being released on an almost daily basis. Shared business networks are expanding into veritable enterprise ecosystems. Incumbents across all sectors have begun to embrace digital assets as a new revenue driver. And policymakers have been busy preparing wide-ranging proposals for new harmonised regulatory regimes.

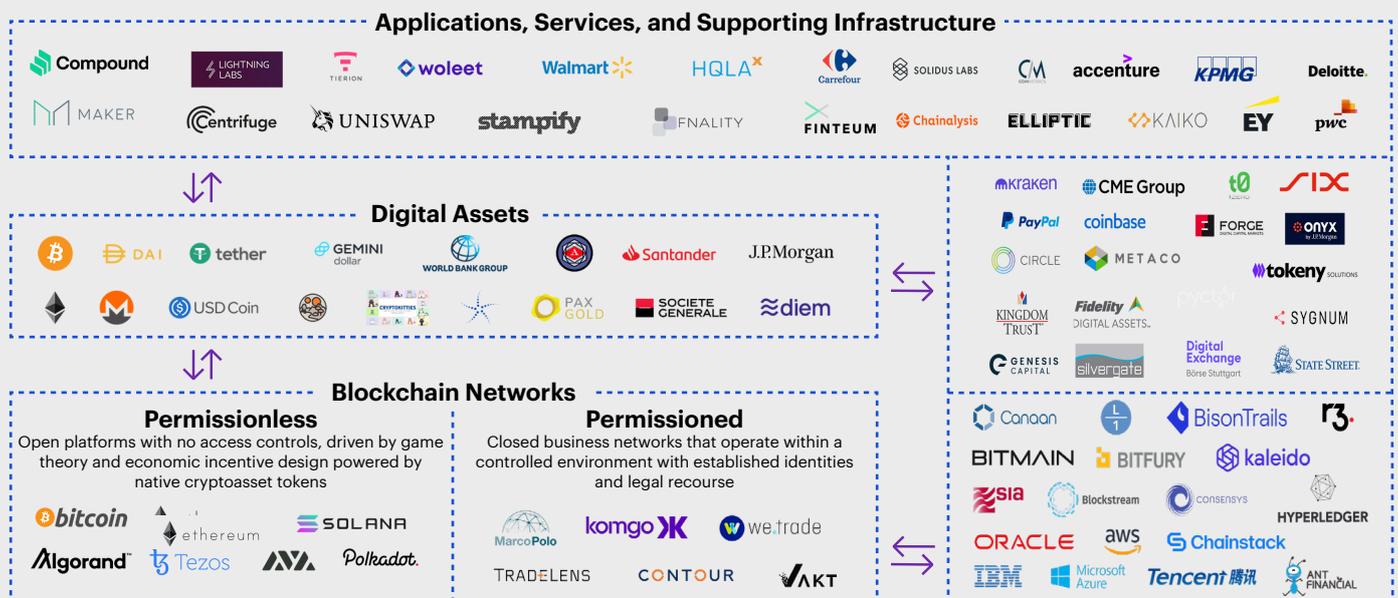
The dynamic nature of the ecosystem requires investors to stay informed through regular updates. Our purpose with this piece is to provide a broad overview of recent industry developments and outline the key trends that continue to shape Blockchain's long-term trajectory. To facilitate the discussion, we have organised this paper around several key themes introduced below.

How to approach the ecosystem

A proper analysis requires a flexible framework. To bring some order into a constantly-changing landscape, we propose a simple model that divides blockchain projects into three categories:

- 1. Blockchain networks (the foundation):** peer-to-peer systems composed of multiple participants that jointly produce a shared record of events. We can further distinguish between *public permissionless* systems (e.g. Bitcoin, Ethereum) – open networks driven by economic incentives and game theory involving a native cryptoasset; and *private permissioned* systems (e.g. R3 Corda, Hyperledger Fabric) that operate in controlled business environments comprising well-defined legal and operational arrangements between known participants.¹
- 2. Digital assets (the tradeable 'fuel'):** digital tokens issued on, managed by, and transferable via blockchain networks. These can be natively digital and exclusively exist within the boundaries of a blockchain network (e.g. cryptoassets), or be a digital representation of an asset that already exists elsewhere (e.g. physical gold).
- 3. Applications, services, and supporting infrastructure (the facilitators):** broad set of commercial offerings that facilitate interactions with digital assets and the underlying blockchain networks. New applications are deployed on existing blockchain networks; new products and services encourage the use of applications; and new infrastructure supports the development, maintenance, and operation of networks as well as the issuance, distribution, storage, and transfer of digital assets.

Figure 2
A conceptual map of the blockchain ecosystem



Source: Official website of the respective authority or company. The copyrighted material owned by third party is used for educational and informational purposes only. The use of the copyrighted material does not constitute a partnership with Invesco or a commercial recommendation or purpose.

While this conceptual model abstracts away much of the blockchain ecosystem's underlying complexity, it illustrates the dynamic interplay between the three major components and explains the value propositions delivered by each, which we will explore in the following analysis.

¹ There are a variety of hybrid models that use elements from both. A peculiarity of public permissionless networks is the dependency on a cryptoasset for the proper operation of the system: the asset, native to the network, plays an indispensable role in the economic incentive design that underlies the consensus process. In contrast, private permissioned networks operate without the need for a native cryptoasset.

02. Blockchain Networks: Shared Platforms for Distributed Applications

Transforming market infrastructure at the industry level

Blockchain networks constitute a new type of mutualised market infrastructure that facilitates seamless interactions between different participants. Jointly developed, maintained, and operated by their members, they are subject to less centralised control and benefit from greater resilience than centralised systems operated by a single entity.² The constant verification of shared records and transactions merges the traditional functions of compliance and audit into a single process, leading to greater transparency and accountability backed by verifiable cryptographic assurances.

Financial services still leading, but other industries are catching up

From hype to deployment: Enterprise Blockchain is maturing

Since its early beginnings in 2015, the 'Blockchain for Enterprise' segment of the industry has made significant progress as an alternative B2B technology. The first years were characterised by disproportionate media hype and lofty promises, which have since given way to actual deployment in production systems. While much of 2017 and 2018 was focused on experimentation and proofs-of-concept, 2019 saw the beginning of permissioned networks creating real economic value for their members. With maturing protocols and improved software tooling, the focus has switched from the technology to the commercial impact.

Why did it take this long? The answer is simple: developing new platforms at the market level requires social coordination and collaboration between industry actors. This means long debates about governance, funding, operations, standards, regulatory compliance, and much more. Unlike developing an application at the firm level, this process generally takes years rather than months. However, once this one-time foundational infrastructure is in place, new applications can quickly emerge on top – and that is precisely what is unfolding right now.

Business networks that launched some time ago have continued to expand across all industry sectors. Furthermore, after years of development and significant funding rounds, new business networks have been launched earlier this year. While financial services and capital markets remain the dominant focus, other sectors have caught up, with supply chain management and tracking seeing the highest growth and traction. Network effects are also starting to take effect: the more traffic and volume a platform generates, the more industry players it tends to attract. Some networks have thus evolved into veritable digital enterprise ecosystems that connect both trading partners and direct competitors.

A notable trend is the growing geographical focus of some networks. Mostly originating from public-private partnerships, the aim is to create shared, cross-industry systems as foundational infrastructure for both public and private digital services within a defined geographical area. Examples of such networks can be found at both the national level (e.g. the Chinese Business Services Network, or the Spanish Alastria network) and the regional level (e.g. the European Commission's European Blockchain Services Infrastructure, a regional network of distributed nodes operated by member countries).

Figure 3
Business networks continue expanding

Insurance		20	insurance companies from 5 continents
Trade finance		35	core member banks
Container shipping	TRADELENS	>50%	of the world's total container traffic
Trade finance	CONTOUR	21	banks following initial launch with 8 founding members
Interbank market		100+	banks covering >85% of the Italian banking industry

Based on public statements from executives, as of 2 December 2020. Source: Official website of the respective authority or company. The copyrighted material owned by third party is used for educational and informational purposes only. The use of the copyrighted material does not constitute a partnership with Invesco or a commercial recommendation or purpose.

² Whilst some of these functions may in practice be delegated to a third party, many benefits of distributed infrastructure still remain.

A new wave of permissionless networks to complement existing offerings

Permissionless networks are thriving – and becoming more numerous

Permissionless networks with open access policies and limited control points have been growing rapidly on all fronts. Bitcoin's hashrate – the total amount of computing power contributing to its security – has grown by more than 180% since mid last year, which indicates a massive expansion of mining operations around the world. In the meantime, the Ethereum network has established itself as the undisputed market leader for smart contract applications thanks to widely-used token standards and readily-available software tooling that facilitates application development on top of the network.

Competition is fierce, however; a number of well-funded permissionless networks have gone live more recently to challenge Ethereum's dominant position and expand the range of options available to application and service providers. While solutions such as Cosmos and Polkadot primarily focus on interoperability aspects to connect fragmented subnetworks, other platforms (e.g. Algorand and AVA) cater more to enterprise applications that want to leverage open networks. Choosing slightly different trade-offs, they often improve upon some of the performance issues faced by older, longer-running networks (e.g. limited transaction throughput, low speed, relatively high transaction costs) which may otherwise impede broader enterprise adoption.

Greater focus on interoperability to prevent fragmentation and data silos

Increasing crossovers between permissionless and permissioned tracks

After 2015, the ecosystem mostly developed on two separate tracks – the permissionless, open networks for cryptoassets and decentralised applications; and the permissioned, closed networks for traditional enterprise applications. Since 2019, however, increasing crossovers between these tracks have emerged. Global banks such as Santander and Société Générale have repeatedly used open networks such as Ethereum or Tezos to issue digital securities, and a growing number of companies are experimenting with permissionless networks.³

Furthermore, cross-industry initiatives such as the Baseline protocol championed by EY and others promote the use of permissionless networks as a middleware layer to synchronise internal enterprise IT systems and facilitate secure B2B process automation. Formal collaboration between different projects and initiatives of each track has become the norm: organisations from rival projects – such as the Hyperledger Foundation and the Enterprise Ethereum Alliance (EEA), for instance – are jointly developing technical interoperability standards through dedicated working groups and cross-memberships. There is also a growing belief that business networks may first launch in a restricted, controlled environment, before gradually transitioning to a more open, permissionless context. This further highlights the importance of ensuring that networks are future-proof in terms of compatibility and interoperability.

Case Study 01 – The Corda Network: an industry-agnostic business network at a global scale



R3, a leading Enterprise Blockchain company known for its Corda software, has extended its business from software to the provision of a global business network to allow Corda-based applications from many different industries to share a common network infrastructure. Launched in 2019, the Corda Network is governed by an independent, not-for-profit foundation based in the Netherlands. Access is open to eligible businesses and provided on a non-discriminatory basis.

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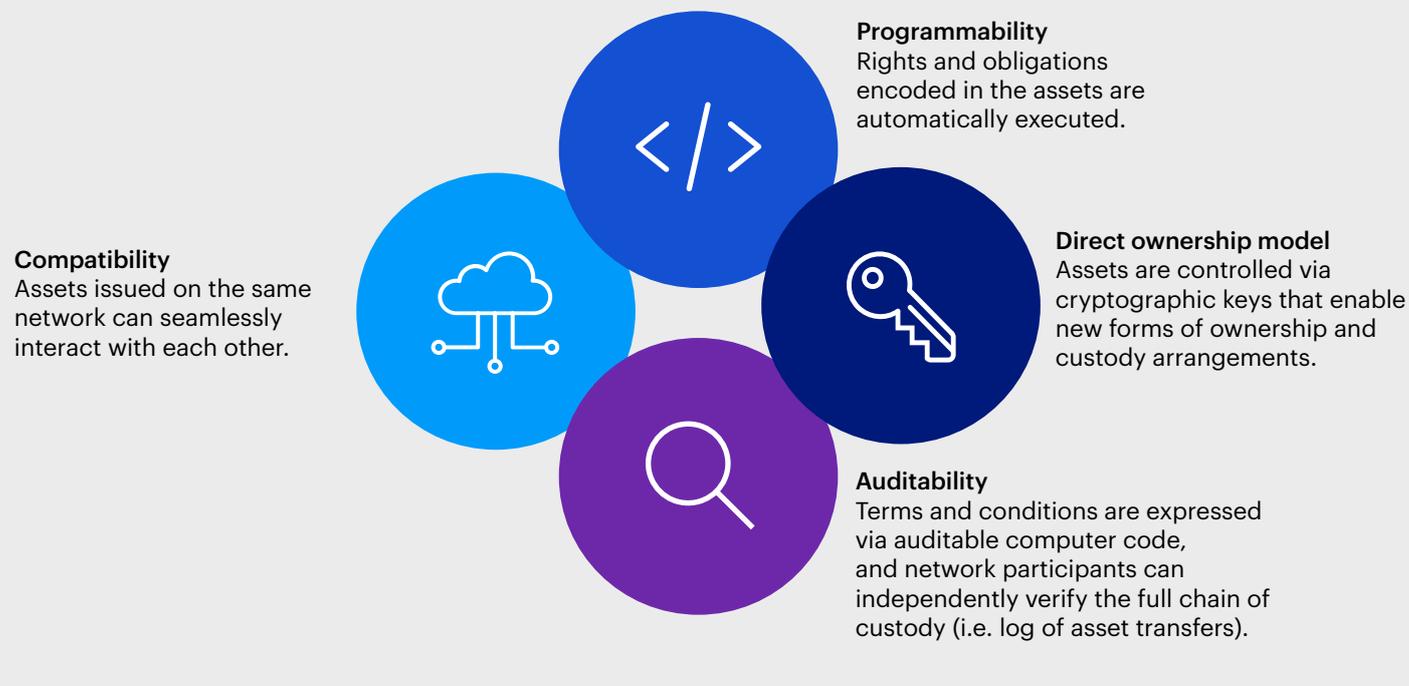
³ For a detailed analysis of the Enterprise Blockchain market segment, see *Cambridge Centre for Alternative Finance (2019) 2nd Global Enterprise Blockchain Benchmarking Study*.

03. Digital Assets: From Bitcoin to Central Bank Digital Currencies

Blockchain networks as powerful asset registries

Most financial assets today are already registered electronically, but mainly in the form of static data strings 'trapped' inside proprietary data silos. Blockchains provide an alternative mechanism for the issuance, distribution, tracking, and transfer of truly digital assets that have unique properties.

Figure 4
Key properties of blockchain-based digital assets

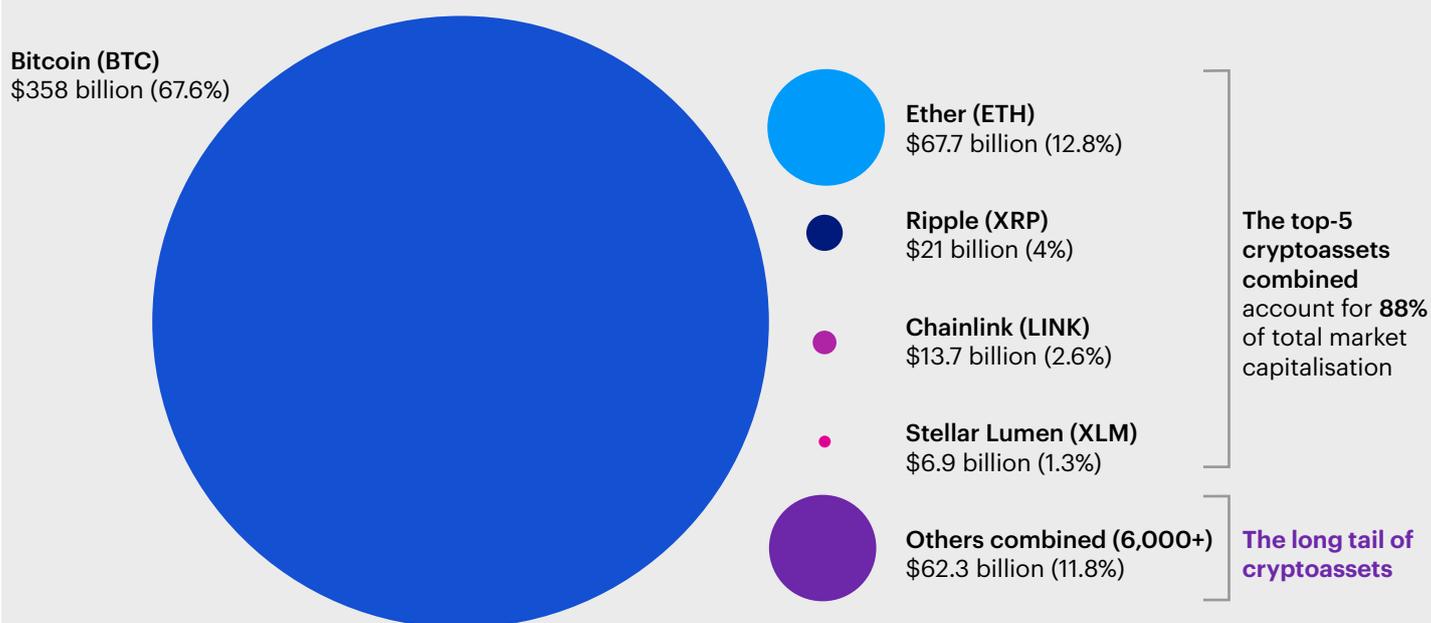


Cryptoassets: towards a new asset class?

In 2009, Bitcoin (BTC) quietly emerged as the first blockchain-based digital asset. Within the span of a decade, it has given rise to an aspiring new asset class – **cryptoassets** – that now at the time of writing, comprises thousands of assets with a combined market capitalisation in excess of \$540 billion.⁴ Despite there being no shortage of new cryptoassets being launched on a daily basis, the market is highly concentrated around half a dozen assets that boast the majority of total market value and trading volume. Even among these, Bitcoin remains the indisputable leader: it accounts for 68% of total market capitalisation, its ticker (XBT) is listed on all major market intelligence and data analytics platforms, and many market commentators have called it one of the best-performing investments of the last decade.

⁴ There is no uniform definition of cryptoassets that is widely accepted in the market. We suggest to distinguish cryptoassets from other digital assets based on their unique economic function in the game-theoretical incentive design of the underlying network or application. Data on total market capitalisation is taken from [OnChainFX](#) (as of November 30, 2020).

Figure 5
Bitcoin dominance and the long tail of cryptoassets



Public domain data, as of 2 December 2020.

Over the years, Bitcoin has increasingly established itself as an alternative investment asset alongside gold and other stores of value.⁵ Until now, this development has been primarily driven by retail investors: a recent study estimates that there are more than 100 million individual cryptoasset ‘users’ (i.e. mostly holders, or investors) across the globe, many accessing these investments through the crypto products of established FinTech firms and neobanks (see next section).⁶ More recently, however, a number of public companies – spearheaded by consulting firm MicroStrategy and payments company Square – have announced an allocation to bitcoin as an inflation-hedging treasury asset, while prominent investors such as Paul Tudor Jones and Stanley Druckenmiller have revealed significant personal allocations. The COVID-19 pandemic and the resulting market turbulence has positively contributed to accelerating the long-awaited institutional adoption of Bitcoin as an generally-accepted portfolio diversifier.

Re-inventing money: the rise of digital fiat currency

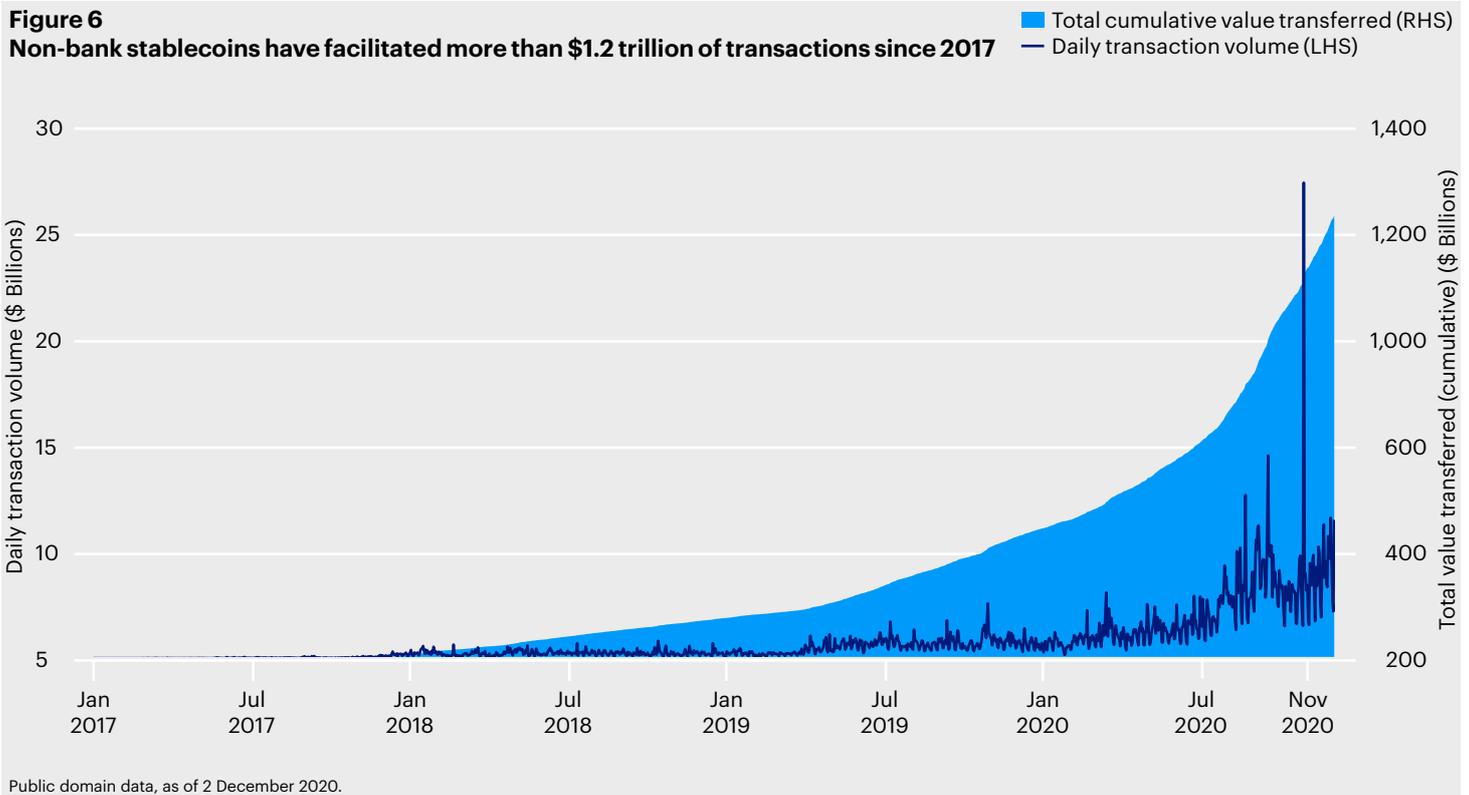
Until recently, many firms in the cryptoasset industry were unable to obtain or maintain lasting banking relationships, as banks deemed the industry to be ‘high risk’, given compliance concerns and an unclear regulatory position. Some companies began issuing synthetic fiat currency on permissionless blockchains that customers could use to fund deposits – and thus **stablecoins** were born.⁷ What began as a narrow, temporary use case to circumvent banking challenges has evolved over time into a global off-shore currency system on alternative payment rails that offers users a new way to move money around the world – generally faster, cheaper, and with less restrictions. While the total amount of outstanding supply remains comparatively low (currently a combined \$26 billion in float when excluding bank assets), stablecoins have generated more than \$1.2 trillion in transactional volume since 2017, displaying a much higher velocity than conventional monetary aggregates.⁸ Tether (USDT) remains the clear market leader, accounting for roughly 75% of all outstanding supply at the time of writing.

⁵ For a good overview of different rationales and investment theses, see Jameson Lopp (2020) *Bitcoin Investment Theses*.

⁶ See p.44 in Cambridge Centre for Alternative Finance (2020) *3rd Global Cryptoasset Benchmarking Study*.

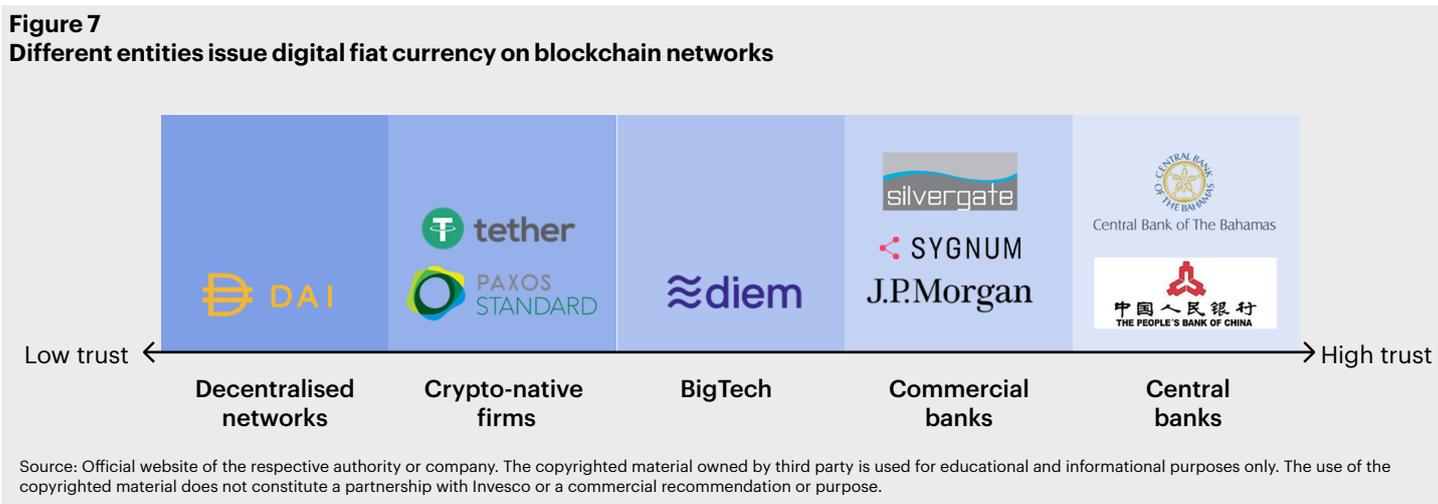
⁷ Stablecoins exist in the form of various instruments (e.g. fiat-backed, crypto-collateralised, hybrid, algorithmic). Fiat-backed stablecoins where the outstanding supply is fully collateralised with adequate reserves continue to be the most popular instrument.

⁸ Authors’ own calculations based on outstanding supply data from *OnChainFX* and transaction data from *Coinmetrics* (as of November 30, 2020).



Historically, cryptoasset firms used to be the main stablecoin issuers (e.g. Tether has been issued since 2015 by an entity linked to crypto exchange Bitfinex). This is changing, however, as a growing number of firms outside of the cryptoasset industry are warming up to the idea. For instance, some commercial banks are developing their own stablecoins, with institutions like Silvergate Bank and J.P. Morgan already making internal solutions available to some clients for wholesale transaction banking. FinTech firms, other payment service providers, and BigTech have also expressed interest, and social media firm Facebook already took the world by storm in 2019 with the announcement of Libra (recently rebranded to Diem), a global consortium-backed stablecoin with a new unit of account.

This was the final nail in the coffin that prompted central bankers from all continents to take action: as a consequence, global stablecoins are now the subject of systemic risk considerations, and central banks are actively exploring the issuance of central bank digital currencies (CBDC) as a public-sector alternative to privately-issued forms of digital money, with the People’s Bank of China taking a lead.



A market still in its infancy

Digital securities: modernising capital markets

Besides synthetic commodities (cryptoassets) and digital money (stablecoins and CBDC), blockchain networks also increasingly serve as platforms for the issuance, distribution, transfer, and management of financial securities. These can be natively digital (**digital securities or security tokens**), such as the World Bank's bond-i digital bond first issued in 2018; or digital representations of existing securities held elsewhere (**tokenised securities**), such as the Paxos Settlement Service which settles US-listed equity trades between participating broker-dealers using tokenised shares (the underlying shares are held at the DTCC). Blockchain-based securities generally enjoy faster settlement and greater transparency at reduced costs because the underlying distributed ledger acts as both the asset registry and the final settlement engine, thereby consolidating several post-trade processes and reducing the need for frequent book reconciliation.

Born out of the initial coin offering (ICO) frenzy in 2017, security token offerings (STOs) have taken hold as a regulated alternative to the unregistered sale of digital assets qualifying as securities under existing legal and regulatory frameworks. Despite a growing number of available offerings (200+), the market is still in its infancy: facing the typical chicken-and-egg problem, issuers as well as buy and sell side are waiting for each other to reach the tipping point.⁹ Current issuances are mainly small and from relatively unknown issuers, but incumbents are getting ready (*see next section*). The larger play behind these developments amounts to a generational modernisation opportunity for adapting legacy financial market infrastructure (FMI) from the 20th century to the market requirements and realities of the 21st century.

Towards a real 'Token Economy'?

Broader asset tokenisation

More broadly, the process of tokenisation enables any object, event, or concept to be represented digitally in the form of a (potentially tradeable) digital asset. Physical assets such as precious metals or real estate can be brought into cyberspace via **digital twins**, i.e. virtual representations that embody the same legal rights and obligations as the physical underlying. **Non-fungible tokens (NFTs)** enable the creation of digital collectibles that are provably unique (e.g. digital artworks, rare gaming cards and items) and open for trading between collectors. Moreover, **engagement tokens** – akin to versatile, programmable loyalty and reward programs – open up a whole range of new ways for brands to interact more directly with customers (e.g. Socios.com collaborating with several top European football clubs to launch 'FanTokens').

In the future, one could envisage a world where the inputs and outputs of any business transaction (e.g. purchase orders, trading invoices, accounts receivable) can be tokenised, with the corresponding tokens being eligible as collateral to access liquidity in other markets. Tokenising the elements at the core of a business proposition can turn idle balance sheet items into productive assets that can be deployed for alternative uses, eventually resulting in what has been labelled a veritable '**Token Economy**' where large parts of the economy are financialised.

Case Study 02 - The Digital Yuan (eCNY): inside China's digital currency project



The eCNY is considered the most advanced CBDC project of any major economy. After several years of R&D, the People's Bank of China has commenced a CBDC pilot over four major cities in early 2020. The trial involves four commercial banks, several Telcos, and major retailers. "Red Envelope" payments were made by lottery to kickstart deployment in Shenzhen, to be followed by a second lottery in Suzhou where the pilot will extend to offline transactions (by touching phones). According to the latest data from August 2020, the system has so far processed \$162 million worth of transactions over 113,300 personal wallets and 8,859 corporate wallets.

⁹ For an analysis of STOs based on empirical data from 185 offerings, see Lambert, Liebau, & Roosenboom (2020) [Security Token Offerings](#).

04. Applications, Services & Infrastructure: Bringing the Ecosystem To Life

Growing up: a dynamic industry of specialised providers

The beginnings of the Blockchain industry can be traced back to the first Bitcoin exchange and wallet projects that emerged a decade ago. A first wave of professionalisation occurred in 2013 when seasoned executives took over from tinkerers, hobbyists, and early entrepreneurs. In 2015, the growing demand for reliable enterprise applications resulted in the formation of the Enterprise Blockchain segment of the industry, which has been growing consistently over the years. With more than \$20 billion in cumulative funding, the industry today comprises thousands of companies – start-ups and incumbents from all sizes – that operate across the globe.¹⁰

Retail-driven market turns institutional

Building out digital asset support

In the early days of Bitcoin, investors had little choice but to use unproven or dubious off-shore exchanges for trading, and complicated open-source software to self-custody cryptoasset funds. With the arrival of the first VC-funded start-ups in 2012, things started to change quite substantially. Less than a decade later, investors can now securely access, trade, store, and transfer cryptoassets using a broad range of products and services from both start-ups and incumbents. Leading FinTechs (e.g. PayPal, Robinhood, Square) and neobanks (e.g. Revolut) have launched consumer-facing cryptoasset offerings, whereas card networks like VISA are beginning to integrate stablecoins and partnering with cryptoasset firms for issuing debit and credit cards. Retail investors can further choose among several dozen regulated exchanges and a wide variety of investment products, together with the cryptoasset trading now offered by trading firms like IG Group and Plus500.

On the institutional side, a fierce sell-side competition is underway between well-funded ‘crypto-native’ start-ups – some of which have become unicorns (e.g. Circle and Coinbase) – and first-mover incumbents (e.g. Fidelity’s subsidiary Digital Asset Services). Sophisticated market infrastructure designed for institutional usage has been set up over the last 3 years, ranging from digital custody solutions and prime brokerage services (e.g. BitGo, Anchorage, Genesis Capital) to institutional trading platforms (e.g. LMAX), derivatives exchanges (e.g. CME Group and ICE’s subsidiary Bakkt), and investment products (e.g. investment trusts, funds, trackers, exchange-traded products). Market intelligence is provided by a handful of data service providers that also offer analytics, compliance, and market surveillance products.

Banks have also warmed up to cryptoassets. Global institutions such as J.P. Morgan and others are growing more comfortable with providing banking services to cryptoasset companies. First movers such as Silvergate and Signature Bank in the US, or smaller banks in Switzerland and Liechtenstein, have built a loyal customer base over the years. And several new, specialised ‘crypto-banks’, such as Sygnum and SEBA in Switzerland, or Avanti Bank in the US, have received regulatory approval to operate.

A similar trend can be observed for digital assets more broadly, most notably with regards to the issuance, distribution, custody, and administration of digital securities. In Europe, for instance, SDX by SIX is building a one-stop shop for digital securities through its end-to-end platform. In South East Asia, leading bank DBS is developing a similar offering. The Bank of Thailand successfully launched its bond issuance platform earlier this year, a consortium of global banks jointly developed a digital assets post-trade platform called Pycor, and in the UK, Archax became the first FCA-regulated digital securities exchange, brokerage, and custodian. These developments indicate a broader trend in capital markets towards an organic, bottom-up upgrade of legacy financial market infrastructure: a growing number of market participants are laying the pioneering groundwork for a new, digital, end-to-end market infrastructure designed from the ground up to support programmable assets.

Blockchain applications on the rise

As foundational blockchain networks mature, applications proliferate. This is most evident in the case of permissionless networks which serve as open application platforms for developers to build on. Leading platform Ethereum alone features thousands of ‘dApps’ – decentralised applications – across a broad range of use cases, including financial services (‘DeFi’), prediction markets, arts and collectibles, and gaming.¹¹ Applications such as Tierion and Woleet use the Bitcoin network’s strong immutability assurances and public auditability properties for secure document notarisation.

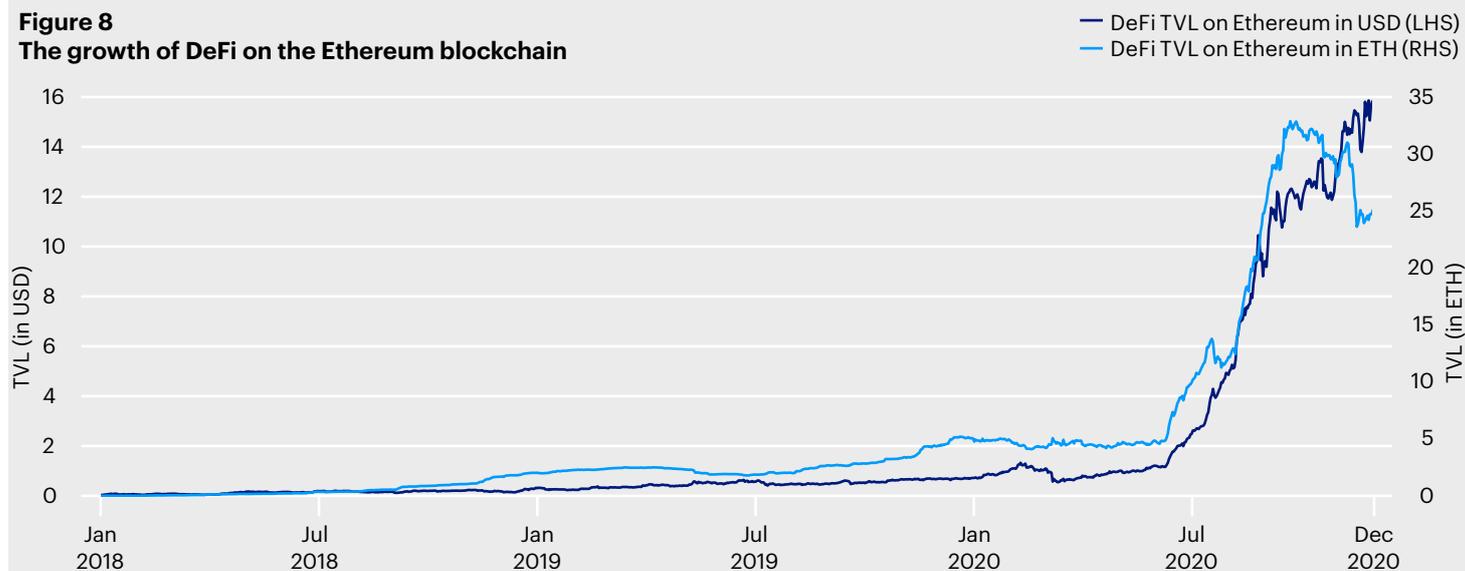
¹⁰ For a good overview of industry dynamics and funding data, see *CB Insights (2020) The Blockchain Report 2020*.

¹¹ See *State of the dApps* for a good overview of dApps across various permissionless blockchain networks.

Decentralised Finance (DeFi): permissionless innovation on open networks

DeFi is an umbrella term that refers to an emerging ecosystem of modular financial services applications that run on permissionless blockchain networks. Covering the full spectrum of financial services (among others lending, trading, and derivatives), these applications provide users and developers with the building blocks for a decentralised, non-custodial alternative to traditional intermediated activities. Users can repurpose and reassemble applications – which are based on open-source smart contract code – into more complex arrangements that run in an autonomous fashion, with no central oversight or control.

Figure 8
The growth of DeFi on the Ethereum blockchain



DeFi has experienced rapid growth over the summer of 2020: the total value of funds locked (TVL) into composable financial services applications on Ethereum alone has grown from less than \$1 billion in May to more than \$14 billion today; growth that has primarily been driven by stablecoins and lending activity.¹²

From network applications (monolithic) to application networks (modular)

In parallel, enterprise applications are on the rise, driving further transformation and tokenisation opportunities across all sectors and industries. As permissioned networks continue to expand, they grow out of their initial monolithic structure – narrowly built around a single application – and give way to more modular arrangements that involve multiple applications deployed in parallel. The success of mature enterprise networks such as Contour, Marco Polo, WeTrade, or Liink is based on the growing number of applications that members can access. As noted previously, the market has been dominated by financial services applications in the past, but non-financial use cases are quickly catching up.

Many of the developments above are made possible – or at least accelerated – by the existence of extensive software libraries and versatile developer tooling. Software companies like ConsenSys, Blockstream, R3, or IBM are competing for market share for their developer tools and protocol frameworks. Likewise, firms across the mining value chain (which spans giants of chip manufacturing like Global Unichip and TSMC, rig producers like BitFury, datacenter operators like Bitmain, and pool operators like BW) as well as emergent staking services play a vital role in the operation of permissionless networks. Critical network components such as nodes are often hosted in cloud environments of established providers (e.g. AWS, Microsoft Azure) for better performance and oversight.

Case Study 03 - J.P. Morgan Onyx: a new business unit dedicated to Blockchain



In October 2020, J.P. Morgan announced the consolidation of their multiple blockchain initiatives – some of which have been ongoing for years – in a new business unit under the Onyx brand. Among others, this includes Liink, a blockchain network for banking applications (featuring more than 400 banks globally, including 25 of the world's largest institutions), and 'JPM Coin', a stablecoin that is now in production with a major tech company in Asia.



This new business unit reflects J.P. Morgan's commitment to innovation as we continue to build cutting-edge technology that delivers a better, faster and more inclusive financial system.

Jamie Dimon, Chairman and CEO.

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¹² 'Total value locked' (TVL) data from [DeFi Pulse](#) (as of December 2, 2020).

05. Looking Ahead: What to Expect from the Future

Key trends to watch

The rapid pace of industry development makes accurate predictions about the future a difficult task. At present, nobody can fully appreciate the long-term effects of widespread asset tokenisation and shared industry platforms on business models, the economy, and society more broadly. Nevertheless, there are some more immediate trends worth watching:

- **Growing M&A activity:** M&A activity in the cryptoasset industry has picked up in 2020, with further consolidation expected primarily in the exchange and custody segments. The recent acquisitions by Broadridge (taking over Northern Trust's private equity blockchain network) and ConsenSys (taking over J.P. Morgan's Quorum platform) indicate a similar trajectory in the Enterprise Blockchain market segment.
- **Regulatory compliance:** efforts from regulators and policymakers to bring cryptoassets and other digital assets into the traditional, regulated financial system are accelerating globally. In addition to binding provisions by international bodies such as the Financial Action Task Force (FATF), market participants have to navigate the fragmented landscape of national and regional regulations. Some countries are moving away from an attempt to shoehorn digital assets into existing frameworks; instead introducing new legislation to provide greater regulatory certainty and confidence – often in an attempt to attract new business activities.¹³ Industry demand for compliance services and personnel is expected to grow significantly over the next years as regulatory requirements increase.
- **Hiding Blockchain:** after years of taking the centre stage, Blockchain is increasingly relegated to the back seat as the focus progressively shifts from technology to user experience and commercial considerations. Blockchain components are quietly integrated into the traditional enterprise IT stack, abstracting away the underlying complexity from end users who are unaware of what is going on in the back end.

Case Study 04 - EU Markets in Crypto-Assets (MiCA) regulation: a wide-ranging proposal



In September 2020, the European Commission unveiled a new proposal to harmonise the fragmented regulatory landscape in Europe with regards to cryptoassets. Using a broad definition of the term, MiCA aims to be a clear, all-encompassing framework to facilitate innovation, financial stability, and to protect consumers and investors. If approved, the regulation would supersede any national regimes and immediately apply to all 27 EU members and EEA countries after coming into force, thereby paving the way for a new global standard. While the current draft raises challenges for some activities and operations (in particular for decentralised applications with no identifiable operator), the clarity and certainty resulting from a unified regulation are an attractive prospect for the industry.

¹³ Prominent examples of new legislation include Switzerland's new DLT law, Liechtenstein's 'Blockchain Act' (TVTG), Germany's updated custody law, and the U.S. state of Wyoming's new licensing regime for special-purpose depository institutions (SPDI).

From sidelines to action

As the blockchain hype gives way to real commercial deployments, and cryptoassets leave behind their Wild West days to become an aspirational asset class, companies and institutions will need to formulate a coherent long-term strategy laying out their approach to this new paradigm. A once-in-a-generation upgrade of core market infrastructure entails challenges and opportunities in all places; risking the disintermediation of existing activities and business models, but also enabling the emergence of wholly-new market models and value-generating services.

How can professionals, including executives, business leaders, and investors, prepare for the future?

1. **Education:** explore key concepts and components, follow the latest industry developments, and conduct small experiments to better understand both opportunities and limitations.
2. **Exposure:** benefit from industry growth without the need for direct business involvement by getting financial exposure to the ecosystem (or its subsegments) through a variety of vehicles.
3. **Engagement:** get involved in industry initiatives and working groups to exchange views with your peers and make your voice heard (e.g. in helping shape new industry standards).
4. **Adoption:** integrate Blockchain into your operations – start providing blockchain-focused products and services, join existing blockchain networks as members, issue your own digital assets, or use key blockchain components to enhance your internal IT systems.

The evolving financial market infrastructure for digital assets is likely to further increase confidence in token markets, and the maturing regulatory environment should provide reassurance in and transparency to the 'Token Economy'. While prognostications are at best anyone's guess, and history appears to favour evolution in leaps and bounds rather than linear extrapolation, the continued acceleration and depth of blockchain's development points to a positive future.

Whilst hype and reality may intermingle, the medium and longer term transformation facilitated by blockchain technology is indisputable. As with any technological change, the road is paved with challenges and obstacles. Ultimately, however, we think there is a strong probability that the blockchain ecosystem will continue to create value for people through the more efficient management of digital information records and assets – most likely in ways that we cannot yet fully comprehend.



When everyone is looking for gold, it's a good time to be in the pick and shovel business.

Mark Twain

Vehicles for accessing exposure to the Blockchain ecosystem

There are a variety of different investment vehicles available to investors who seek financial exposure to the blockchain ecosystem. Cryptoassets can be directly acquired on regulated exchange venues and safely held with institutional custodians. Investors can also opt for indirect exposure via a variety of financial products (e.g. futures, other derivatives and exchange-traded products listed on regulated exchanges), as well as investment funds (e.g. unit trusts, index funds) that are available through traditional brokerages and directly from asset managers.

There remains an interesting question as to whether exposure to this transformation is better served by investments in digital assets or in the businesses that may capture the benefits of this transformation. For the latter, investors can directly invest in promising public and private companies, or choose from a number of funds with a broader portfolio (e.g. crypto hedge funds, venture capital funds, or exchange-traded funds that invest in publicly-listed companies).

Investment risks

Investment strategies involve numerous risks. Investors should note that the price of your investment may go down as well as up. As a result you may not get back the amount of capital you invest.

Important information

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Data as at 5th January 2021 unless otherwise stated.

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