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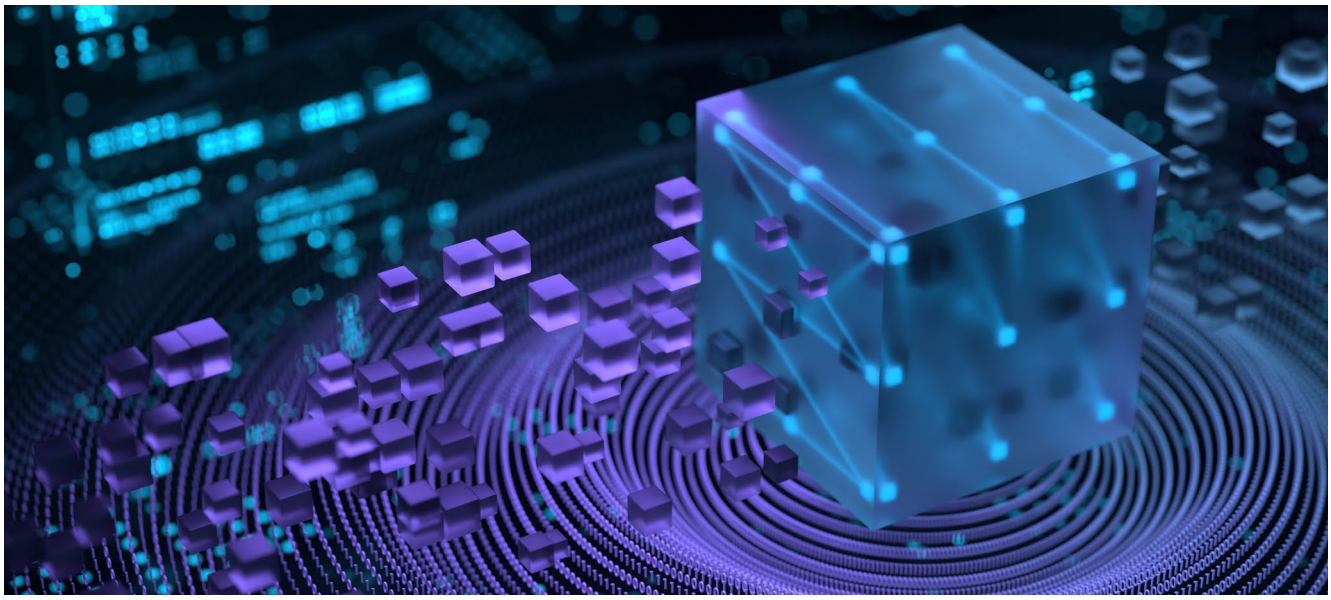
Blockchain's real world impact grows as hype recedes



- **As the buzz around blockchain technology has subsided, so the technology is beginning to show signs of fulfilling its potential across a range of areas**
- **From financial services to supply chains, blockchain is beginning to enable disruptive product innovation and greater efficiency**
- **The VanEck Crypto and Blockchain Innovators UCITS ETF offers access to the technology ecosystem's crypto miners, exchanges and other businesses.**

It's said in economics that "things take longer to happen than you think they will, and then they happen faster than you think they could."[1] Much the same may happen with the blockchain – the digital ledger technology that not only underlies cryptocurrencies but also has the potential for enabling innovation across a range of sectors.

Blockchain became widely noticed in 2009 when the Bitcoin cryptocurrency was released. It was touched by some of the hype around cryptocurrencies. In 2017, for instance, the New York-based beverage maker Long Island Iced Tea changed its name to Long Blockchain Corp, announcing it would invest in cryptocurrencies. The result? Reportedly, the stock price briefly climbed by 500%.[2] Since then, though, the technology has gradually been recognized for its numerous potential applications. In short, the blockchain's main advantages are: decentralization, immutability, transparency and security.

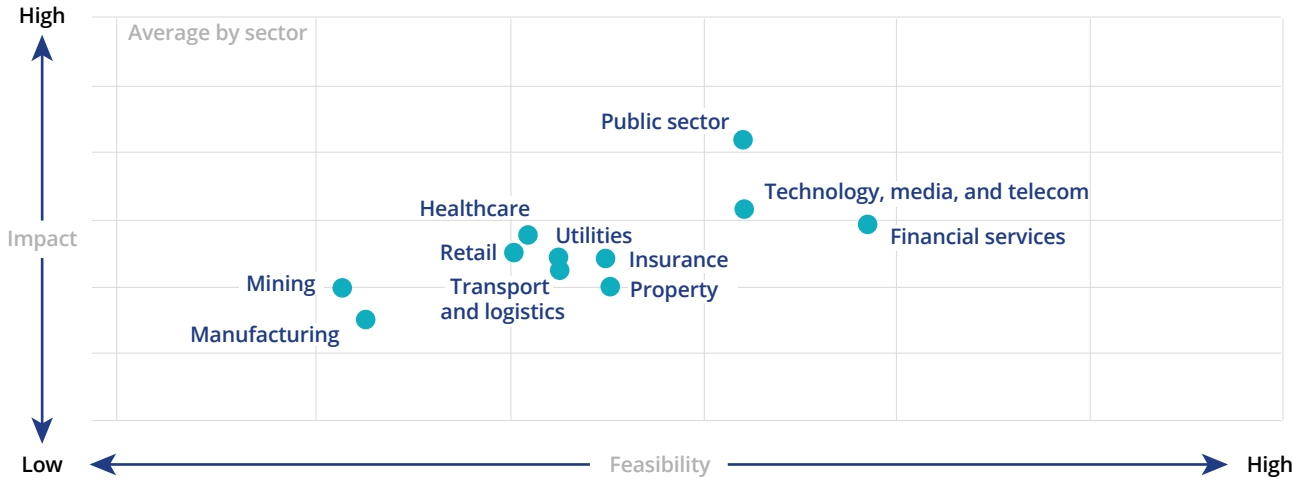
The hype has subsided and blockchain technology is quietly being adopted across the economy. Most publicly, Bitcoin is gaining respectability after the US Securities Exchange Commission, the financial regulator, approved the first spot Bitcoin ETFs in early 2024. Yet, less noticed, the technology is being applied in financial services, the public sector, insurance and corporate supply chains. The potential for innovation is considerable.

Below is an illustration depicting where McKinsey & Company sees blockchain having the greatest strategic business value.

After the hype has subsided, blockchain is quietly growing. The blockchain technology market was valued in 2022 at $11.1 bn and is projected to grow from $17.6 bn in 2023 to around $470 bn in 2030, according to a study conducted by Fortune Business Insights[3]. That equates to an impressive compound annual growth rate (CAGR) exceeding 50% over the forecast period.

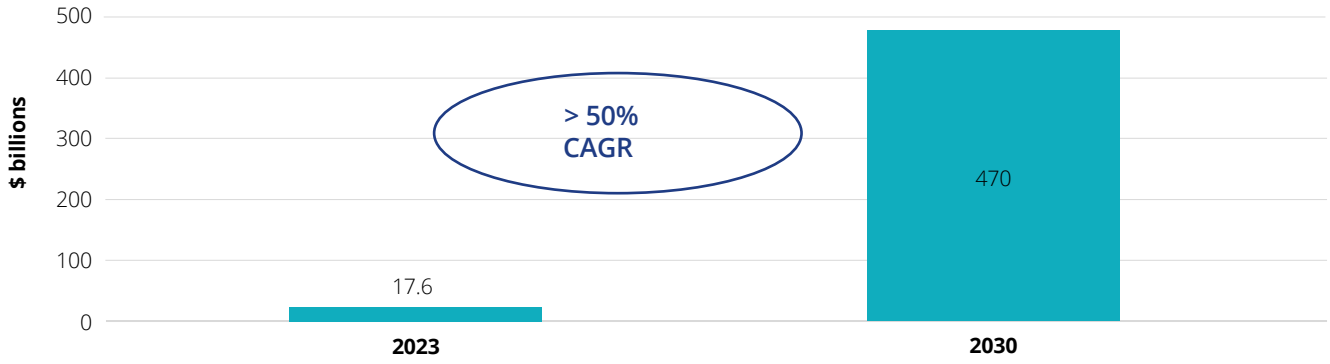
[1] Quote attributed to Rudi Dornbusch, the distinguished German economist.
[2] 'Fake it till you make it' - but know when to stop. Financial Times. June 22, 2018.
[3] Source: Fortune Business Insights, "Blockchain Technology Market Size, Share & COVID-19 Impact Analysis, By Component (Platform/Solution and Blockchain as a Service), By Type (Public, Private, Hybris, and Consortium), By Application (Digital Identity, Payments, Smart Contracts, Supply Chain Management, Internet of Things (IoT), and Others), By Deployment (Proof of Concept, Pilot, and Production), By Industry (BFSI, Energy & Utilities, Government, Healthcare and Life Sciences, Manufacturing, Telecom, Media & Entertainment, Retail & Consumer Goods, Travel and Transportation, and Others), and Regional Forecast, 2023-2030".

Blockchain beyond the hype: what is the strategic business value?



Source: McKinsey & Co. Blockchain beyond the hype; what is the strategic business value?, 2018

The Blockchain market's projected growth



Source: Fortune Business Insights, VanEck

The blockchain is finding its way into several sectors of the economy. Meanwhile, some countries are embracing the technology either as legal tender or to gain economic advantage. In 2021, El Salvador famously became the first country to make Bitcoin legal tender. Perhaps more significantly, though, countries such as Portugal, Singapore and the United Arab Emirates have been establishing themselves as innovation hubs for the blockchain.

Businesses across sectors test blockchain's potential

Across many areas of the economy, businesses are applying blockchain as they seek ways to become more efficient and launch new products. Currently, the financial services sector has made most progress, but there is considerable potential in the public sector, as well as for improving stressed supply chains more generally.

The differences between public and private blockchains

Just as the names suggest, public blockchains are open to anyone while private blockchains are not. Public blockchains are true to the ethos of crypto currencies: as permissionless ledgers they are decentralized, with no central authority controlling the network. Bitcoin and Ethereum are both examples of public blockchains. By contrast, private blockchains are established and controlled by a central authority, like a company, that verifies network users and confers varying degrees of authorization. These private ledgers can have the advantage of higher speeds but might also be less secure in some cases.

Financial services: Introducing innovation and disruption

The blockchain's greatest application so far is within financial services. Its underlying distributed ledger technology and smart contracts lend themselves to innovation within a sector that has seen few fresh developments since the widespread introduction of hedge funds and ETFs in the 1980s and 1990s respectively.

What are smart contracts?

Just like normal paper contracts, smart contracts define a set of rules and conditions. The difference is that the rules and conditions are written into a code and stored on the blockchain, essentially allowing for automation, decentralization and disintermediation. The most popular blockchain for hosting smart contracts is Ethereum. In the interests of transparency, any user can review the code behind a smart contract.

Raising capital:

Within the capital markets, banks and large companies have already raised hundreds of millions of dollars in bond issues on the blockchain. The European Investment Bank was the first to do so in 2021, raising €100 million on the Ethereum blockchain. Since then, it has been followed by organizations such as the World Bank (23/08/18, $118 million raised), UBS (3/11/22, CHF375 million raised) and Siemens (14/02/23, $60 million raised). At the time of its 2022 bond issue, UBS stated in its press release that the disruptive technology would make issuing bonds faster, more efficient and simpler.

How is a fixed-income instrument issued on the blockchain? Part of the beauty of these digital bonds arises from the blockchain's smart contracts. The bond is effectively tokenized, or split into tokens, which are distributed to investors. Each token contains a smart contract that automates the bond's indenture features like the payment of coupons, maturity date and various embedded options. The processes involved with issuing bonds – such as bookbuilding and underwriting – can also be conducted on the blockchain.

Lifecycle of a tokenized bond

Pre-issuance — **Post-issuance** — **Redemption**

Origination	Distribution	Storage	Cashflow	Trading	Operations	Maturity	Termination
Bond design and smart contract development	No intermediaries needed, distribution via blockchain	Online or offline self-storage by owner or storage with third party (custodian)	Coupon payments	Secondary market trading	Emergency handling	Principal repayment	Token reclaim and smart contract destruction

Source: Cryptoresearch.report

Blockchain bonds automate trade settlement, which becomes immediate rather than taking several days. Intermediaries are no longer necessary: there's no need to register securities at a central securities depositary and secondary trading takes place directly between buyer and seller. What's more, the entire bond lifecycle including events like coupon payments and call/put option exercises can be completely automated, thus cutting costs. German fintech, Cashlink, estimates that expenses can be cut by 35 to 65%.

Equity is also beginning to be issued and traded on the blockchain. For instance, start-ups may use the blockchain to address a larger investor base more efficiently. Brille24, a leading online optician in Germany, did this with part of its equity through the platform Neufund. The same path was followed by Uniti, a Swedish EV startup, and many other young European companies.

Tokenization of (real) assets:

One of the most promising areas of financial services innovation is the tokenization of assets from real estate to alternative investments. For instance, private equity firm KKR tokenized its successful Health Care Strategic Growth Fund on the Avalanche blockchain in 2022, allowing greater retail access to the fund.

"Tokenization" involves minting (issuing) digital tokens, each one representing a fractional ownership of an underlying asset. These tokens are stored on the blockchain and can be either fungible (with identical value and features) or non-fungible (unique, non-interchangeable).

In practice, how does tokenization for a PE fund work? Traditional Limited Partner interests are written in the form of code which is stored on a blockchain. Besides mere asset ownership data, namely who owns what, also the conditions at which shares can be bought or sold are coded. A token is created: essentially a string of code that is the digital representation of a stake in the fund and contains all its main features. Also tokens which are the digital version of cash can be stored on the same blockchain, along with those representing fund shares. This allows the entire private equity fund to be recreated on a digital ledger.

Tokenization is expected to grow rapidly. By 2030, the combined value of tokenized illiquid assets could be around $16 trillion, roughly 10% of global GDP, according to Boston Consulting Group (BCG). But this is BCG's conservative scenario; its best case foresees assets of $68 trillion.[4]

Tokenization significantly increases the liquidity of investments in real assets while reducing minimum investment sizes. This is already leading to investments in assets like private equity and real estate. The potential is enormous. In the US, in 2022, the first house was sold through the blockchain. In this case the property was digitally represented as an NFT and got sold for around 210 Ethereum[5]. Furthermore, much higher efficiency and speed of transactions can be achieved. Expensive intermediaries like notaries can be cut, thus bringing down costs for ownership transfers.

Insurance: Automating policies

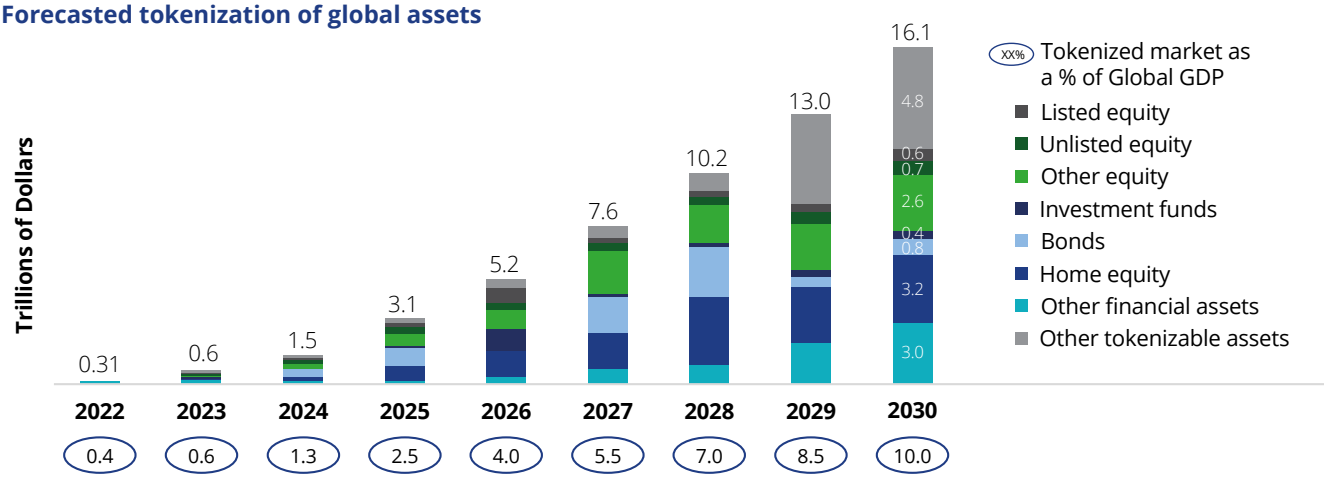
Just consider a farmer who buys insurance for protection against excessive rainfall. The policy's terms and conditions can be embedded in a smart contract that executes automatically. What happens if there's a flood? A weather report is conveyed to the smart contract and the insurance is triggered automatically. This happens through a network of nodes that conveys real-world data from off-chain sources (e.g. the weather forecaster AccuWeather) to on-chain smart contracts via oracles. The software acts as intermediary. A well-known network of decentralized oracles is Chainlink, whose goal is exactly to transmit real-world data to smart contracts executing on the blockchain.

Take Lemonade, the digital insurance company listed on the New York Stock Exchange. Lemonade started a non-profit initiative in 2022 for African farmers and livestock keepers to insure against weather risks. It leveraged the Avalanche blockchain.[6] Because of a severe lack of meteorological infrastructure, African farmers have few opportunities to insure themselves against the weather – and those that exist are expensive.

What are NFTs?

The clue is in the name: non-fungible token (NFT). Unlike cryptocurrencies that can be exchanged with each other, each NFT is unique and cannot be exchanged with another. Normally NFTs are associated with art, music and videos but their applications are expanding fast.

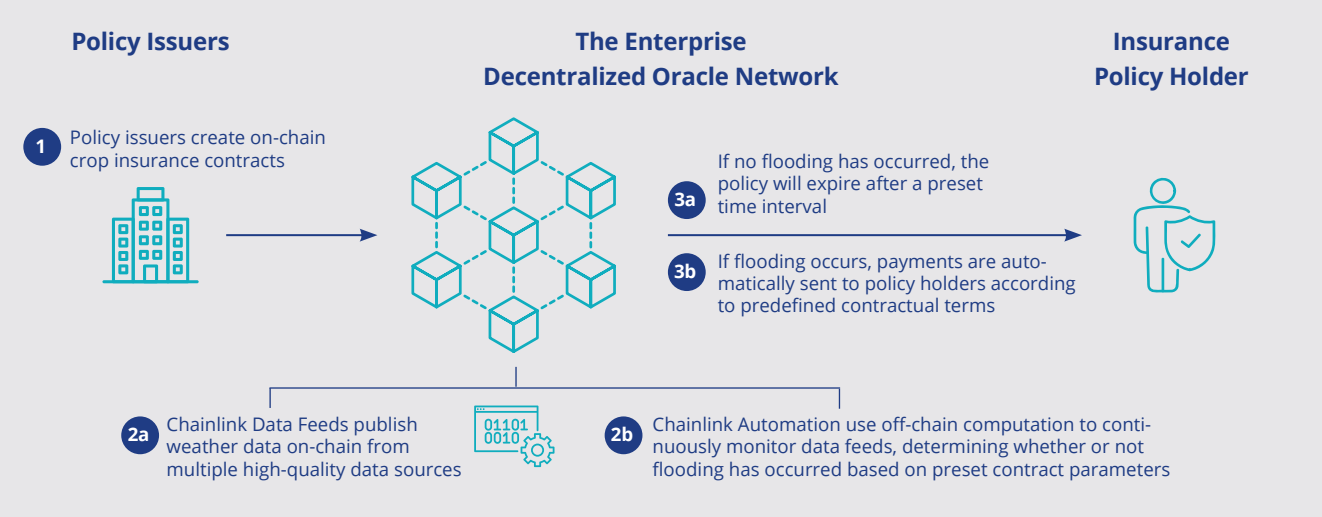
Forecasted tokenization of global assets



Source: World Economic Forum, Global Agenda Council – BCG Analysis

[4] Source: Boston Consulting Group, Relevance of on-chain asset tokenization in "crypto winter", September 2022.
[5] Source: Tampa Bay Times. [6] Source: Lemonade.

Automated insurance for farmers



Source: Chainlink

Lemonade's goal is to offer these people easy and quick access to insurance instruments. The project uses smart contracts to achieve this objective. These hard-coded contracts are stored on the Avalanche public blockchain and trigger automatic payments if the conditions are met. They receive real-time accurate weather data through the Chainlink network, thus bringing the claim analysis and execution costs down to zero.

Logistics and supply chain management: Fostering control and transparency

With unforeseen events revealing the fragility of supply chains, timely information about disruptions is invaluable. As globalization increased, supply chains became more complex and stretched over longer distances, involving a large number of intermediaries and related informational, inventory and financial flows. Managing supply chain data has become challenging, with limited visibility, uncertainty regarding product authenticity, mistakes about quantities and specifications, and slow reactions to unforeseen events.

Blockchain technology can help to meet these challenges, with all parties to supply chains inputting real-time information, so that the ledger provides a shared and truthful version of reality. If an unforeseen event takes place, like the disruption of a trade route, or any other problem, a smart contract can react immediately. For example, if a batch did not reach a distributor in a pre-determined number of days, an automatic order from another supplier would be triggered.

Source: PwC

Blockchains are solving supply chain issues in the healthcare, automotive, food and luxury goods sectors. In healthcare, numerous drugmakers, distributors and wholesalers have come together and partnered with a company called Chronicle. Among them are industry giants like Pfizer, McKesson and AstraZeneca. The result of their cooperation is MediLedger: the blockchain network of the pharmaceutical industry, that aims to address the entire sector supply chain. It has been a game changer for the sector and has been officially approved by the US Food & Drug Administration. Essentially, MediLedger allows drugs to be tracked throughout complex supply chains, thus guaranteeing their authenticity and traceability. It's a versatile blockchain, with applications that also include transferring patient records, streamlining the process of clinical trials and sharing medical data across multiple parties.

Within the automotive sector, supply chains have also become complex. The blockchain can monitor the provenance of car components and their route through the supply chain. For instance, Daimler is experimenting with creating greater transparency into its indirect suppliers.

When it comes to food, blockchain makes it possible to trace and authenticate where foodstuffs come from. Walmart has pioneered use of the blockchain across its vast network of suppliers and distributors, uploading real-time information that helps to guarantee the authenticity and safety of food. It started exploring this possibility in 2016 with IBM. The trigger for this decision was the six days it took Walmart's employees to trace a batch of mangoes back to the source. By 2018, they were already able to track effortlessly 25 products from where they had been produced up to the store shelves[7]. The system kept developing, making Walmart a pioneer in food traceability. By having the vast network of suppliers and distributors upload real-time information on the blockchain, every step of a product can be recorded. Were, for example, a food-borne disease to emerge, it would be much quicker to go back to the source and prevent it from spreading. Moreover, the ledger stores information like temperature at various steps of the journey and expiry date, thus reducing risks. Walmart has benefited from using blockchain by optimizing inventory management and making more data-driven decisions.

Similarly, authenticity is important for luxury goods like diamonds. In 2022, for instance, De Beers launched the first blockchain-based diamond sourcing platform, Tracr, which tracks diamonds from mine to retailer. How? By first creating a digital ID for each diamond encompassing information like provenance, characteristics and ownership history. Specifically, Tracr records the entire production process, registering each manufacturing step. Even pictures and videos can be included in the digital ID. All this is then stored on the blockchain and made visible only to authorized parties[8].

Public sector: Enabling potential transformation

The area of the economy where blockchain may have the biggest impact, according to McKinsey & Co's analysis, is the notoriously inefficient public sector. One field where the blockchain is already having an impact is personal data management, where digital ledger technology provides a secure, immutable and transparent audit trail for regulatory compliance, contract management, identity management and citizen services.[9]

For instance, Sweden's land registry, Lantmäteriet, verifies and stores all property transactions, recording all steps in the process. The country began exploring possible applications with regards to real estate in 2016. The real estate market is important in the Scandinavian

[7] Source: Walmart. [8] Source: De Beers. [9] Source: IBM.

country, with a current value of around $3.8 trillion[10]. Putting that into perspective, Sweden's GDP in 2022 was only $585.9 billion[11]. The real estate market's large size presents significant hurdles with respect to registering property transactions. However, Lantmäteriet has devised a way to record them on a private blockchain. The project has been developed with telecommunication giant Telia, the consultancy firm Kairos Future and other start-ups. The blockchain in this case verifies and stores all property transactions, recording in detail all steps in the process. There are other examples of governments using blockchain within taxation, public procurement, public health and even voting.

VanEck Crypto and Blockchain Innovators UCITS ETF:

Investing in the quiet evolution of the blockchain is far from simple as many of the underlying businesses are small. What's more, while the prospective rewards from investing in these companies might be large, so too are the risks. The **VanEck Crypto and Blockchain Innovators UCITS ETF** provides exposure to this ecosystem, spreading the risk across a basket of underlying businesses. The underlying index (MVIS Global Digital Asset Equity Index) selects companies that derive at least 50% of revenues (25% for current components) from activities related to digital assets, or that hold at least 50% of their assets (25% for current components) in digital assets. Currently, the companies are mainly related to cryptocurrencies, including: crypto miners, crypto exchanges and payment gateways. However, as blockchain becomes more widely adopted, new companies should emerge that could be included in the ETF. This is an early and dynamic (thanks to periodic index reviews) bet on a sector projected to grow over coming years. Some risks investors should keep in mind are those connected to emerging technologies and those associated with investing in small capitalization companies.

What follows is a quick introduction to the four main types of companies in the ETF:

Crypto miners create new blocks. The miners compete to add blocks and receive 'block rewards' in the form of newly minted Bitcoin. They also receive fees when transactions are completed on a block. There are moderately high barriers to entry as miners need substantial computing power. Mining machines consume tremendous amounts of power, so crypto miners are normally located where power is abundant and cheap. Texas is a popular location due to its permissive regulatory environment and abundance of cheap renewable energy like wind and solar. The main operator of Texas energy grid, the Electric Reliability Council of Texas (ERCOT), is made up of a network of independent energy providers and has historically struggled with fluctuating energy prices. They tend to oscillate widely throughout the day and the state, depending on the demand and supply curves. In order to stabilize the price, ERCOT has struck deals with miners, who consume vast amounts of energy. In particular, it has started offering credits to those miners who can stop or bring down their energy consumption at times of peak demand. For example, during a brutal heatwave in August 2023, the miner Riot Platforms was paid $31.7 million in credits to halt operations. Thus, miners can benefit from an additional source of income in this way. Even without the allure of energy credits, miners are flexible. They can use the energy when demand is low and, in a state like Texas, they can exploit renewables.

Crypto exchanges work like stock or commodity exchanges, matching buyers and sellers. It's important to distinguish between centralized and decentralized exchanges. The former supervises all the activity on the exchange: examples are Coinbase, Binance and Kraken. Real-time order books are matched electronically. By contrast, decentralized exchanges practice peer-to-peer trading. By opening a wallet at an

[10] Source: Statista Market Insights. [11] Source: MacroTrends.net

exchange an investor can buy cryptocurrency with his fiat currency or cross trade one cryptocurrency for another. Crypto exchanges also tend to provide additional services like custody, margin lending and various market making activities. Intuitively, their revenues are mostly based on fees for the activity that takes place through them. Whether it is withdrawal, deposit, trading or margin fees, this constitutes the bulk of their income.

Payment gateways offer payment processing and analytics platforms. For example, Square provides point-of-sale devices and cards, also allowing users to buy Bitcoin. It charges a margin for these transactions.

Companies holding cryptocurrencies as treasury funds are also included in the VanEck ETF. An example is Microstrategy. The US firm specializes in offering enterprises solutions to manage data as well as other analytics services. As of 27 December 2023, its Bitcoin holdings were worth more than $8 billion thanks to continuous purchases and an appreciation of the cryptocurrency[12]. With a Bitcoin total market cap exceeding $800billion,[13] Microstrategy holds close to 1% of the Bitcoin in the world. Tesla is another company holding Bitcoin on its balance sheet.

Conclusion: From hype to reality

It's often the case that new technologies initially stir up unwarranted hype that gives way to disappointment before they eventually prove their worth. Indeed, this pattern is so well recognized that it has been given a name: the Gartner Hype Cycle.

Arguably, the blockchain has been through just such as painful evolution. Certainly, the hype associated with crypto currencies and blockchain was enormous for a while. Ironically, now that the buzz has been silenced the technology is quietly showing its advantages across a range of sectors.

For interested investors it is a time to take stock. Review the evidence and judge for yourself whether blockchain's potential for enabling innovation and efficiency mean it's likely to be widely adopted across the economy.

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[12] Source: Bloomberg. Data as of 27/12/23. [13] As of 8/01/24.

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