



Julius Bär

CRYPTO MATTERS

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Editorial

Dear reader,

While buying a cup of coffee or a loaf of bread with crypto coins is likely to remain a challenge in the years to come, digital assets as a whole will continue to gain importance with every day that passes. This is because digital assets and their underlying technology are firmly located at the heart of the next technological revolution that is reshaping the world across societies and economies, i.e. Web 3.0.

We acknowledge that digital assets are still in their infancy, having been on the scene for little more than a decade. As they come of age, however, they have the power to disrupt the world and serve as an economic accelerator. The key to their success is their decentralised set-up, which allows for disintermediation and the digitalisation of trust. This, in turn, will hand back the power and control of personal data to its owner. As a result, new and highly efficient business models will emerge. These will be open to everyone with access to the internet and will therefore act as a societal equaliser too.

In this brochure, we will look at digital assets from a holistic point of view, explain why Web 3.0 is groundbreaking, investigate the use of crypto assets from an investor's point of view, introduce some basic concepts, and highlight some interesting talking points on the subject.

We have deliberately kept the language in this brochure as simple as possible. It is our belief that understanding the importance of digital assets for our future should not be hidden behind technical jargon. We hope you enjoy reading this brochure as much as we enjoyed writing it.

Yours faithfully,



Yves Bonzon

Group Chief Investment Officer
Member of the Executive Board



Nicolas de Skowronski

Head of Wealth Management Solutions
Member of the Executive Board

Contents

An introduction to digital assets	4
Web 3.0	7
Interview with Nicolas de Skowronski, Head of Wealth Management Solutions and Member of the Julius Baer Executive Board	
Investment considerations	11
Interview with Yves Bonzon, Group Chief Investment Officer and Member of the Julius Baer Executive Board	
Digital assets: A close-up	15
- Crypto coins – how they work - Stablecoins – the link in-between - Central bank digital currencies - NFT – everybody knows it is mine - Decentralised finance	
Talking points	24
Key terms on digital assets	29
Important legal information	33



An introduction to digital assets

How it all started

Terms like ‘crypto currencies’, ‘non-fungible tokens’, and ‘decentralised finance’ are on everyone’s lips these days. However, these inventions are just part of a technical revolution – the emergence of Web 3.0.

A financial world turning point

What we are currently witnessing is truly a watershed moment for the world of finance, and it may well turn out to be one of the major drivers for global economic growth over the coming years.

Just as we have switched from physical mail to emails, the way we handle money-based transactions is now undergoing a similar transformation. While we have been forgoing cash and paying with debit and credit cards or apps for quite some time already, the evolutionary next step is the increased use of digital money, completely detached from the fiat currencies of the ‘real’ world.

The creators of digital assets have laid the groundwork for technically simplifying and ‘democratising’ the way we conduct financial transactions – be it for a single money transfer or the purchase of a few pixels of a digital artwork, to name just two of the use cases. ‘Digital assets’ is often used as an umbrella term for a number of developments in the field of digital transactions, such as crypto coins or tokens, which all trace back to the blockchain technology.

The blockchain as a trailblazer

We firmly believe that there is more to blockchain technology than its use merely for digital transactions. We understand the technology as an enabler of the next technical revolution, affecting not only the financial world but also economies and societies as a whole.

The decentralisation of the internet (with its vast

The introduction of Bitcoin in 2009 marked a paradigm shift in the financial world and came at a time when trust in the financial system was at rock bottom.

advantages for users, who will regain power over their data), the subsequent digitalisation of trust, and the huge efficiency gains inherent in the concept of disintermediation are the main drivers of another growth push in the years to come.

The origins of digital assets

The key to understanding digital assets lies in understanding the fundamental idea behind blockchain databases. It is therefore important to look at the origins of Bitcoin, the ‘original digital asset’, as everything else that followed links back to it. But first, let us go back even further and look at two earlier developments that contributed to Bitcoin’s success.

Before the world’s first crypto coin was launched, there were a number of attempts to create digital cash, such as DigiCash, B-money, and Bit Gold. Although they were not all very successful, they certainly paved the way for Bitcoin, since they introduced the idea that money does not need to be

physical or even linked to a country or a currency union, like the eurozone.

Then there were the previous technological advances that fostered the blockchain idea. These innovations include systems (or protocols) that use cryptographic techniques to secure data and prevent it from being tampered with, as well as the so-called proof-of-work system, in which one party proves to other parties that a specific portion of a defined computational task has been performed. The latter, in particular, is often considered to be an important step in the history of crypto coins and digital assets as a whole.

The story of Bitcoin began in 2008, the year the world faced a financial crisis of unprecedented proportions. It was the year of the fall of the American bank Lehman Brothers, the mortgage crisis, and a spike in unemployment rates. Confidence in the global economy and in the banking sector, in particular, sank to an all-time low, and there were widespread demonstrations against banks and governmental agencies.

Meanwhile, under the pseudonym of Satoshi Nakamoto, the Bitcoin blockchain White Paper was published in October 2008, introducing a system that could make the entire existing financial system obsolete, according to its author. In the White Paper, Nakamoto proposed a decentralised approach to transactions, effectively cancelling the need for a trusted third party (like a bank) and culminating in the creation of blockchains. This helped the blockchain concept, which had already existed for years at that point, to achieve a breakthrough.

In slightly more technical terms: in a blockchain, timestamps for a transaction are added to the end of previous timestamps, (typically) based on proof-of-work, creating a historical record that cannot be changed. In January 2009, shortly after the publication of Nakamoto's White Paper, the software was released, the very first Bitcoin was minted, and the Bitcoin network was born.

“Who is Satoshi Nakamoto?” you might ask. Nobody knows. It could be a single person, a group of programmers, or even a secret government team. Despite living in a social media age, Bitcoin's creator has managed to remain unidentified, adding to the mystery of Bitcoin's birth.

What is next?

While the adoption of Bitcoin by the technology community happened rather quickly, so far it has not yet gained too many followers outside of it. Nevertheless, the launch of the first blockchain-related crypto asset has triggered many other inventions and has broadened the potential fields of application considerably.

Although it is impossible to tell how big digital assets will eventually become, we do see the asset class growing over time as the market becomes more appreciative of the potentially disruptive power of blockchain technology, particularly in the area of decentralised finance (DeFi). However, we do not expect crypto coins to grow so much that they become currencies which are regularly used by private individuals.

Finally, no matter what you may think about digital assets, they will continue to influence our lives – probably more than we can imagine today.



Web 3.0

The rise of distributed ledgers

In this interview, Nicolas de Skowronski, Head of Wealth Management Solutions and an early adopter of digital assets, shares his views on the impact of blockchain technology on societies, economies, and our livelihoods.

It is hard to believe that Sir Tim Berners-Lee created the World Wide Web only 33 years ago, ushering in what we now refer to as Web 1.0. What is your take on developments since then?

Nicolas: The creation of Web 1.0 through the early portals, provided by the likes of AOL and others, resulted in businesses, individuals, and governments occasionally posting and consuming content on the World Wide Web. Most of its users were readers, and only a few actually posted content. With the internet gaining in acceptance and attracting more users, further leaps in technology enabled the development of Web 2.0, the web as a platform. It then became a huge disruptor for many industries (e.g. media, advertising, and retail), as a massive number of users suddenly participated in content creation, and search engines became an integral part of our lives.

But the business model of Web 2.0 has actually become unattractive to many users, since the centralisation and exploitation of data, and its use without the owner's meaningful consent, has become a main point of criticism.

[And Web 3.0 will change that?](#)

Nicolas: Exactly. The rise of distributed ledgers and storage on blockchain allows for safe and transparent data decentralisation, disrupting the power of today's technology behemoths with regard to centralisation, surveillance, and exploitative, targeted advertising. As a matter of fact, individuals will become the rightful owners of their data again. And I think that is the main argument for Web 3.0 – it enables individual users to be the 'sovereigns' by

"A collaborative medium,
a place where we could all
meet and read and write."

Sir Tim Berners-Lee on his invention – the internet

giving them the power to determine which data they wish to share and with whom.

[How long do you think it will take for Web 3.0 to be implemented in a meaningful way?](#)

Nicolas: That is the million-dollar, or should I say Bitcoin, question. Using the analogy of the time around the bursting of the dot.com bubble in 2000, we could be back in 1995 today, when Web 3.0's predecessor was still in its infancy, or already in 2003 when many of the previously hyped inventions were slowly implemented. However, the concepts inherent in Web 3.0 (i.e. the decentralisation of data, the digitalisation of trust, and disintermediation) are simply too strong and value-generative not to be implemented going forward.

[You have already explained the advantages of 'decentralised data'. Can you please explain what the 'digitalisation of trust' means to you?](#)

Nicolas: During the course of the pandemic, we have been forced to adopt a more digital approach to our lives. However, while digitalisation is one side of the

coin, it is the trust in the regulators of that digitalisation that drives adoption rates among the broader public.

There are different adoption drivers when it comes to digital trust: it is a combination of users' attitudes, behaviour, the environment, and very personal experiences too. It is thus no surprise that levels of digital trust vary significantly across the world. The main issue with the digitalisation of trust is that, not only do we have to trust the system that we are using, but we also typically have to trust a centralised organisation (be that a company or a government) to take good care of our data. This is where the blockchain technology, with its decentralised set-up, has the edge.

Sometimes described as 'trustless trust', the concept of a distributed ledger system, like a blockchain, means that one does not have to trust a third party (like a bank, a government, or any kind of intermediary) but only the counterparty with whom one wants to share data. So while blockchains address the basic part of the digital trust challenge, it is the end-to-

end trustworthiness that still matters most to users.

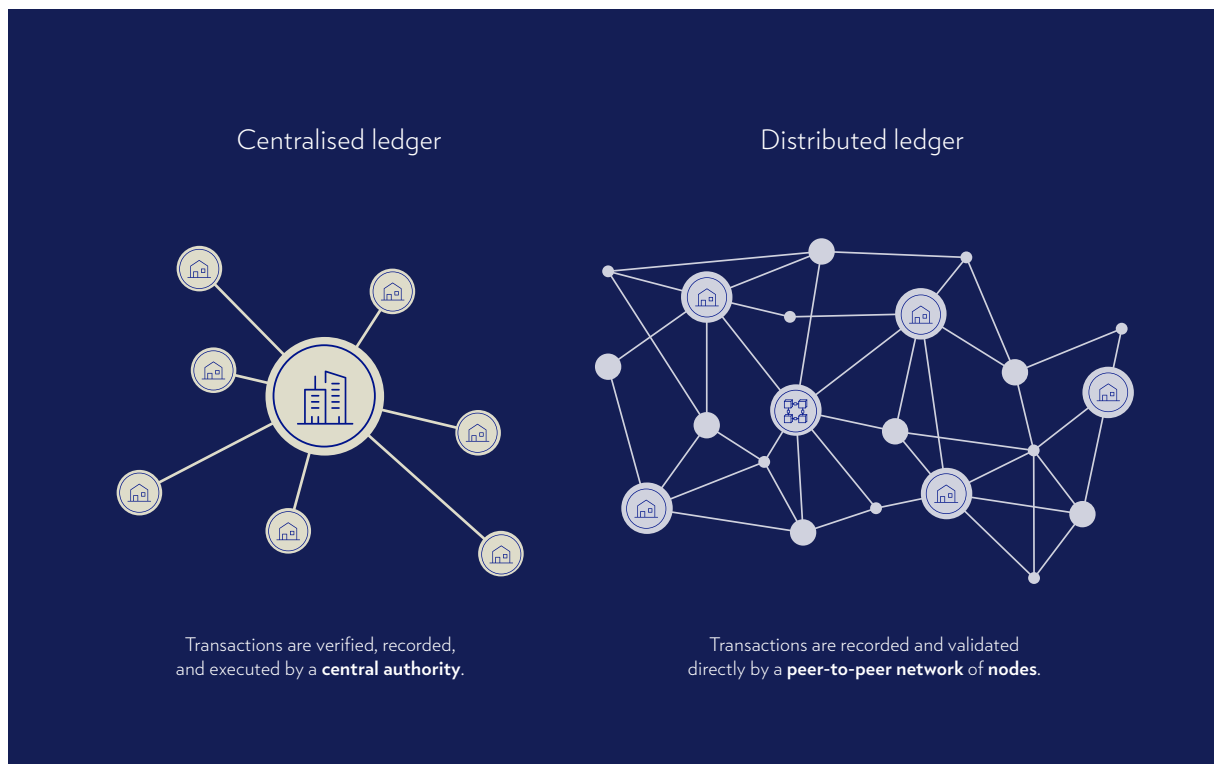
The concept of trust is quite complex, and blockchain technology is only one part of the solution. Other parts include a modular and interoperable platform architecture that is built on top of a blockchain, in which some functions serve as enabling platforms for others. This enhances the security of the system and makes it highly resistant to any forms of tampering, thus increasing its trustworthiness.

While the digitalisation of trust is still in its early days, the adoption process will more than likely be unstoppable as digitalisation moves forward.

And what about disintermediation?

Nicolas: In the wake of the financial crisis, the role of intermediaries and whether they are needed at all came to the fore. A certain level of distrust emerged, since investors not only felt that the wool had been pulled over their eyes when it came to products that were simply too good to be true, but also serious

The concept of disintermediation in a nutshell



Source: Julius Baer Investment & Wealth Management Solutions

data abuses were unveiled as well. This has led to a strong trend towards the emergence of disintermediation over the last decade, and the process has likely not stopped yet.

Indeed, it is a fair assumption that, with today's technical infrastructure, there is no longer the need for an intermediary when one wants, for example, to exchange euros into Icelandic kronas. Paying an agent to facilitate a service that, in fact, is not needed, is highly inefficient. However, thanks to the emergence of distributed-ledger technologies and the ability to include 'programming' within crypto assets, it is now possible to move multiple transactions, even those in need of a cascade of orders, to the internet.

Furthermore, the distributed-ledger technology also has tremendous potential to improve existing global business processes. Cutting out the intermediaries means possibly exponential cost savings for both an enterprise and the end consumer. Currently, the activities required by an organisation to deliver goods and services to the consumer (the supply chain) represent a long list of intermediaries that

"I am convinced that Web 3.0 will have a vast impact on societies across the world and serve as one of the main economic growth drivers over the coming decade."

Nicolas de Skowronski,
Head of Wealth Management Solutions

often creates more complexity than simplicity. The distributed-ledger technology revolutionises efficiency.

Nevertheless, it is clear that there are still plenty of services where intermediaries play an important role – just think of wealth management solutions, corporate finance, and mortgage lending within the banking industry.



Nicolas de Skowronski, Head of Wealth Management Solutions, Member of the Executive Board, and an early adopter of digital assets



Investment considerations

Thoughts from our CIO

In this interview, our Group Chief Investment Officer, Yves Bonzon, answers key questions and shares his insights on crypto assets, also in a portfolio context.

How has your thinking on cryptocurrencies evolved?

Yves: The ‘cryptocurrencies’ narrative has really done a disservice to the emerging digital asset class. For the record, I prefer to call them crypto assets, or crypto coins, as they have little to do with the fiat currencies of our world. The focus on the coins’ volatility and operational issues, including energy costs, will prove to be a distraction in the grand scheme of things. What has become ever clearer in recent years is that the blockchain revolution will have much deeper consequences, and will most likely not only disrupt financial services but also propagate across all sectors of the economy, as businesses rely more and more heavily on technology. We are entering the new era of Web 3.0, where the decentralisation of technology and the internet will rule.

Do you see crypto assets playing a role in an institutional or investor’s portfolio?

Yves: As an emerging asset class, it is not straightforward to predict how digital coins and other digital assets will affect one’s portfolio – the return and volatility history is most likely too short to shape a well-informed guess. That said, we have considered the impact of a nominal allocation to crypto, such as a basket of leading coins, to a model portfolio, and it turns out that it actually improves the risk-adjusted performance in our simulations.

Practically speaking, the real question is: why add digital asset exposure to a portfolio? When it comes to Bitcoin, one may conceive it as digital gold. If adopted, Bitcoin could become the staple ‘real’ asset of a generation. More importantly, investing in digital assets could be compared to buying an option,

with the disruptive force of the blockchain technology acting as the underlying asset.

What considerations ought to come into play when deciding whether or not to invest?

Yves: First and foremost, if an investor considers trying their hand at digital coins or wishes to get exposure to the blockchain space, then they should be able to live with the volatility, which is not likely to subside very soon. The path to Web 3.0 will not be smooth, and we will likely see many incumbents in the space disappear before the true leadership emerges – just think of the dot.com bubble.

One important aspect is regulation. China introduced an outright ban on the use of cryptos in its efforts to maintain a monopoly over money issuance. Western governments are also unlikely to let a decentralised financial system run unchecked, and the degree of regulation will play a big role in the speed and extent of adoption.

“Crypto assets cannot be ignored, as they may severely disrupt the businesses underlying the traditional assets held in our portfolios – whether credit or equities.”

Yves Bonzon, Group Chief Investment Officer

Another major concern today is security. While the data saved in a blockchain is unchangeable, which provides some degree of security, if one loses the private key to one's crypto wallet, that value is definitely lost forever.

So things might get bumpy down the road, and investors who wish to seek exposure to the asset class must be prepared for the ride. This is also why it is probably smart to start small and slowly build up positions.

High volatility makes it hard to judge when to buy/sell crypto coins. What factors should one consider when it comes to the timing of investments?

Yves: Timing the market is a tricky endeavour even with traditional asset classes, so in the case of digital assets, and crypto coins in particular, it is likely a futile exercise. A buy-and-hold strategy is probably a much more reasonable approach in this case.

More risk-averse investors might want to wait it out altogether. The more risk-inclined could attempt to buy the dips, remembering that execution is often more difficult than expected.

What is the best way for interested parties to participate at this stage?

Yves: There are two main ways worth mentioning at this stage. The first is through digital coins, which above and beyond their 'decentralised money' narrative, will remain key in underpinning the functioning of the decentralised technology ecosystem. A diversified way to get exposure to those is through an exchange-traded product (ETP) replicating the return of a basket of digital coins. One should be careful, however, when it comes to the replication method of the instrument. The second way of seeking exposure to the asset class is through investments in public companies that are participating in the build-up of the blockchain ecosystem. Investments in private ventures are mostly at an early stage at the moment and should be approached very selectively.

"Cryptocurrencies? For the record, I prefer to call them crypto assets, or crypto coins, as they have little to do with the fiat currencies of our world."

Yves Bonzon, Group Chief Investment Officer

And finally, if we asked you to look into our crypto ball, what trends do you foresee emerging in the crypto world?

Yves: A standout consequence of blockchain taking over will be the digitalisation of trust. Just think of the possible efficiency gains from digital 'smart contracts', which would revolutionise the conduct of business. It should have a tremendous impact on financial markets, with decentralised finance (DeFi) protocols permitting financial transactions, lending, and trading without the intervention of a centralised player. The private investment space could be substantially transformed, as private investments become more liquid and the line between private and public markets becomes blurred. Ownership and the transfer of other illiquid assets, such as real estate or art, could be simplified and made more secure and verifiable through the use of non-fungible tokens. Importantly, the digitalisation of trust does not mean that the human element of trust will be diminished – if anything, human connections will be that much more meaningful in an increasingly digital world.

But one of the most fascinating aspects of Web 3.0 is that it might displace the winners of the last decade, i.e. the social media and web platforms we have come to know as the technology giants and whose services have become indispensable in our daily lives. Internet users will no longer have to rely on big

players to share their content and build their businesses. Instead, they will be able to manage, contribute to, and curate decentralised platforms themselves, and the whole process will be incentivised by some mechanism for earning digital tokens. Moreover, blockchain could help to solve the data-privacy issues affecting social media platforms by giving ownership back to the individuals whose data it is.

It is hard to imagine today what the world just adumbrated might be like, but it is worth bearing in mind that the same kinds of questions came up back when previous iterations of the internet were emerging.



Yves Bonzon, Group Chief Investment Officer, Member of the Executive Board



Digital assets:
A close-up

Crypto coins – how they work

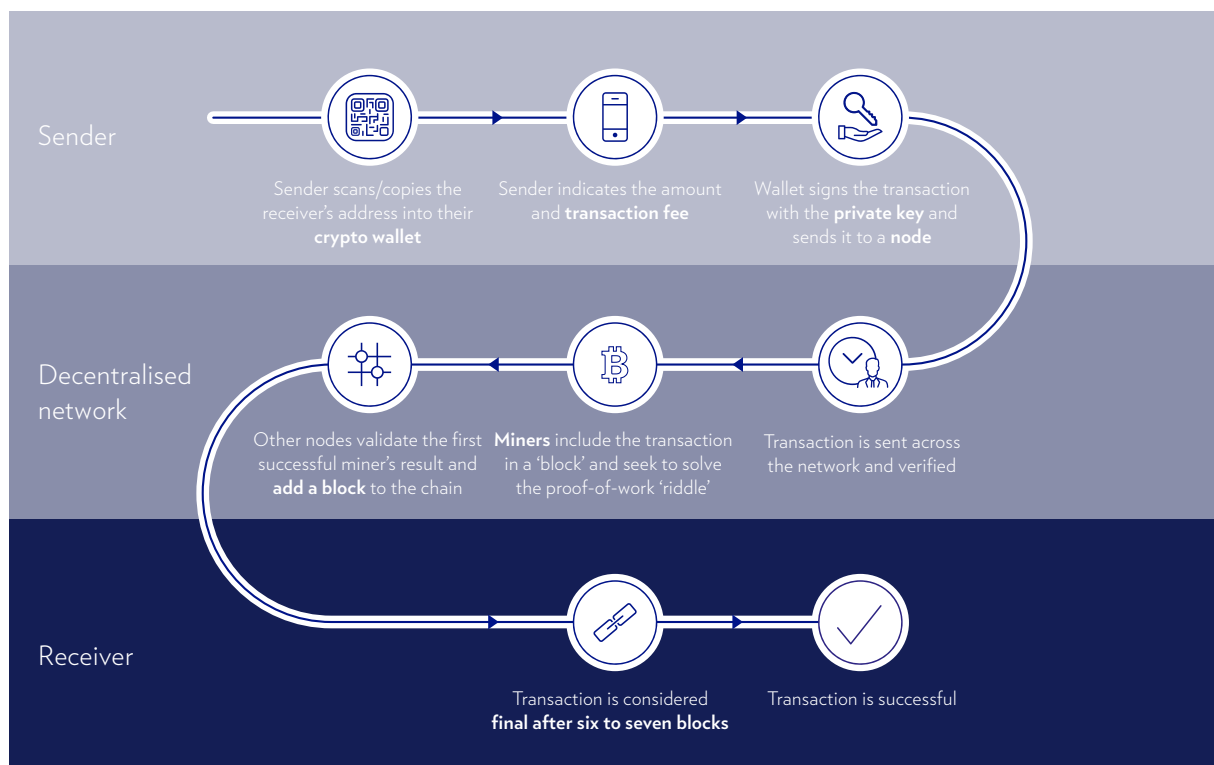
Blockchains provide a massive improvement on existing settlement paradigms. Transferring digital assets like crypto coins is simple, in principle.

A revolution in the transfer of ownership

The fact that digital assets can be accessed by everyone who has internet access is embedded within the vision of the technology. One of the positive consequences is that blockchains provide a massive improvement on existing settlement paradigms. For example, it is perfectly imaginable that financial intermediaries may no longer be needed for services like international remittances or wire transfers – a huge business all over the world. Just think about

when you want to send money to a relative living in another part of the world. Rather than asking your local bank to trigger a payment from your account, which is expensive, takes a few days, and can only be done during working hours, you can transfer your assets with a few clicks and the settlement takes place almost instantly. This is simply because there is no longer a need for the different parties involved to align their databases – a safe and decentralised network takes care of it all, 24 hours a day, seven days a week, and at hardly any cost.

Crypto transactions explained



Source: Julius Baer Investment & Wealth Management Solutions

But how does it actually work? In order to explain how it works, let us take as an example a Bitcoin trade (and note that, in principle, the mechanism is the same regardless of which crypto coin one uses).

A Bitcoin transaction – before you start

First things first: in order to transact Bitcoins directly, both you and the person to whom you wish to transfer the coin, need to have a Bitcoin wallet address. This is a randomly generated unique set of numbers and letters. By sharing your public address with others, they can send digital money to it. Also good to know: your holdings and transactions can be viewed by anyone who knows your public address.

Then you need your public key, which is comparable to an account number. This can be freely shared with everyone, and anyone can potentially send transactions to it. Your Bitcoin wallet address is a hashed version of your public key. To spend Bitcoin, though, you need a private key, which is essentially a password or verification code that, together with the corresponding public key, allows you to access your funds on the blockchain. The basic concept is that the public key allows you to receive transactions, and the private key is necessary to send transactions.

A wallet is like an encrypted virtual keychain that contains all the information needed to access your funds on the Bitcoin blockchain. It contains both your address and your digital keys.

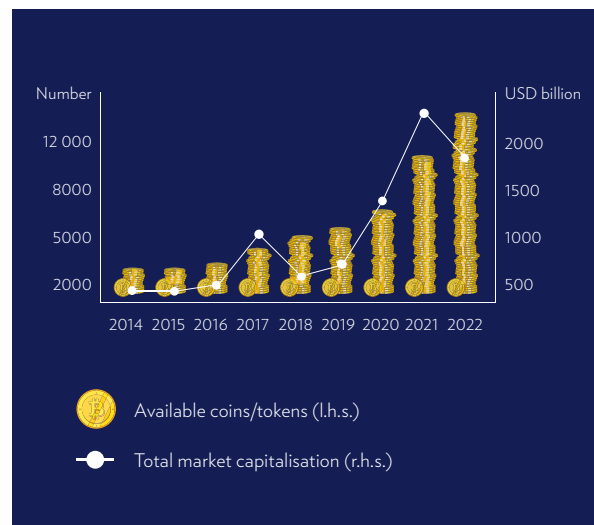
Crypto coins in vogue

The fundamental law relating risks to returns also applies to cryptos. As an extension of this law, less established and smaller crypto coins tend to come with a higher risk than established and larger ones. Depending on who you ask, there are between 8,000 and 14,000 crypto coins available (January 2022), which attests to their growing popularity since the launch of Bitcoin in 2009 as well as to the relative ease with which crypto coins can be created. It should be noted, however, that it is believed that the top 20 crypto coins make up about 90% of the total market.

Still, it is far from a given that today's leading coins in terms of market share are also the ones that will

still be in use tomorrow. Of the largest 200 coins from early 2016, more than 160 are no longer in the top 1,000 today, according to CoinMarketCap, the world's most-referenced price-tracking website for crypto assets. Instead, there is fierce competition in the information technology community, nurturing innovation and rapid developments in infrastructure and architecture. Developers are working hard on providing coins that offer mass scalability, decentralisation, and security at the same time – three parameters that are widely understood to be critical for the success of a crypto coin. It is therefore likely that in one year's time, the top ten crypto coins in terms of market share will be different from those of today.

Rapid rise of a new asset class



Data as at 24 January 2022, 18:10 CET

Source: CoinMarketCap, Julius Baer Next Generation Research

Stablecoins – the link in-between

The value of crypto coins tends to fluctuate heavily – while stablecoins are crypto coins too, their value is often tied to an outside asset, limiting their volatility.

Stablecoins – a potential solution for the pragmatic

There are advantages to holding crypto coins, but there is also one big disadvantage, namely large price fluctuations. The coins' inherent volatility is due to a number of factors, one of the most striking of which is that they are not backed by the full faith and credit of a central entity such as an issuing government.

The resulting challenge is hard to overcome given the fact that one of the reasons for issuing crypto assets in the first place is to circumvent a central authority that would be in a position to 'control' it, for example by increasing or decreasing its value.

That said, stablecoins may provide a solution of sorts for those who worry about the asset class' inherent volatility. Stablecoins attempt to provide value by bridging the gap between the digital and the traditional – or analogue – world of finance. Specifically, stablecoins are pegged to a fiat currency like the US dollar, or to gold, or – and this would be the more traditional approach by the digital community – a basket of crypto coins. In this way, they aim to remain rather unaffected by the occasionally high volatility in the market while still providing all the advantages of a decentralised crypto coin.

By their very nature, stablecoins can diverge somewhat from the original idea of a crypto coin, but they indeed come closer to meeting the challenge of providing a 'digital store of value'. This makes them attractive for various use cases.

What could be the use cases for stablecoins?

- As a facilitator of decentralised finance (DeFi) transactions, e.g. as collateral in crypto derivatives, and as an enabler of yield generation on crypto holdings, e.g. in borrowing and lending.
- As a means for switching from one crypto coin to another without having to do so via fiat currencies, which would incur very high fees.
- To have a crypto form of cash if at times one does not want to be invested in the free-floating coins, and also for quick money transfers.
- To have access to a more stable form of 'money' in countries plagued by high inflation, weak currencies, and weak institutions, and where access to the US dollar is heavily constrained.

Collateralisation of stablecoins

While the collateralisation of a stablecoin against fiat currencies like the US dollar, metals like gold, or commodities like oil is rather straightforward (i.e. one-to-one), the collateralisation against other cryptos demands an over-collateralisation of up to two times in order to maintain the value of the stablecoin.

Another way of stabilising the value of stablecoins is to manage them the way a central bank manages a currency, i.e. by increasing or decreasing the supply of tokens as needed, using 'smart contracts'. Such coins are called non-collateralised (algorithmic) stablecoins.

Central bank digital currencies

With the growing emergence of stablecoins, and the challenge they pose to today's fiat currencies, central banks are working to create their own solution.

What are central bank digital currencies?

The simplest way to think about central bank digital currencies (CBDCs) is as digital cash. Just as we saw the evolution from solid coins used in ancient Greece to paper money nowadays, CBDCs represent a technologically more advanced means of exchange. The idea is that they will be fully backed by a central bank, and, as such, are considered a direct liability denominated in the local currency.

In principle, CBDCs can become part of a country's fiat currency system. The key difference with existing physical currencies is simply that CBDCs only exist virtually, but in coexistence with paper money they represent an additional form of payment method.

Why now?

Many believe that the urgency to explore the technology derives from the need for governments to respond to the emergence of stablecoins, as the widespread adoption of the latter threaten to replace current fiat currencies, thus challenging governments' control over their monetary systems.

However, in essence, CBDCs represent a natural progression of monetary systems. A well-known trend over the last decade is the sharp decline in the use of cash for consumer transactions in all advanced economies. The pandemic has accelerated this trend, not least because of the health concerns linked to coins and notes and the doubling of digitalisation efforts.

In the US alone, the use of cash by consumers has decreased from around 55% in 2010 to just 30% in

2021. The evolution is even more pronounced in other countries, such as Sweden, where consumers using cash now represent a mere 10% of the population, compared with 60% at the beginning of the last decade.

In contrast to crypto coins, CBDCs could provide a stable store of value, given that they are in fact a fiat currency. After all, using distributed ledger technology allows for a more efficient payment system than cash, resulting in a more efficient and reliable way to conduct transactions.

It is only a matter of time

Central banks around the world have already looked into the possibility of adopting the new technology. According to a 2021 survey by the Bank for International Settlements, 86% of all central banks are actively researching the potential for CBDCs and many have launched pilot projects. China, for example, is already in the latter stages of its testing process. Overall, CBDCs hold a solid claim on the future of fiat currencies, which could sooner or later drive cash to extinction.

Much at stake for CBDCs

While CBDCs offer plenty of advantages to both providers and users, they are not without their risks too.

To build a CBDC ecosystem and make it sustainable, central banks must address all kinds of potential factors that might limit the use of the currency, such as cyber threats, financial exclusion (especially in technologically less developed countries), and

threats to financial stability through the suboptimal architecture of such currencies.

Furthermore, there is another trade-off for private individuals, which might hinder the quick adoption of CBDCs. While their introduction overall increases the security and safety of transactions (they are validated and captured in a distributed ledger), there is a threat to privacy, for consumer and business transactions are no longer anonymous. It is important for a country's authorities to strike a balance between regulation and ensuring the confidentiality of its citizens' personal and financial information.

What if an authoritarian government were to interfere with the privacy of some of its citizens' funds by declaring their CBDC accounts void, for example. While today, it is of course possible too to freeze individual bank accounts on governmental order, the implementation of such drastic measures could become significantly easier with the widespread use of CBDCs. Building trust and integrity is essential for the successful adoption of any CBDC.



NFT – everybody knows it is mine

Non-fungible tokens (NFTs) could rapidly accelerate the adoption of Web 3.0. Providing the solution to digital ownership uncertainties could lead to the exponential growth of the NFT market.

Raison d'être

Anyone can buy a print of Edvard Munch's 'The Scream', one of the most famous paintings in the world, but the original hangs in the Munch Museum in Oslo, Norway. The proof of ownership and authenticity is straightforward in this case. Alas, the same cannot be said in the case of digital artworks, including music, videos, and digital pictures.

Until recently, an artist had no way of ensuring that the 'original' digital piece retained its value. After all, bytes, files, and pixels can be copied and pasted almost instantly and with only a few clicks. Proving ownership or authenticity can therefore be a tricky and time-consuming endeavour. This is where the concept of an NFT provides a solution, as it uses blockchain technology to certify the ownership and authenticity of a specific token. With NFTs, moreover, artists can code royalty schemes into 'smart contracts' to profit directly from a wider use.

The main difference between an NFT and a traditional crypto asset like a coin is simply – and as the name suggests – that an NFT is non-fungible, i.e. unique and thus irreplaceable even by an identical copy.

Still a niche

The market for NFTs is still tiny. According to data platform NonFungible, trading grew 600% between the second and third quarter of 2021, but a turnover of roughly USD 6 billion in Q3 2021 is still small considering that Apple, for example, had a turnover

(net sales) of USD 365.82 billion over the whole of 2021. There are only an estimated one million people or fewer engaging in NFT trading today and the explanation for the low figure is, most likely, that purchasing NFTs is still cumbersome and subject to risks.

Shortcomings

First of all, potential market participants have to own crypto coins (most NFTs are built on the Ethereum blockchain with its trading means 'Ether') and have a crypto wallet to receive and send NFTs too.

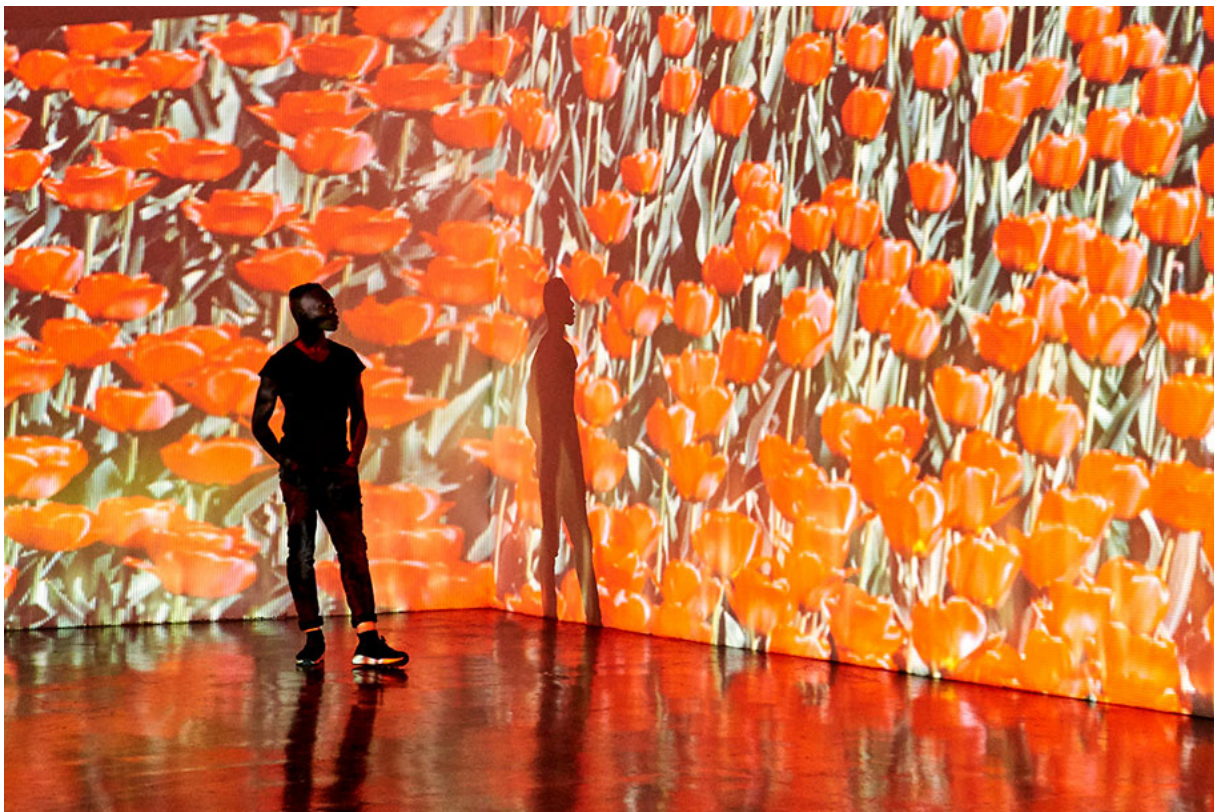
Further, aside from price fluctuations in the NFT itself, there are various other parameters that need to be considered when trading NFTs, including the notoriously high volatility of the payment means and the so-called 'gas fee' that is owed by the purchaser and paid for the authentication process. The occasionally high gas fees, which are updated about once every 30 seconds when trading, are also one of the main points of criticism of the Ethereum network, and are in fact spurring the development of other networks, such as Solana, where gas fees are lower.

Great potential

Despite NFTs' shortcomings in terms of pricing, access, and market size, the concept of digital ownership enabled by blockchain technology might well turn out to be a major step forward for many industries and governments too. The technology may enable a whole range of new applications and pave the way for the decentralised Web 3.0.

Already today, there is more to NFTs than merely the proof-of-ownership of a digital token. Some allow owners exclusive access to specific communities or physical merchandise that is unavailable to the general public. Others are used in video games, where players can monetise their time spent gaming by selling well-bred and well-fed characters to other players, for example.

Going forward, it is perfectly conceivable that the public proof-of-ownership of, say, a piece of property could be written in a blockchain too. Imagine the kinds of efficiency gains that would entail.



Decentralised finance

The blockchain technology forms the basis of a ‘brave new financial world’, but it is the fact that digital money can be programmed that will change it for good.

A world without intermediaries

The term ‘decentralised finance’ – or ‘DeFi’, as it has come to be known – refers to a decentralised ecosystem that offers financial services of various kinds. The applications are based on blockchains and are therefore not controlled or managed by a central authority, such as a bank.

DeFi thus envisions a financial world without financiers and works with so-called ‘smart contracts’. These are programmes stored in the blockchain of a transaction that get executed automatically if certain conditions are met. The aim is to democratise finance by replacing centralised institutions such as banks with direct, peer-to-peer relationships.

A simple way to understand the vast opportunities of DeFi is to think of it as offering the possibility of programming money as if it were a piece of software. In doing so, one can create transactions with conditions such as those used in margin trading, the insurance business, borrowing and lending, escrow accounts, trusts, and so on. In short, anything that touches on the area of finance and digitalisation has a potential DeFi use case.

In essence, DeFi wants to be to the entire financial ecosystem what crypto coins aim to be to fiat currencies.

DeFi – an enabler of new businesses

The fact that DeFi platforms constitute an alternative system rather than a plug-in solution to existing banking or finance systems means that, over time, they will become fully detached from their original developers and come to be governed by their own community of users.

As a consequence, there is room for new business models, and financial services may become more decentralised, innovative, interoperable, borderless, and transparent.

Smart contracts

The key determinant for the success of DeFi is the development of ‘smart contracts’. These help developers build far more sophisticated functionalities than merely sending and receiving crypto coins.

For example, a smart contract could be used to establish a loan agreement between two people. If certain terms are not met, the collateral could be liquidated. All of this would happen automatically through a pre-written protocol, doing away with the need for a bank or any other intermediary.

Smart contracts such as these can be used to build decentralised applications, or ‘dApps’ for short, which are like normal apps and offer similar functions. The key difference is that they are run on a peer-to-peer network, such as a blockchain, which means that no single entity has control of the network.



Talking points

Food for thought

In this section, we discuss six topics that provide ample food for thought when talking about blockchain technology.

1 Use cases

It is not only about finance – blockchains have the potential to revolutionise entire industries.

- **Healthcare:** patient records are cumbersome to share – this is the status quo in most healthcare systems. Having health-related records stored on a distributed ledger, such as a blockchain, enables faster access (especially relevant in an emergency) and can enable anonymous patient data analysis on a scale previously unknown.
- **Sharing economy:** the sharing economy today relies on centralised ‘clearinghouses’ that connect the parties. Although there might still be a need for a trustworthy organisation managing the blockchain, the technology is an obvious enabler of the sharing economy, connecting individuals looking for a service directly with those offering it.
- **Insurance #1:** blockchain-related insurance can support the growth of the blockchain ecosystem by giving participants a way to protect themselves, for example from financial losses connected with an account held at a crypto exchange, or from losses due to an incorrectly coded ‘smart contract’.
- **Insurance #2:** for the insurance business itself, the benefits of blockchains may mean enhanced efficiency as many processes are still manual, increased trust due to its cryptography, faster claims processing and lower costs, as well as greater fraud mitigation. The cost of insurance fraud in the US alone is estimated to be more than USD 40 billion per year.
- **Banking:** the banking industry continues to be transformed by technology. If banks were to incorporate blockchain technology, this would be just one more step in that process, even if admittedly a rather big one. Areas where blockchain technology can help make the banking industry more efficient as a whole are very diverse. These include compliance/know-your-client processes, making real-time transactions ubiquitous, the issuance of securities or tokens, the custody of crypto assets and tokens backed by a wide array of illiquid assets, and the execution of certain corporate actions via ‘smart contracts’.
- **Accounting:** classical accounting and audit work could become disrupted by the blockchain technology. It is, by design, a distributed ledger, and thus it can reduce the cost of maintaining and reconciling accounting ledgers. Furthermore, it provides a new level of certainty when it comes to the ownership and history of assets.
- **Supply chains:** supply chains are mostly non-integrated networks, which rely on a costly system that can be described as ‘trust-but-verify’. A blockchain can help reduce costs and build trust between parties, including when it comes to product identity exchange, quality control, and faster payments via ‘smart contracts’.

An enabler of blockchain-embedded supply chains can be sensors on physical objects that are connected to one another and can exchange data (also known as the ‘Internet of Things’). These sensors can provide real-time data transparently and 24/7 on the blockchain.

- **Public services:** property records and personal identity information (date of birth, marital status, etc.) are kept today on centralised databases. Obtaining this information in document form can be time-consuming, especially when requesting such documents from outside the country. Given the global nature of the blockchain, an appropriate set-up can make these documents available quickly and efficiently.

And maybe even more importantly, the inherent security aspects of the blockchain technology can sharply reduce the risk of documents being tampered with.

- **Government:** in countries where voters have to register to vote, the registration process can be a cumbersome exercise. An e-government token could enable citizens to register online, and even voting could one day take place via a blockchain. Using ‘smart contracts’, ballots could be verified and votes counted in a decentralised manner, almost instantly.

2 Blockchain and sustainability – can they go hand in hand?

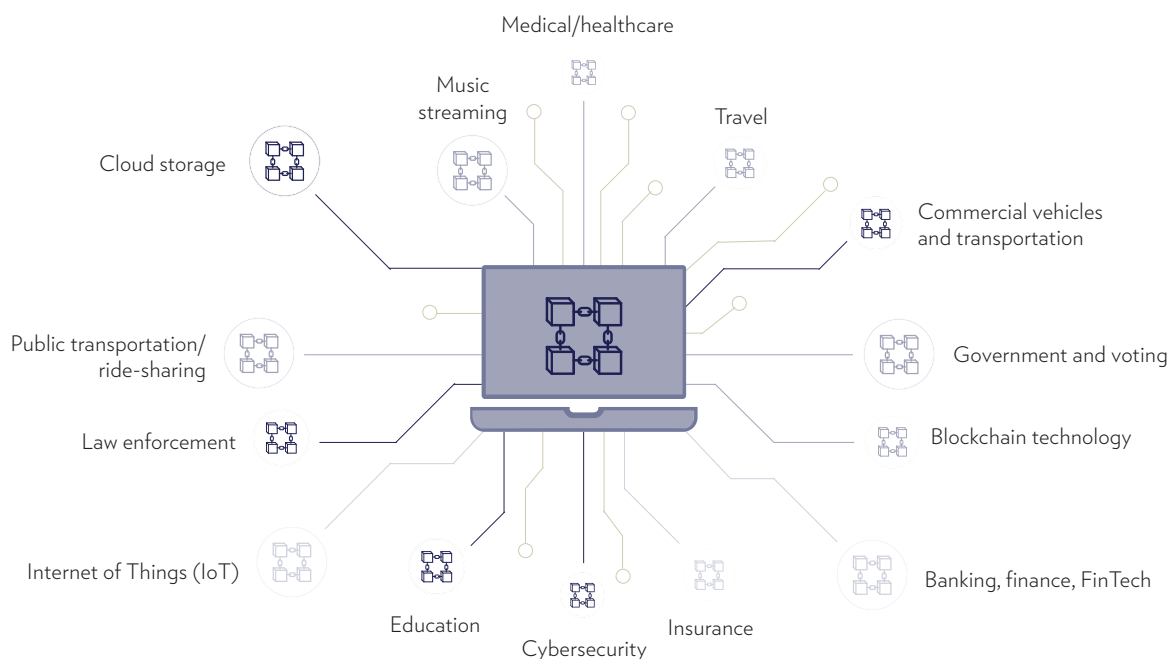
In time, blockchain technology holds the potential to have a positive sustainable impact on the environment. Today, however, the blockchain industry has a negative ecological footprint. Bitcoin mining consumes around 90 terawatt-hours of electricity annually. This is more than the annual electricity consumption of Finland, or almost 0.5% of all electricity consumption worldwide*.

The high energy usage mainly relates to the proof-of-work (PoW) process, the validation mechanism used for Bitcoin. However, the good news from an environmental perspective is that other validation mechanisms, such as proof-of-stake (PoS), have a much lower cost of production (mining).

We are in fact seeing an increase of digital assets’ adoption of more productive, less energy-intensive blockchain validation models. Ether, the second biggest crypto coin, started moving to the PoS model at the end of 2021.

*Kim, E. (2021). Bitcoin mining consumes 0.5% of all electricity used globally and seven times Google’s total usage, new report says. Insider.

The blockchain technology – not a one-trick pony



Source: Julius Baer Investment & Wealth Management Solutions

3 Staking – the new fixed income?

Almost any business owner borrows money to run their business and pays interest to the lender in return. In the world of crypto finance, staking a coin is the way to earn interest for those wishing to lend – comparable to the traditional (fixed) income business. The mechanics of staking are similar to maintaining a bank account, slightly adapted to the technology used, of course. Given that there is no intermediary on the blockchain to confirm that transactions have occurred, a system of validation is used instead. The validator of a new block receives a fee, or interest, upon validating a block. This validation creates an immutable register of the transaction that has occurred. The greater a validator's stake in a crypto coin that uses PoS as a model, the greater the reward (interest) they can receive. Owners of crypto coins can delegate the staking to validators and receive a share of the interest in return.

However, the first principle of finance also applies to staking: no risk, no reward. Besides operational risks, the price of the crypto coin might drop, which is why some staking mechanisms have a minimum holding period during which the crypto coin cannot be sold.

Nonetheless, staking has the potential to become an alternative source of income, both from a diversification and from yield-generation perspective.

4 What about users' privacy?

Digital wallets are represented through a unique string of random letters and numbers (26–35 characters) linked to and displayed in every transaction involved on the blockchain ledger. Therefore, information encoded on the blockchain is immutable and accessible by everyone. Although this provides complete transparency, it could also threaten users' privacy.

For example, anyone could theoretically gain insights into a person's wallet and value it by analysing incoming and outgoing transactions to vaguely determine a person's wealth. If we start using the blockchain technology for storing other types of information too, such as medical or legal records, the issue of privacy becomes even more relevant.

There are ways of anonymising transactions, for example by swapping Bitcoin for stablecoins and back again, which makes it hard to keep track of users' wallets. This, however, goes against the concept of the public ledger, which is considered a core attribute of the technology.

5 Keys – why you should not lose them

We are all used to a world in which, if you forget your password, there is usually a way to recreate it or to circumvent the process by remembering your mother's maiden name or your first family pet's name, or what have you. Unfortunately, when it comes to using the blockchain, and, in particular, to storing one's crypto coins in a wallet, things are completely different: forget your password or recovery phrase and you have forfeited your asset. Once your digital keys are lost, you cannot unlock your asset – it is gone forever.

Do not lose your keys!

Approximately 20% of all Bitcoins have been permanently lost because their owners have lost their keys (i.e. forgot their passwords).

Source: 'Tens of billions worth of Bitcoin have been locked by people who forgot their key', New York Times, 13 January 2021

One way of avoiding the problem is to store the crypto coins with an exchange. However, these exchanges face the risk of being hacked. In 2020 alone, 75 exchanges were shut down, with five being exposed as scams.

Another solution is to keep your coins or tokens in a so-called cold wallet, a device not connected to the internet, which you can keep in a secure location.

6 Regulation: good or bad?

The world of digital assets and decentralised finance (DeFi) remains largely unregulated. This is in stark contrast to the highly regulated world of traditional

finance, which the digital world aims to disrupt. We expect that regulators will eventually seek to create a level playing field between these two worlds. For people in countries with limited financial infrastructure, weak currencies and high levels of inflation, as in many parts of the developing world, a functioning crypto infrastructure could well have the greatest appeal. However, it is in such countries that we have seen various bans. For example, the mining of crypto coins has been banned in China and Iran, with the result that mining activities have increasingly moved to more crypto-friendly places.

This raises another important aspect worth considering, namely that businesses look for a stable, business-friendly environment that allows them to plan ahead and grow. In this context, regulation can be seen as a positive element. It can instil trust and help reduce concerns. In the process, it can ultimately serve to accelerate the adoption of blockchain-based solutions in the economy.





Key terms on
digital assets

Key terms explained

Infrastructure

Distributed ledger technology (DLT)

A distributed ledger is one that is decentralised and where transactions are recorded and validated directly by the network of peers, i.e. the ledger is not controlled by a centralised entity. The transactions are bundled into blocks and each block contains a cryptographic hash of the previous block and thus the blocks form a chain. It is the underlying technology platform for digital assets, consisting of a network of nodes.

Blockchain

A blockchain is a tamper-proof distributed public database. It consists of blocks of data that are linked to each other in chronological order. Retroactive changes to the blocks cannot be made because this would invalidate all future blocks and break the chain. An easy analogy is a novel: the data is like the text, the block is like the page, and the chain is like the bookbinding.

Node

Blocks of data are stored on nodes, which are devices, mainly computers, laptops, or even bigger servers. These devices keep a copy of the distributed ledger and are also communication points – they constantly exchange the latest blockchain data with each other so that all nodes remain up-to-date.

Miner

Miners are a subset of nodes. In the context of Bitcoin, when new transactions occur, the miners create hashes and ultimately add a new block to the blockchain. The first miner to find the random number, called a nonce, and create a hash that meet the criteria, is rewarded with new Bitcoin.

Hash

A unique (digital) 64-digit signature that corresponds exactly to the set of data in a block. A cryptographic hash function is a very complicated formula that takes any string of input and turns it into a unique output.

Protocol

Consensus mechanism

When there is no centralised authority, consensus mechanisms exist to make sure that all the nodes agree on the correct state of the ledger. It ensures trust, consensus, and security across a decentralised network. The two most common consensus mechanisms for digital assets are proof-of-work, which is used in the Bitcoin blockchain among others, and proof-of-stake, where miners can mine or validate block transactions based on the amount of coins they own, i.e. the more coins they own, the more mining power they have.

Services

Cryptocurrency

When the term 'cryptocurrency' is used, it refers to a currency that is digital and decentralised, i.e. no central authority or bank is involved. However, as the term 'currency' is reserved for legal forms of payment, we refrain from using it and instead talk about crypto 'assets', 'coins', and 'tokens', as appropriate.

Crypto coins

Crypto coins are digital means of payment based on cryptographic tools, such as blockchains and digital signatures. As a payment system, they are intended to be independent, distributed, and secure. Use cases include the use of crypto coins for transferring money, as a store of value, and as a unit of account. Bitcoin is the largest crypto coin in terms of market capitalisation. It was invented in 2008 and first used in 2009.

Smart contract

A smart contract is neither 'smart' nor an actual 'contract'. It is a software programme stored on a blockchain that runs when predetermined conditions are met. Essentially, it is a piece of code that allows the parties involved to make an agreement on automated and self-executing contractual clauses without the need for any intermediaries.

Token

A token is a crypto asset that does not operate on its own native network but instead operates on an already existing blockchain. It allows for the digital transfer of ownership without the need for centralised institutions. Fungible tokens are interchangeable with other fungible tokens of the same type. Non-fungible tokens (NFTs) are digital files with content such as art, videos, or music, and each have unique characteristics. Through the blockchain technology, a verified and public proof of ownership is established.

Important information about digital assets

In view of the rapid evolution of digital assets, their use and terminology, and given that every digital asset has its own features and inherent risks, the following does not describe every risk or consideration involved. New risks may also arise from investing in new types of digital assets, or where the investor engages in more complex transaction strategies.

Digital assets are subject to a higher risk of market abuse, market and/or price manipulation, and insider dealing by market participants than traditional assets, due to valuation challenges as well as a lack of regulation, supervision, market control, centralised price source, and/or liquidity.

The legality and regulatory treatment of digital assets may not be regulated consistently and may vary depending on the jurisdiction. One or more jurisdiction may, in the future, adopt laws, regulations, or directives that affect digital assets or their holders, which may in turn affect the use, transfer, exchange, or price of such assets.

Digital assets may have no intrinsic value and their price is subject to changes in sentiment. The price of digital assets is highly volatile, unpredictable, and speculative. There may be no market/secondary market for certain digital assets and no guarantee that an investor can establish or liquidate positions when desired or at favourable prices.

There is counterparty risk when effecting transactions with issuers, private buyers and sellers, or through trading, lending, or other dealing platforms. Most trading, lending, or other dealing platforms or venues, intermediaries, vendors, and custodians of virtual assets are also presently unregulated. There is a risk that a platform or venue intermediaries, vendors, and custodians of virtual assets may not hold sufficient assets to satisfy their obligations.

Furthermore, the technology behind digital assets is relatively new and rapidly evolving. This may lead to an increased risk of fraud, hacking, or cyberattacks that allow unauthorised access to digital systems to misappropriate assets or sensitive information, manipulate data, or cause operational disruptions, as well as various operational risks (for example, system, hardware, software, or network failures).

The opaque underlying or spot market poses asset and ownership verification challenges and gives rise to an increased risk of manipulation and fraud, all of which may undermine market confidence and negatively impact prices. The risk of loss, theft, or destruction of a digital asset especially if held in 'hot wallets' may also result in an irrecoverable loss.

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METHODOLOGIES AND GLOSSARY

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