Marketing Material

Blockchains and Cryptocurrencies:

What, Why and When?

Xtrackers by DWS × galaxy

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Introduction

Blockchains present a high-potential technology that may become one of the driving factors of the ongoing fourth industrial revolution. Its advocates believe that the general-purpose technology will soon host diverse use cases across industries including but not limited to finance, insurance and supply chain management. This wide applicability is enabled by blockchain's technical structure: It allows decentralized networks to maintain a tamper-resistant database without relying on a centralized party.

The launch of the first blockchain application Bitcoin in January 2009 marked a technological breakthrough, though it initially only invoked excitement across a small computer science community. Over the next years, the Bitcoin community grew alongside other blockchains and cryptocurrencies, in spite of the traditional financial industry and large institutions shrugging off Bitcoin and its peers. "*Blockchain, not Crypto*" developed as a mantra and blockchain expectations quickly grew. Already in 2015, a World Economic Forum survey predicted that by 2027 10% of global GDP might be stored on blockchains (World Economic Forum, 2015). Over the years, similar predictions were made, especially for blockchain applications in the financial sector. For example, McKinsey predicted that the total tokenized market capitalization – tokenized means value represented as a digital token on a blockchain – may reach USD 2tn by 2030 (McKinsey, 2024).

However, today's adoption of blockchain technology in the financial industry, as well as other industries, remains limited. While there are promising use cases, broad adoption is still some way off. An example is tokenized assets: Our strategic ally Galaxy estimates their market capitalization to have reached USD 2.5 billion as of September 2023 (Galaxy, 2023, notably excluding stablecoins), which does not yet live up to the aforementioned high expectations. In contrast to the still lacking broad blockchain adoption across industries, cryptocurrencies have grown significantly over the past 15 years, reaching a market capitalization of more than USD 2 trillion as of September 2024 (Coinmarketcap.com, 2024). Why have cryptocurrencies experienced substantial market growth, while blockchain adoption beyond cryptocurrencies continues to falter? To answer this question, we will analyse how blockchains and cryptocurrencies relate.

The 101 of blockchain technology[1] and their native cryptocurrencies

Blockchains enable network participants to collectively work together without relying on a centralized party – they neither need to know, nor trust, each other. Data integrity is no longer provided by a central party like a financial institution. Instead, the decentralized network itself maintains the data integrity by enacting a technical design called *consensus mechanism*. Consensus mechanisms ensure consensus about the blockchain ledger data across the decentralized network participants by incentivizing honest network behaviour and disincentivizing manipulation of the blockchain ledger.

There are multiple consensus mechanisms, the two most well-known ones being "*Proof of Work*", used by the Bitcoin blockchain, and "*Proof of Stake*", exercised by the Ethereum blockchain. Bitcoin and Ethereum, today's two largest blockchains by market capitalization (Coinmarketcap.com, 2024), showcase successful consensus mechanisms that have secured their blockchain data integrity for the past 15 and 9 years, respectively. This reliable functioning of consensus mechanisms is an indispensable prerequisite for technical blockchain resilience and thus vital for further cryptocurrency and blockchain adoption.

Consensus mechanisms are enacted by certain network participants called "*miners*" for Proof of Work and "*validators*" for Proof of Stake. Miners and validators must either contribute energy (Proof of Work) or stake assets (Proof of Stake) to confirm the authenticity of a proposed transaction and eventually add it to the blockchain ledger. Miners and validators

[1] This article focuses on public blockchains.

are economically incentivized for completing this work. Each public blockchain incentivizes honest network behaviour via its own, native cryptocurrency. The Bitcoin blockchain uses its native cryptocurrency, bitcoin, while the Ethereum blockchain relies on its native cryptocurrency, Ether. Miners and validators receive transaction fees paid in the native cryptocurrency for each transaction that they successfully add to their blockchain. Thus, if Alice wants to send Bob 0.2 bitcoin, she must send a little bit more in transaction fees. Bob receives the 0.2 bitcoin, the miner receives the transaction fees.

Blockchains, and notably their consensus mechanisms, are a technological breakthrough: They provide a technical infrastructure on which data consensus between various stakeholders can be achieved without relying on a centralized party. In contrast, traditional business models rely on trusted (and often regulated) centralized parties to maintain data integrity. With blockchain technology, data integrity no longer depends on centralized parties, but is instead achieved via blockchain's technical design.

Blockchain and cryptocurrency taxonomy

Today, several thousand blockchains, and their native cryptocurrencies, exist, with widely different value propositions. These value propositions can be used to cluster cryptocurrencies into three main categories:

(1) Payment/Store of Value
(2) Infrastructure
(3) Utility Coins

(see graphic one).

Graphic One: Three Main Categories of Cryptocurrencies

Primary value proposition	Description	Examples	
1 **Payment Coins**	Payment coins aim to be digital money, especially store of value and means of exchange.	BTC	XRP
2 **Infrastructure Coins**	Infrastructure coins and their underlying blockchains allow the creation of digital assets and decentralized applications.	ETH	SOL
3 **Utility Coins**	Utility coins are designed for specific purposes and usable within predefined ecosystems (similar to "vouchers").	FIL	AAVE

Source: DWS International GmbH, 09/2024

1. **Payment and Store of Value Cryptocurrencies** aim to be a means of exchange and/or a store of value. The most well-known example is bitcoin which was originally introduced by its anonymous inventor Satoshi Nakamoto as a "*Peer-to-Peer Electronic Cash System*" (Bitcoin whitepaper, 2008). For the first time ever, value

could be transferred digitally peer-to-peer without involving any intermediary. Through its digital and global nature, bitcoin can be sent easily across the world. However, today, bitcoin's usage as a means of exchange remains limited mainly due to its high volatility, limited adoption by merchants, and the comparatively high and volatile (layer 1) transaction fees. Instead of using bitcoin as a means of exchange, financial market participants increasingly see its potential to act as an alternative store of value. This has led to bitcoin being referred to as "*digital gold*". Indeed, bitcoin shares many properties with gold – most importantly a limited supply and its decentralized nature.

2. **Infrastructure Cryptocurrencies** and their underlying blockchains allow developers to build decentralized applications, known as "*dApps*", by using so called smart contracts. The blockchain ledger stores the dApps data. An intuitive comparison would be to think of an infrastructure blockchain as a decentralised app store, on which developers can create their own blockchain-powered apps. Today, the most prominent infrastructure blockchain is Ethereum, with roughly 15% market share (Coinmarketcap, 09/2024). See the below info box for more details about Ethereum use cases.

3. **Utility Coins** function as "digital vouchers" that can be used to get a specific utility, such as a discount for using a specific service. An example is Filecoin which can be used to pay for decentralized storage space (Filecoin, 2024).

Info box: Ethereum financial use cases

Today, Ethereum is the most prominent infrastructure blockchain with diverse financial use cases, particularly tokenization and Decentralized Finance applications. In addition, Ethereum has a large potential for non-financial use cases, such as its use as a golden data source for supply chain management.

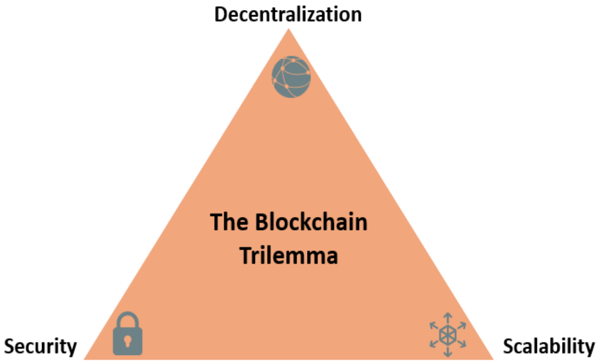
Tokenization means digitally representing assets as a token on a blockchain. Today, the Ethereum blockchain is the most popular tokenization blockchain for traditional and alternative assets like bonds, funds and real estate. For example, in 2021, the European Investment Bank (EIB) issued a EUR 100mn 2-year bond on the Ethereum blockchain (EIB, 2021). The bond's term sheet was coded as a smart contract and the Ethereum blockchain was used for the registration and settlement of the tokenized bond. Another tokenization example is fiat-backed stablecoins. As of September 2024, the stablecoin market capitalization has grown to USD 160bn (Coinmarketcap.com, 2024) with ~53% being recorded on the Ethereum blockchain (DeFiLlama, as 09/2024). These tokenization use cases exemplify how traditional finance like the EIB or fiat money use the Ethereum blockchain, combining centralized and decentralized structures.

Decentralized finance (DeFi) applications use blockchain protocols to offer financial services that were formerly offered by centralized financial companies. Today, Ethereum is the most popular blockchain for DeFi applications. DeFi adoption can be measured by the *Total Value Locked* (TVL), that is all value "locked" in Ethereum DeFi protocols. As of September 2024, the Ethereum TVL equaled USD 48bn. Popular Ethereum DeFi applications are the decentralized exchange Uniswap with a TVL of ~USD 4bn, and AAVE, a decentralized lending and borrowing protocol, with a TVL of ~USD 11bn (Ethereum - DefiLlama, as of 09/2024).

Challenges slowing down blockchain adoption

Blockchain is a general-purpose technology with diverse use cases across multiple industries. But despite the technology's high potential, blockchain adoption is lagging behind expectations. What challenges hinder quicker blockchain adoption? In our view, the main challenges can be grouped into technological, regulatory, and use case specific, challenges.

Graphic Two: The Blockchain Trilemma



Source: DWS International GmbH, 09/2024

An important technological challenge faced by the blockchain community is the blockchain trilemma, which is the inherent trade-off between blockchain-security, decentralization, and scalability *(see graphic two)*. Though each goal is individually indispensable, today's technical solutions cannot simultaneously fully realize all three goals. Thus, each blockchain must find a trade-off, according to its use cases. For example, the Bitcoin and Ethereum ecosystems often prioritize security and decentralization, which can disfavour scalability and cause high (layer 1) transaction costs. Large scale adoption of Bitcoin as a payment network, or Ethereum as a general-purpose infrastructure, will require the sufficient realization of all three goals. Blockchain and cryptocurrency communities are working intensely to develop innovative technical solutions, such as layer 2 solutions to ease the scalability issues.

In addition to technical challenges, regulatory uncertainty hinders more widespread blockchain adoption, especially in the highly regulated financial industry. While regulators must develop new concepts to regulate completely decentralized structures, many blockchain stakeholders are indeed centralized parties that can be regulated by traditional regulation approaches. Examples for centralized blockchain stakeholders include issuers of tokenized assets, centralized crypto exchanges, as well as centralized mining and staking pools. But, recently, blockchain and digital asset regulation has made progress. Importantly, within the EU, the *Markets in Crypto Assets Regulation* (MiCAR) provides an EU-wide harmonised regulatory framework for crypto assets and crypto asset service providers. MiCAR went into force in 2023 and is becoming stepwise applicable in 2024. Besides regulation from external institutions, sound blockchain governance is also fundamental to increase trust and drive further adoption. The challenge is that blockchain governance must balance diverse stakeholder interests across the many blockchain network participants.

Besides technical challenges and regulatory uncertainty, use case specific challenges and complex implementation are slowing down blockchain adoption. While the potential of the general-purpose blockchain technology is vast, blockchain technology has been struggling to power a critical mass of use cases. The most promising blockchain use cases often span fragmented value chains with multiple stakeholders. Successful adoption thus depends on the numerous stakeholders agreeing to adopt blockchain and its specific set up, as well as their willingness to bear innovation costs. The asset management value chain exemplifies the difficulty: Stakeholders including, but not limited to, retail and institutional investors, asset managers, regulators, custodians, fund administrators, transfer agents, central security depositories, fund platforms, exchanges, liquidity providers and auditors must agree on and adopt the blockchain solution. The multitude of stakeholders that must agree invokes "*chicken and egg*" problems and thereby hinders positive network effects from kicking in. In addition, some traditional players might hinder adoption to protect their market position and instead propose alternative solutions.

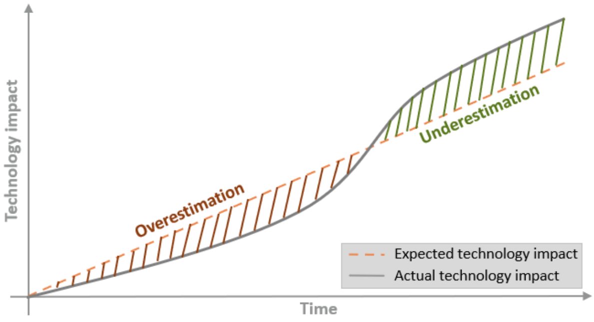
Summary and conclusion

Blockchain market expectations have been high for at least the last decade and continue to be so despite slower adoption than expected. Such recurring unmet adoption predictions may sometimes feel like a "*déjà vu*" (McKinsey, 2023). Will blockchains and cryptocurrencies finally become largely adopted, and if so, when?

The mantra of "*Blockchain, not Crypto*" did not, and indeed cannot, come to fruition: Cryptocurrencies are technically indispensable for public blockchains. But, in addition to their functioning as fuel to public blockchains, cryptocurrencies are also the first scalable blockchain application. Blockchain adoption can and will expand to other use cases besides cryptocurrencies, and cryptocurrencies in turn will profit from increased adoption of public blockchains. For the time being, cryptocurrencies' fast market growth, adoption and institutionalization helps to develop the still young blockchain technology and its adoption beyond cryptocurrencies. In our view, blockchain adoption will come in waves. Successful realization and market acceptance of high-potential use cases will come first and reduce the hurdles for other use cases that are profitable only at scale and may have considerable adoption obstacles to overcome.

Thus, today, blockchain enthusiasts should focus on identifying the short-term high-potential blockchain use cases to avoid future déjà vus of unmet adoption predictions. In the finance industry, the next wave of blockchain adoption may finally be long expected tokenization use cases. Today, stablecoins are the most adopted tokenization use case with a market capitalization of USD 160bn (Coinmarketcap.com, as of 09/2024). This tokenization use case flourished as it profited from the successful adoption of cryptocurrencies and DeFi applications. Another growing tokenization use case is tokenized money market funds. Again, tokenized money market funds can profit from the already existing cryptocurrency ecosystem, as money market funds may be particularly interesting for crypto-native investors to earn money market yields from their treasury assets while keeping their assets on-chain. This step-wise adoption of first tokenization use cases may already be paving the way for broad(er) tokenization adoption.

Graphic Three: Amara's Law



Source: DWS International GmbH, 09/2024

Finally, the slow blockchain adoption may also be understood as an example *of Amara's Law (see graphic three)*. It states that in the short term, breakthrough technologies are often overestimated, but in the long-run their impact is underestimated. Blockchains are a technical breakthrough: The blockchain ledger offers a golden data source that is tamper-resistant by design, which allows participants to work together in a decentralized network. This makes blockchains highly suitable for use cases spanning multiple stakeholders. But the challenges remain high, technical issues, a still nascent regulatory and governance framework, and slow blockchain-specific market adoption remain. We are optimistic that they will be solved.

Appendix

In 2023, Xtrackers by DWS, a large and established provider of high-quality exchange-traded products, and Galaxy, a financial services innovator in the digital asset and blockchain technology sectors have formed a strategic alliance to advance European digital asset adoption. Both allies are focused on an education-first approach to digital assets and provide simple, efficient and reliable access to selected cryptocurrencies.

The strategic alliance leverages the combined expertise and track record of two leading players in investing and digital assets. Xtrackers by DWS is a large and established provider of high-quality exchange traded funds (ETFs) and exchange traded commodities (ETCs). Providing efficient 'passive' exposure to diversified indices or to single commodities, Xtrackers ETFs and ETCs provide a comprehensive set of dependable investment tools for effective portfolio allocation.

Galaxy is a global digital asset financial services institution that offers a broad range of financial services across its three business units, global markets, asset management and digital infrastructure solutions. As of Feb 29, 2024, Galaxy's Asset Management unit oversaw USD 10.1 billion in digital asset AUM across a broad range of passive, active, and venture strategies.

Glossary

Bitcoin: The first and largest digital asset, enabling decentralized peer-to-peer transactions. Bitcoin with a capital B refers to the blockchain network, while bitcoin with a lower-case b refers to the cryptocurrency.

Blockchain: A blockchain is a chain of blocks of data that are immutably chained together via cryptography and stored on a distributed and decentralized database.

Coin: A coin is a cryptocurrency, which is native to a specific blockchain and an integral part of it (e.g., as payment for transaction fees). A coin is independent of any other platform. For example, Ether on the Ethereum blockchain.

Cryptocurrency: A digital asset recorded on a Blockchain that is often neither issued nor controlled by any centralized authority.

DeFi (Decentralized Finance): DeFi provides blockchain-based financial services in which intermediaries are (to some extent) replaced by automated protocols.

Decentralized Network: Decentralized networks are distributed among multiple computers, creating an interconnected system where no single entity holds complete authority. Thus, the entities control each other and there is no need to trust a central authority.

Ether: The native cryptocurrency of the Ethereum network.

Ethereum: A decentralized, public blockchain network that supports composable smart contracts which can be used to create decentralized applications and tokens and facilitate peer-to-peer transfers.

Layers: Layers aim to increase blockchain scalability. Layer 1s, like Bitcoin and Ethereum, are foundational blockchain networks that validate and record transactions on their respective layer 1 blockchain ledger with the aims to have tamper-proof ledger. A layer 2 is a protocol built on top of an existing layer 1 blockchain network. Layer 2s typically aim to increase transaction speed and solve scaling difficulties of Layer 1 blockchain networks.

Ledger: A ledger is a database, which tracks the movement of assets. Blockchain technology creates a decentralized, public and unalterable ledger of all transactions recorded.

Miner: A participant in the consensus of a proof-of-work blockchain, adding blocks to the blockchain for rewards.

Mining: Mining is the process of creating valid new blocks containing transactions for proof-of-work based blockchains. To link a new block to the last one, a computationally intense mathematical puzzle must be solved.

Native cryptocurrency: In the context of cryptocurrencies, native to a blockchain refers to the primary and original cryptocurrency of a specific blockchain. A native cryptocurrency typically plays a central role in the consensus mechanism of its blockchain and is used for paying transaction fees in the network.

Proof-of-stake (PoS): A blockchain consensus mechanism, where validators stake a certain minimum number of their cryptocurrencies and are then randomly selected to validate transactions and create new blocks.

Proof-of-work (PoW): A blockchain consensus mechanism, where miners compete to solve computationally intensive puzzles to validate transactions and create new blocks.

Public blockchains: A public blockchain is a decentralized, open, and permissionless database, where anybody can join the network, establish a node, and view the history of the blockchain.

Stablecoin: A stablecoin is a digital token that is pegged to an asset, like a national currency or gold.

Tokenization: The process of transforming assets, rights, and obligations into a digital, tradeable token on a blockchain.

Validator: A participant in the consensus of a proof-of-stake blockchain, involved in validating blocks for rewards.

Blockchain and cryptocurrency risks

Cryptocurrency price volatility: High intra-day price volatility of cryptocurrencies may result in potential losses for investors

Blockchain technology risk: Nascent blockchain technology may result in system disruptions, cyber security risks, source code risks, hacking attempts, forks, problems relating to activity peaks, etc.

Regulatory and policy risk: Ongoing changes in regulations and policies in relation to cryptocurrencies may lead to adverse impacts for investors

Counterparty risk: Crypto brokers and counterparties (e.g., cryptocurrency custodians) may be less established compared to traditional counterparties

Liquidity risk: Instability in cryptocurrency markets may lead to (temporary) illiquidity of underlying assets

Adverse Environmental and Social Impacts (ESG): Certain cryptocurrency features such as the consensus mechanism may lead to adverse environmental and social impacts

Fraud risks: Cryptocurrencies may be used for criminal activities (e.g., ransom software, money laundering, terrorism financing)

Operational disruption: Immature processes in combination with above general risks (e.g., blockchain technology risk) may lead to operational disruption and risks

Marketing Communication

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