CRYPTOCURRENCY & BLOCKCHAIN IN INDIA

AN OVERVIEW OF A CRYPTIC JOURNEY

August 2023

KIRTANE & PANDIT

Table of Contents

1. Executive Summary

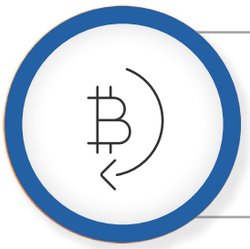
Bitcoin was created in 2008 by Satoshi Nakamoto, a person or group of persons whose identity remains unknown to this date. Today, cryptocurrency and blockchain technology have become heavyweight terms, and not just in the fintech world- in fact, by 2025, around 10% of global GDP is expected be stored on blockchain platforms.

Cryptocurrency can be termed as the counter-culture revolution of the 21st century. Despite their highly volatile nature and the many scams, hacks, and frauds over the years, cryptocurrencies remain highly popular among investors. The appeal lies in the core concept of decentralization - a means for individuals to buy and sell cryptocurrency freely and to create, own, and monetize content without authentication from banks, governments or third parties. Social media has also been a core contributor, as demonstrated by the hype around non-fungible tokens (NFTs).

The post-pandemic era has seen a significant rise in the adoption of digital ledger technology by key players. However, the 2022 crypto winter and the FTX collapse caused a major stir among lawmakers worldwide to create a regulatory framework for cryptocurrency and blockchain payments.

On the Indian front, the government maintains a conservative stand on cryptocurrencies, but blockchain applications are being implemented in various sectors in India. Cryptocurrency and blockchain technology regulations were expected to be addressed in India's Union Budget 2023. The bill is still under discussion; however, India has already implemented a 30% tax on capital gains arising from the transfer of cryptocurrencies. India is also launching its own Central Bank Digital Currency (CBDC), the e-Rupee. Significantly, with India taking up the G20 presidency, cryptocurrency and blockchain technology are expected to be an important topic of discussion at the September G20 summit.

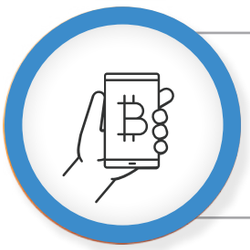
This report tries to cover:



A brief history of the rise of cryptocurrencies

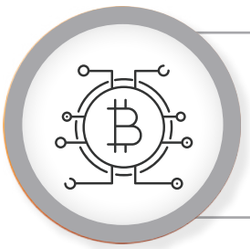
The social and economic causes for the rise in popularity of cryptocurrencies

Cryptocurrency value drivers and risk factors

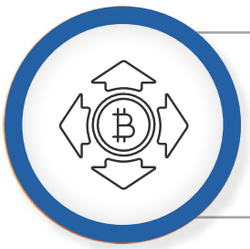


Businesses that use cryptocurrencies as a mode of payment

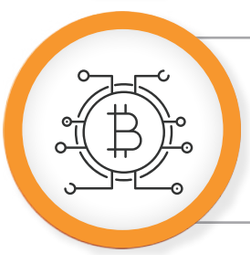
India's digital journey



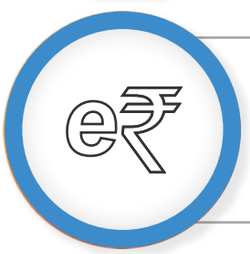
Decentralized Finance (DeFi) and Web 3 platforms



Applications of Blockchain Technology



The regulatory framework



India's position on cryptocurrency and blockchain regulations

2. What is Cryptocurrency?

Cryptocurrency is a **digital currency** designed to work as a medium of exchange by using **encryption techniques** to control the creation of monetary units and to verify the exchange of money. Cryptocurrency does not rely on any central authority, such as a government or bank, to verify its transactions. It is a **decentralized system** that functions through distributed ledger technology, typically a **blockchain**, that serves as a public financial transaction database.

The first decentralized cryptocurrency was Bitcoin (BTC), which was created by Satoshi Nakamoto in 2008, and was released as an open-source software in 2009. Bitcoin uses a blockchain majority consensus mechanism called proof-of-work (PoW).

Although Bitcoin is considered to be the world's best known cryptocurrency, as of March 2023, there are over 8,000 active cryptocurrencies in the marketplace, with over 500 cryptocurrency exchanges.

In today's economy, digital assets such as cryptocurrencies, stablecoins, non-fungible tokens (NFTs), and tokenized assets aim to replace traditional assets such as equities, bonds, and other securities. Although cryptocurrencies still remain a largely unregulated market, there is now a global focus on developing a regulatory framework for digital assets. Every day, new applications are being built on blockchain platforms, giving rise to a new financial system called decentralised finance (DeFi).

What is a Blockchain?

A blockchain is a **digital, decentralized, public ledger** that exists on a peer-to-peer network. It is an advanced database mechanism where encrypted blocks of digital asset data are stored and chained together, and do not require third-party authentication.

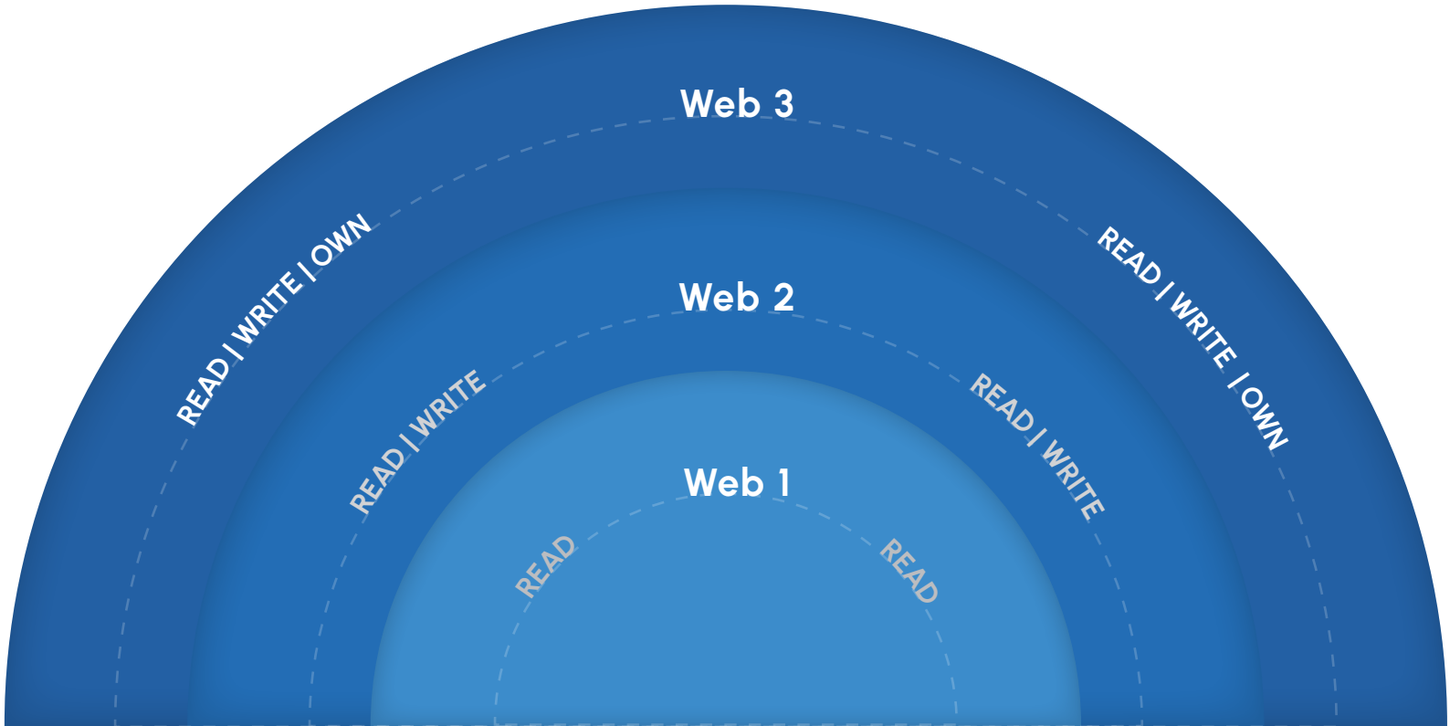
Blockchain mining is a complex process that involves solving math problems by a 'miner' to create new blocks on the chain. When a block is successfully mined, the miner receives a reward, for e.g., one Bitcoin. In order to make changes to a particular block, the miner needs to re-mine not only the block with the change, but every block that follows in the chain. This ensures that any data on the blockchain, once written, cannot be modified or manipulated easily.

Although the blockchain technology was originally created for Bitcoin to operate on, its purpose is not limited to financial transactions. Its advanced security and transparency features has seen growing adoption in a number of sectors, including banking, identity security, supply chain management, and others.

What is Web3?

The history of the World Wide Web is divided into two parts – Web1, the read-only internet which ran from its inception in the 1990s until 2004, and Web2, the read-write internet which we all currently use. While Web1 was the internet owned by a handful of companies that generated content, Web2 allows platforms to share user-generated content and engage in interactions between users. Web2 gave rise to the advertising-driven model, which allows users to create and share content and to also monetize it.

The term 'Web3' was coined by Ethereum co-founder Gavin Wood shortly after the launch of Ethereum in 2014. The mistrust with Web2 stems from a few private companies monopolizing and controlling data on the internet. With Web3 - which is a **decentralized, blockchain-based web**, and which would incorporate native payments such as cryptocurrencies and Decentralized Autonomous Organizations (DAOs) - the idea is to decentralize control, giving rise to an internet that will be read-write-own.



3. Types of Cryptocurrencies

Bitcoin, the first cryptocurrency, was developed as an alternative to fiat currencies such as the Indian rupee (INR) and the US dollar (USD). Although Bitcoin is considered to be the world's best known cryptocurrency, as of March 2023, there are over 8,000 active cryptocurrencies in the marketplace.

Today, most cryptocurrencies are used either as a payment mechanism or as speculative investments. It is therefore important to understand the types of cryptocurrencies in order to decide which coin or token is best suited to an investor's needs.

Altcoins

Alternative coins or altcoins are cryptocurrencies that were developed as an alternative to the market leader Bitcoin. Some experts exclude Ethereum from the definition of altcoins and use it in the same vein as Bitcoin, because most altcoins are derived from or forked from either of these two major blockchains. The first altcoin was Litecoin, forked from the Bitcoin blockchain in 2011.

Certain cryptocurrencies may also advertise as a way to raise funds for specific projects. For e.g., the Ethereum token Bananacoin was sold via an initial coin offering (ICO) to raise funds for an organic banana plantation in Laos, and was pegged to the export price of one kilogram of bananas.

Crypto Tokens

While these terms are often used interchangeably, a 'crypto coin' is a cryptocurrency that is built on a native blockchain (such as Bitcoin or Ether); whereas a 'crypto token' is a cryptocurrency asset that runs on another existing cryptocurrency's blockchain (for e.g. USD Coin, which runs on the Ethereum blockchain).

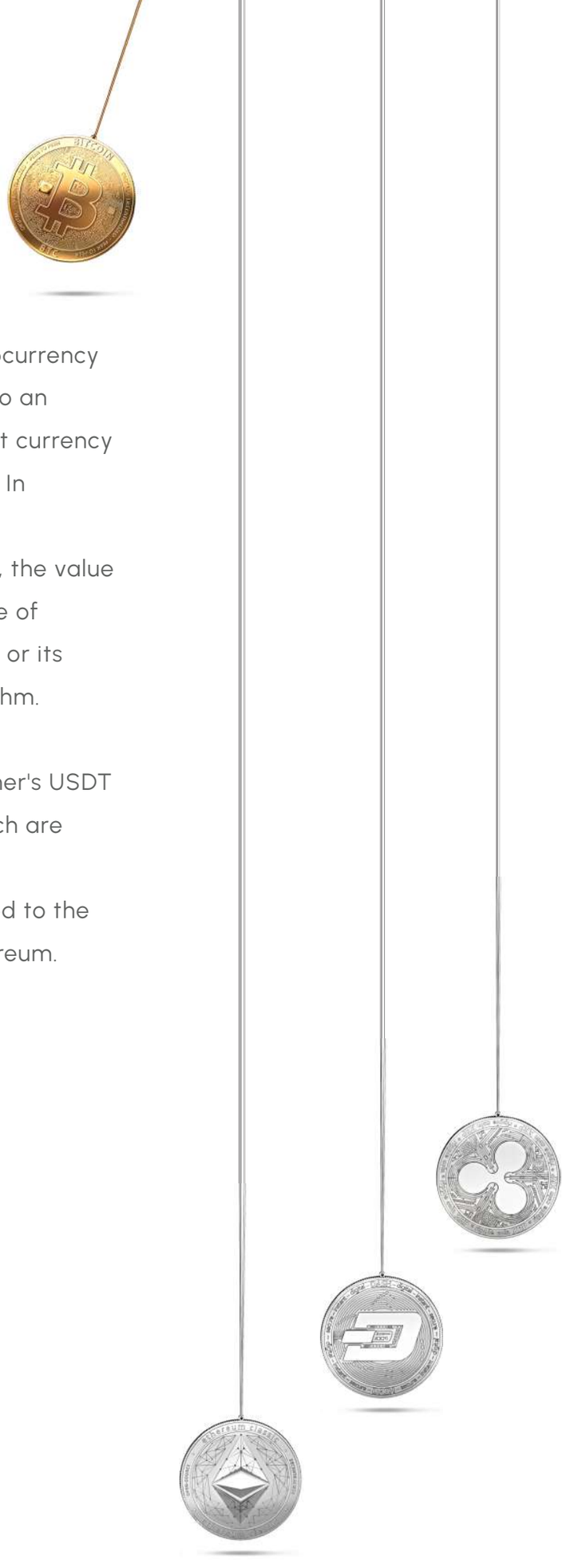
The most common types of crypto tokens are as follows:

- **Utility tokens** are used to provide access to services within a network, for e.g., Ether (ETH), which is a utility token designed to be used in the Ethereum blockchain to pay for transactions, or Filecoin, which is used to buy storage space on a blockchain network. Utility tokens comprise the largest and most well-known Initial Coin Offerings (ICOs), which are the cryptocurrency industry's equivalent of an Initial Public Offering (IPO).

- **Security tokens** are tokenized assets offered on stock markets, which act like traditional securities in many ways, including being regulated by the US Securities and Exchange Commission (SEC). In 2021, the Bitcoin wallet firm Exodus successfully completed a SEC-qualified token offering, allowing for shares worth USD 75 million of common stock to be converted to tokens on the Algorand blockchain.

- **Governance tokens** are essentially utility tokens, but which allow holders certain rights within a blockchain, such as voting for changes to protocols or having a say in the decisions of a decentralized autonomous organization (DAO).

- **Non-fungible tokens (NFTs)** have become popular in the mainstream media for purchasing digital art and collectibles. NFTs are unique tokens that exist on a blockchain (usually Ethereum), and which represent ownership of an associated asset or privilege.



Stablecoins

Stablecoins are a type of cryptocurrency whose market value is pegged to an external reference, such as a fiat currency or even another cryptocurrency. In contrast to the high volatility of cryptocurrencies such as Bitcoin, the value of stablecoins is tied to the value of another currency or commodity, or its supply is regulated by an algorithm.

Notable stablecoins include Tether's USDT and the USD Coin (USDC) - which are pegged to the US dollar - and MakerDAO's DAI, which is pegged to the US dollar, but is backed by Ethereum.

Top 5 Crypto Market Players in 2023

BITCOIN

Market cap as of May 2023:
USD 524.8 billion

Bitcoin (BTC) remains by far the largest and most popular cryptocurrency. It is a decentralised digital currency that has transferable ownership. This cryptocurrency is mineable and has a maximum supply of 21 million Bitcoins.

ETHEREUM

Market cap as of May 2023:
USD 218.9 billion

Ethereum is the first blockchain-based platform to host smart contracts. The network (native cryptocurrency 'Ether') allows developers to build applications on its blockchain. This is now known as decentralized finance (DeFi).

TETHER

Market cap as of May 2023:
USD 82.8 billion

Tether (USDT) is described as a stablecoin. Tether has stated that it maintains USD 1 of asset reserves for each USDT 1 issued, but has failed to present audits showing sufficient asset reserves.

BINANCE COIN

Market cap as of May 2023:
USD 48.3 billion

Binance Coin (BNB) is a cryptocurrency that originally ran on the Ethereum blockchain, but is now the native currency of the Binance blockchain.

USD COIN

Market cap as of May 2023:
USD 29.8 billion

USD Coin (USDC) is a relatively fresh stablecoin pegged to the US dollar. USDC is a service to tokenize US dollars, and the tokens can be changed back to USD at any time.

4. Cryptocurrency: The Story So Far

1983 - The Concept

An American cryptographer David Chaum presents the concept for a currency that could be sent untraceably and anonymously, and in a manner that did not require centralized entities such as banks.

1998 - Bit Gold

Bit Gold - often deemed a direct precursor to Bitcoin – is designed by Nick Szabo. It requires a participant to dedicate computer power to solving cryptographic puzzles, and those who solve the puzzle receive a reward. The term 'smart contract' is also introduced.

2008 - The Birth of Bitcoin

In the aftermath of the 2008 global financial crisis, on October 31, 2008, a mysterious person or group, using the pseudonym Satoshi Nakamoto publishes a white paper called "Bitcoin – A Peer to Peer Electronic Cash System", describing the functionality of the Bitcoin blockchain network.

2009 - Open-source

Bitcoin is released as an open-source software.

2010 - Pizza Day & Dark Net

The Bitcoin Pizza Day – Bitcoin is first used to purchase two pizzas for approx. USD 30, or 10,000 BTC.

An untraceable dark net called Silk Road emerges, which accepts only Bitcoins for purchasing black market items.

2011 - Competition

Litecoin (LTC) is launched – the first rival to Bitcoin.

2014 - Scams

In January 2014, the largest Bitcoin exchange Mt.Gox suddenly goes offline, and the company declares bankruptcy. In 2014, more cryptocurrency scams and hacks emerge.

2015 - Smart Contracts

The Ethereum blockchain is launched, the first to host smart contracts functionality.

2020 - Pandemic Disruption

The COVID-19 pandemic hits, and the as the world begins to shut down, cryptocurrency begins to surge.

2021 - El Salvador Declares Bitcoin as Legal tender

El Salvador passes a law declaring Bitcoin as legal tender.

2022 - COVID-19 and the 2022 Crypto Winter

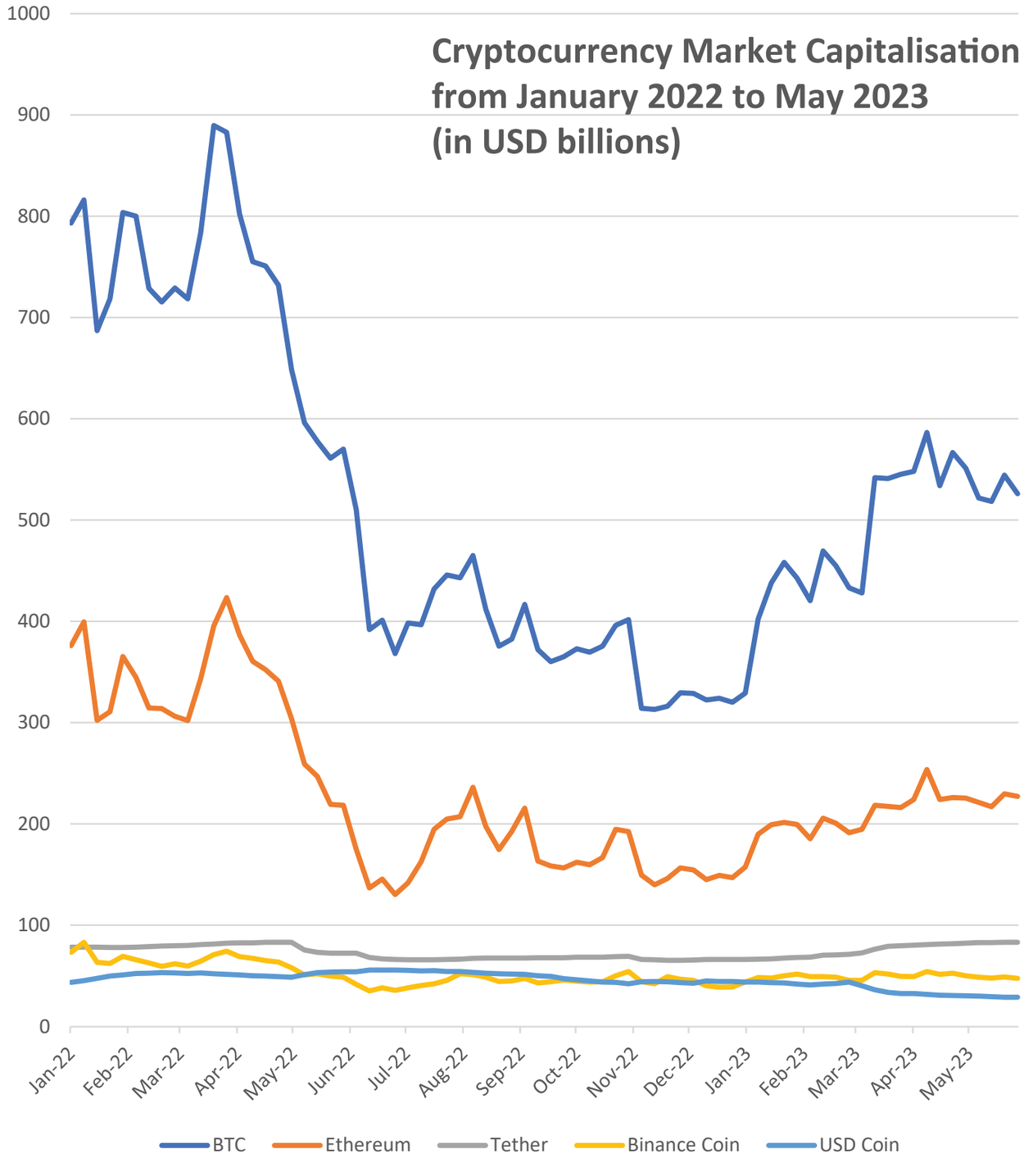
The stablecoin Terra (Luna) collapses. Causing a ripple effect, the cryptocurrency industry crashes, prompting what is now known as the 2022 crypto winter.

In November 2022, FTX, a major cryptocurrency exchange, files for bankruptcy. Its founder, Sam Bankman-Fried is arrested on charges of fraud and finance law violations.

Recent Highlights:
COVID-19 and the 2022 Crypto Winter

The cryptocurrency market has boomed since its inception 10+ years ago, but it has had more than its fair share of highs and lows. The COVID-19 pandemic remains an unprecedented event that impacted society as well as the financial economy. The crypto market was not exempt from the slowdown, but it soon saw a surprising flourish. Many people working from home and who were flush with cash, turned to alternative forms of passive income in 2020 and began investing in cryptocurrency.

During the onset of the pandemic in March, the value of Bitcoin dropped as low as USD 4,400. However, five months later, its value recovered, thanks in part to a phenomenon known as Bitcoin Halving, which is a means to limit the number of Bitcoins mined.



The year 2022 was Bitcoin's second worst single-year performance since 2011, and in general one of the worst years for crypto investors.

2022

2022 was the second worst single-year performance for Bitcoin since 2011, and in general one of the worst years for crypto investors. In the first half of 2022, global equities as well as the cryptocurrency markets suffered owing to rising interest rates and inflation. Real estate and commodities were equally impacted by the bursting of a global economic bubble in the wake of the COVID-19 pandemic.

The main blow to the cryptocurrency industry was the collapse of the stablecoin Terra (Luna), followed by the bankruptcy of the hedge fund 3AC, then Voyager, Celsius, and finally, the bankruptcy of FTX and the arrest of its co-founder, Sam Bankman-Fried (covered in detail below).

Cryptocurrency implications also extend to geopolitical relations around the globe. In the Russia-Ukraine war, both sides of the conflict leveraged cryptocurrency to try and gain the upper hand – with pro-Ukraine donations being collected globally and remitted in cryptocurrencies, and with Russia raising cryptocurrency for pro-Kremlin groups and propaganda outlets by bypassing Western sanctions. Both sides have attracted their own share of scammers as well, with many criminal activities also having come to light during the year.

The FTX collapse was not simply a downfall but an immense breach of trust in the crypto ecosystem. 2022 therefore remains a warning as to the volatility of the financial and crypto market, and for investors to do their due diligence before making investments.

Frauds, Hacks, and Scams

Although experts have praised the security of blockchain technology – the underlying platform for cryptocurrencies – it is important to remember that the cryptocurrency market is unregulated and is thus susceptible to a fair share of scams and hacks. The Federal Trade Commission (FTC) reported that more than 46,000 consumers lost more than USD 1 billion to crypto scams between January 2021 and March 2022. There are almost daily reports of swindlers exploiting schemes to lure users into making fraudulent crypto investments. The biggest risk for users is that since transactions on a blockchain are immutable, fraudulent investments cannot be undone, and it is extremely tricky to get money back, once lost.

The Bitcoin industry faced massive scandals in the year 2014 alone, beginning with Mt. Gox going bankrupt, FBI's seizure of online black marketplace Silk Road, and various other frauds and scams coming to the limelight. There are many types of cryptocurrency 'cyber' scams, such as investment schemes, rug pull scams, market manipulation, phishing scams, crypto romance scams, man-in-the-middle attack, pump-and-dump schemes, dark pool trading, etc.

We discuss below three of the biggest frauds and scams that toppled the market since the inception of Bitcoin.

The Federal Trade Commission (FTC) reported that more than 46,000 consumers lost more than USD 1 billion to crypto scams between January 2021 and March 2022.

Mt. Gox was a cryptocurrency exchange that handled around 70-80% of Bitcoin's trading volume at its peak. In 2011, it was particularly prone to hackers, who used stolen credentials to steal Bitcoins valued at the time at around USD 8.5 million. In February 2014, the exchange suspended withdrawal of funds, claiming that there was a bug in the Bitcoin software that allowed users to alter transaction IDs. The company lost between 650,000 to 850,000 Bitcoins, however later was able to locate around 200,000 of the missing Bitcoins.

While it is not known what exactly happened, the missing cryptocurrency sent the exchange crashing, and subsequently the market itself. In 2019, Mark Karpeles, the CEO of Mt. Gox, was found guilty of falsifying data to inflate holdings by USD 33.5 million.

Terra Luna

Terra (Luna) is a blockchain protocol where users can mint and hold stablecoins, which are backed by a fiat currency. The two native cryptocurrencies on the blockchain were Terra and LUNA – the Terra stablecoin can be pegged to any fiat currency (such as the US dollar for the TerraUSD), whereas its sister coin, LUNA, was used to mint UST, an algorithmic stablecoin. The UST was pegged to the US dollar and was supposed to have a fixed price of USD 1.

In April 2022, before the collapse of Terra (Luna) network, one LUNA coin was going for around USD 116, having skyrocketed 135% in less than two months. In May 2022, the coin ended up falling to a fraction of a penny before getting delisted from major trading exchanges. The crash was triggered by the liquidation of USD 285 million worth of UST, which led to the UST stablecoin falling below its promised optimum price of USD 1. This, in turn, led to an excess supply of Luna coin over demand. The crash is estimated to have wiped out almost USD 60 billion from the digital currency market, and tanked the value of Bitcoin to below USD 27,000.

FTX

FTX, a giant crypto exchange, had a successful run from its inception in 2019, with Sam Bankman-Fried achieving almost celebrity status in the cryptocurrency industry. In November 2022, a Coindesk report revealed that Alameda Research, a crypto hedge fund run by Sam Bankman-Fried, held a position on the FTT token (the native token of the FTX exchange) valued at USD 55 million. This prompted withdrawals of FTT by many investors, and FTX was unable to process the withdrawal requests which reached an estimated USD 6 billion. Over two dramatic days, Binance announced it would bail out FTX, and then backed out of the deal, stating concerns regarding mishandling of customer funds and transparency issues. By 11 November 2022, FTX had fallen from a net worth of USD 32 billion to filing for bankruptcy. Later, Sam Bankman-Fried was arrested in the Bahamas on multiple fraud charges.

FTX has alleged it had been a victim of several unauthorised transactions, and that it was hacked. Nevertheless, its collapse guaranteed that comprehensive cryptocurrency regulation will be on the agenda for many countries, especially the US, in 2023.

5. Cryptocurrency: A Social, Economic & Cultural Revolution

Cryptocurrency has been one of the most exciting revolutions of the 21st century, although experts and economists remain sceptical as to whether it will pave the way for a new financial domain. As per a survey from the World Economic Forum, around 10% of the global GDP will be stored on blockchain platforms by 2025. Since 2014, ICOs have emerged as a new financing instrument. A few countries, such as El Salvador and Japan, have already adopted Bitcoin as legal tender, with Bitcoin ATMs popping up in bars and restaurants in various countries; while other countries have announced plans to regulate cryptocurrencies and blockchain applications. China, however, has banned cryptocurrency exchanges and mining within its borders.

In India, there has been much noise in the last few years in the media space regarding the regulation of cryptocurrencies, and the Reserve Bank of India (RBI) and the Indian government have maintained an anti-crypto stance. However, India plans to introduce its own Central Bank Digital Currency (CBDC), the e-Rupee, by the end of 2023 (discussed in detail below).

In this section, we discuss some of the economic, social, and philosophical causes behind the rise in popularity of cryptocurrencies, and the main factors driving their value.

Satoshi Nakamoto described Bitcoin as "a system for electronic transactions without relying on trust", thus presenting cryptocurrency as not simply a financial but also a social concept.

Causes behind the Rise in Popularity of Cryptocurrencies

Decentralization

One of the biggest contributors to the rise of cryptocurrency is its decentralization feature, namely, the transparency provided by blockchain platforms as regards public asset data. Fueled by a mistrust in banks and regulators, investors flocked to cryptocurrencies, which can be freely bought and sold without the intervention of any third-party authentication or world governments. In fact, Satoshi Nakamoto described Bitcoin as "a system for electronic transactions without relying on trust", thus presenting cryptocurrency as not simply a financial but also a social concept.

Security

With cyber-attacks on the rise, blockchain technology offers a robust and secure system for its users to transact with one another. Blockchain technology's distinguishing features are that it is based on consensus, encryption, and decentralization principles, ensuring that there is no point of failure, and it is almost impossible to erase or re-write data. It also creates a permanent audit trail, allowing tracking of any changes made on the network.

Social Media and Market Sentiment

A large number of early cryptocurrency investors were noted to be individuals below 40 years of age. Media hype and speculative behaviour causes a surge in the demand for cryptocurrency, especially by young people who got on to the crypto wagon to make a quick buck – but this may also be the reason behind its volatility.

One of the best examples of this is Dogecoin – a meme coin that was created as a joke, which spiked by 20% after it was hyped in a series of tweets by Elon Musk. Another example is that of the artist known as Beeple, who sold a digital art piece as a Non-Fungible Token (NFT) for USD 69 million, pushing NFTs to the forefront of mainstream media. It can be said that a 'crypto counter-culture' is emerging.

Cost Effectiveness

One of the main reasons people flocked to Bitcoin and other early cryptocurrencies was the low entry and associated transaction costs. By their very nature, cryptocurrencies cut out the intermediaries and third-party authenticators. They also offer quick and easy worldwide usage through the use of e-wallets, thus saving transfer costs and foreign exchange fees for investors.

Safeguard from Inflation / Deflation

Unlike fiat currencies, cryptocurrencies derive their value from the laws of demand and supply, production costs, internal governance, etc. Cryptocurrencies, therefore, do not directly respond to the same inflationary pressures as any other currency. However, it is worth noting that inflation may affect the overall liquidity of an investor, thus adversely impacting the value of a cryptocurrency based on changes in supply and demand.

An interesting case is that of Venezuela's prolonged hyperinflation, where in 2019, as the economy regressed and the local currency rapidly devalued, many Venezuelan nationals began to convert their currency into Bitcoin or began to use Bitcoin for making foreign remittances in the hopes of safeguarding value. Bitcoin quickly became a hedge against inflation, and Venezuelans emerged as one of the world's leading cryptocurrency miners, owing to the prevailing low electricity rates. Venezuela also launched Petro, a controversial national cryptocurrency backed by oil reserves, to circumvent sanctions imposed by the US.

Dogecoin is a meme coin that was created as a joke, which spiked by 20% after it was hyped in a series of tweets by Elon Musk.

Cryptocurrency Value Drivers

The cryptocurrency market is volatile, as evidenced by the numerous price highs and lows in roughly the past 10 years. In what is now known as the 2022 crypto winter, the cryptocurrency market capitalization fell over USD 1.3 trillion, with Bitcoin, the leading cryptocurrency, falling over 57% from an all-time high.

It is important to analyse some of the main value drivers of cryptocurrencies and the factors that lead to the volatility in the market.

Demand and Supply

The laws of demand and supply are the primary drivers of the value of a cryptocurrency. When a cryptocurrency is in higher demand than its supply, it drives the price up. The supply mechanism of each cryptocurrency is public knowledge; for example, Bitcoin's maximum supply is 21 million Bitcoins (out of which 19 million Bitcoins have been mined and are in circulation), whereas Ether has no limit on supply. Some cryptocurrencies 'burn' existing coins or tokens to limit the maximum supply.

As more people invest in cryptocurrency, the overall demand increases. Further, as more decentralized finance (DeFi) applications emerge on a blockchain network (for e.g. the Ethereum blockchain), the demand for that cryptocurrency (for e.g. Ether) spikes, driving up the price.

Cost of Production

Bitcoin uses a proof-of-work (PoW) blockchain consensus mechanism, also called mining, in reference to receiving a reward for work done. Ethereum, on the other hand, switched to a proof-of-stake (PoS) mechanism in 2022, which is more secure, less energy-intensive, and scalable as compared to the previous proof-of-work architecture.

The infrastructure, electricity, and mining costs are higher in a proof-of-work (PoW) mechanism. Therefore, higher competition among miners means more expensive equipment and higher costs, which drives up the price of the cryptocurrency mined. Incidentally, the electricity use of Bitcoins equalled that of the entire Switzerland in 2019. The difficulty level of the math problems underlying the mining of a cryptocurrency can also be an indirect cost, considering the extra time and resources required to solve them.

Speculation

Some cryptocurrencies, for example Dogecoin, do not pass the utility tests of an investment, and their values are instead driven by market speculation.

Cryptocurrency being a relatively new entrant in the financial market, the influence of certain individuals, media hype, etc. can highly impact investor perception and demand, leading to an unstable and volatile market.

It is also important to note the influence of 'crypto whales', i.e., individuals or entities that hold large amounts of cryptocurrency. For e.g., in May 2022, the top 100 wallets held around 15.36% of all Bitcoin in circulation. This affects the liquidity of the coins in circulation and influences the price of cryptocurrency.

Regulation and Compliance

Regulations issued by various countries also impact the demand for a cryptocurrency. China has issued an outright ban on cryptocurrency mining and exchanges. The US Internal Revenue Service (IRS) taxes cryptocurrency assets as property, whereas India has recently recently announced a 30% tax on gains from virtual digital assets, including NFTs and cryptocurrencies, which has impacted the overall trading volume. On the other hand, El Salvador declaring Bitcoin as legal tender caused a 6% spike in the coin's value.'

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Competition

With new cryptocurrencies entering the market (there are over 8,000 active cryptocurrencies as of March 2023), another factor to consider is the competition and accessibility to a new coin or token on a cryptocurrency exchange. Further, if a cryptocurrency is thinly traded, i.e., if the volume traded is low, the transactions costs are spread among fewer investors, leading to higher costs and lesser profit margins.

6. Cryptocurrency in India

Since the early 1990s, with the advent of the internet and electronic banking, there has been a rising trend towards non-cash transactions. By the 2010s, digital payments had become widespread in many countries, with apps such as PayPal becoming the preferred intermediaries for transactions. The COVID-19 pandemic was a tipping point in favour of a cashless society, triggering an appetite for fast and reliable digital payment platforms across the world.

India's Digital Payments Landscape

Cash primarily dominated the payment landscape in India, however, since 2015, India's efforts to go digital have taken swift hold. The Unified Payments Interface (UPI), launched in 2016, pioneered India's fintech revolution, so much so that in 2020, India emerged as the world's largest real-time payment market, ahead of China and the US, as per data from ACI Worldwide and GlobalData.

- In December 2019, Google suggested the US Federal Reserve Board to follow India's UPI as an example in developing FedNow, a real-time payment system for the US.

- By 2022, more than 52% of all transactions in India were cashless - a percentage predicted to reach over 70% by 2025.

- In the month of March 2023, UPI recorded the highest ever number of transactions at 8.7 billion.

UPI is an instant real-time payment system designed to enable peer-to-peer interbank transactions, regulated by the Reserve Bank of India (RBI). UPI leverages the increasing use of mobile phones, and its success can also be attributed to the fact that India is the second-largest consumer of smart phones in the world. From January 1, 2019, UPI became a popular payment option for initial public offerings (IPOs). Further, from February 2023, international payments can be made directly via UPI to many countries such as UAE, Singapore, Mauritius, Nepal, and Bhutan.

Other than India, countries such as Sweden and Brazil are increasingly considering digital payment markets. Many countries are also poised to come up with their own Central Bank Digital Currency (CBDC) which will be based on blockchain technology.

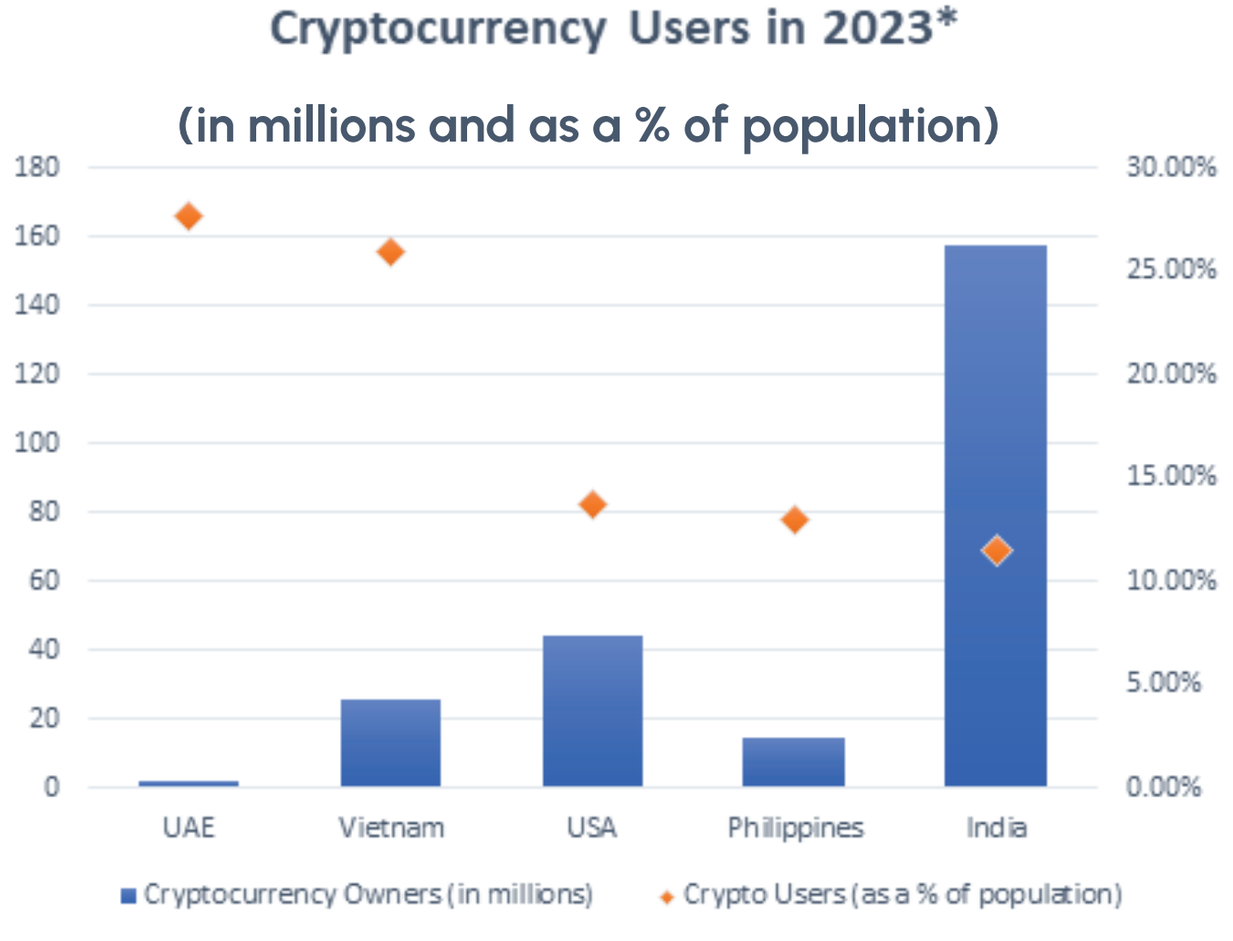
The global move to an increasingly cashless society is thus paving the way for increased adoption of cryptocurrency payments, which provide the benefits of a decentralised, peer-to-peer network without the use of intermediaries such as banks and brokerage houses, and with the added advantage of cheap transaction costs.

India's successful UPI operation has boosted its digital landscape, with the next step being the launch of its own CBDC, the e-Rupee, which is already in its pilot stage, and is expected to launch by the end of 2023. India is also set to be a key player in the emerging Web3 and decentralized finance (DeFi) landscape. These points are covered in detail in the following sections.

The Indian Stance on Cryptocurrencies

India has the highest number of cryptocurrency holders than any other country. **In 2022, India had an estimated 115 million crypto investors – around 15% of India's total population.** Between 2015 and 2022, India had the third highest number of app downloads of cryptocurrency exchanges. According to WazirX (one of the largest crypto exchanges in India), **66% of its users are under 35 years of age.** India's cryptocurrency ownership is primarily driven by its young population, with around **40% represented by users under the age of thirty, namely, millennials and gen-Z.**

Cryptocurrency began gaining momentum in India as early as 2012. In 2013, a pizza shop in Mumbai began accepting payments in Bitcoin. While India has had some of the most enthusiastic cryptocurrency miners, the process has recently become infinitely more difficult. With the hardware setup, infrastructure and energy costs, miners need to work smarter and not harder. Until 2022, Ethereum was one of the most lucrative tokens to mine in India. However, Ethereum's transition to a proof-of-stake (PoS) consensus mechanism (which does not require mining), came as a blow, forcing crypto miners to look for other proof-of-work (PoW) alternatives or begin selling their mining rigs.



The position of the Indian government and the Reserve Bank of India (RBI) is that cryptocurrencies should be banned, but the application of standalone blockchain technology should be explored. The RBI had been issuing circulars cautioning users against cryptocurrencies from 2013. Notably, in 2018, the RBI proposed a bill proposing an outright ban on all virtual currencies in India. The Supreme Court, however, in 2020, reversed the RBI's ban on cryptocurrency.

The RBI has expressed concerns on India losing its sovereignty and policy control over its currency owing to adoption of cryptocurrency, and the dollarization of its economy. The government has also stated concerns over the use of cryptocurrency for financing terrorist and criminal activities. In December 2022, India's Financial Intelligence Unit (FIU) reported that it had tracked 3,300 crypto accounts which were suspected of being used for illegal activities.

India, along with plans to launch its own CBDC, the e-Rupee, has advocated the development of a national blockchain infrastructure, and the creation of a Distributed Ledger Technology (DLT) platform for maintenance of statutory information. The government has also issued directives to all crypto exchanges and virtual digital asset wallet providers to complete the Know-Your-Customer (KYC) procedures and to report any cyber-security incidents to the relevant authorities.

Tax on Cryptocurrencies in India

Currently in India, virtual digital assets (VDAs) are not regulated, i.e., there is no license required, and cryptocurrency can be traded on many regulated crypto exchanges and wallets. However, effective from 1 April 2022, the Income Tax Act was amended to introduce a 30% tax on capital gains arising from the transfer of virtual digital assets (VDAs), including NFTs and cryptocurrencies. The announcement saw a massive (almost 90%) slump in transaction volumes, with many Indians considering moving their investments to foreign exchanges.

The following are the key aspects of the tax regime on VDAs:

- Effective from 1 April 2022, a 30% tax (plus surcharge and cess) applies on capital gains from the transfer of VDAs, in addition to tax on all other income (for e.g., income through crypto mining).
- Cost of acquisition / purchase price of the VDA may be claimed as a deduction while computing the tax on capital gains.
- No set-off is available for losses from one crypto asset against gains from another crypto asset or other income.
- Effective from 1 July 2022, a 1% Tax Deduction at Source (TDS) applies on every transaction involving VDAs.

Tax Complications

- Only cost of acquisition is allowed as a deduction for the 30% tax. Mining costs or other cryptocurrency-related expenses are not allowed as deductions.

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- Since non-residents' income is subject to source-based taxation in India, it is unclear how the gains will be taxed if an individual becomes a non-resident Indian (NRI).

- Indian cryptocurrency exchanges now deduct the 1% TDS on every transaction by default, however, this is not followed by international crypto exchanges, and currently, there is no such rule in place.

- It is the responsibility of the buyer of the VDA to report capital gains and to ensure that 1% TDS is deducted.

- There is some ambiguity regarding classification of crypto-related income under 'capital gains', 'business income', or 'special income'.

- Clarifications are also required regarding the applicability of GST on these transactions.

As per data released towards the end of March 2023, India has raised over USD 19.2 million in cryptocurrency tax-based revenues in the financial year 2022-23.

India's e-Rupee

Following India's successful UPI operation, the next step is the launch of its own Central Bank Digital Currency (CBDC), the e-Rupee, which is already in its pilot stage, and is expected to launch by the end of 2023. With the introduction of the e-Rupee, India hopes to alleviate the risks associated with digital currencies, especially in the aftermath of the FTX collapse. With Web3 and blockchain technology on the rise, the e-Rupee can be naturally integrated as the de-facto currency for these decentralized transactions.

The e-Rupee (e₹-R) is a digital currency controlled and managed by the RBI, using the country's fiat currency as legal tender. Users can pay peers and merchants via a digital wallet. The e₹-R offers features of physical cash like trust, security, and settlement finality. Similar to cash, the CBDC will not earn any interest and can be converted to other forms of money, such as deposits with banks.

The difference between UPI and CBDC is that while the former is a payments system, the e-Rupee will be a currency system which eliminates the need for banks. **The technology behind the CBDC is currently in the trial phase and will have components based on blockchain technology.** The CBDC is also expected to have offline functionality and can be used in remote areas with little or no network connectivity.

By February 2023, the CBDC retail pilot project recorded 770,000 transactions across eight banks.

Two CBDC pilots have been launched so far:

- A wholesale CBDC with the participation of 9 banks.
- A retail CBDC within a closed group of 50,000 users comprising of participating customers and merchants, whose testing began in four Indian cities.

RBI's Position and Challenges

The RBI, in its concept note, has outlined its approach towards launching the CBDC in India, mainly that "The e₹ will provide an additional option to the currently available forms of money. It is substantially not different from banknotes, but being digital it is likely to be easier, faster and cheaper. It also has all the transactional benefits of other forms of digital money." The RBI's approach towards digital currency is governed by two basic considerations: (i) to create a digital Rupee that is as close as possible to a paper currency, and (ii) to manage the process of introducing digital Rupee in a seamless manner. One of the primary motivations of the RBI behind introducing the CBDC is also the potential reduction in the cost of managing physical cash.

During the CBDC pilot phase, the RBI identified several challenges including issues such as ensuring the same level of privacy and anonymity as using physical cash. However, RBI plans to launch a nation-wide CBDC by the end of 2023 may still see fruition. The RBI aims to incorporate cross-border considerations and international collaboration with banks of other countries while designing their CBDCs.

In March 2023, the RBI signed a memorandum of understanding with the UAE Central Bank to jointly explore the interoperability between the CBDCs of the two countries.

The G20 has prioritised enhancing cross-border payments. In fact, 105 countries (together representing over 95% of global GDP), including 19 of the G-20 countries, are also exploring a CBDC.

China has already rolled out its digital currency, the digital yuan (e-CNY) across the country, however, the same is not a cryptocurrency and does not incorporate blockchain technology. Recently, Russia hinted at a common digital currency between three BRICS countries, namely, India, China, and Russia. Although the idea of a multinational digital blockchain-based currency has been floating around since 2018, its reality will depend largely on geopolitical relations and the countries agreeing on a common goal.

India took charge of the G-20 presidency on 1 December 2022, and a series of meetings have already taken place with the Indian central bank's entourage regarding coordination on global cryptocurrency regulations. The first G20 summit to be hosted in South Asia will be held in Delhi in September 2023. Cryptocurrency and blockchain technology regulations are expected to be an important topic of discussion at the summit.

7. Cryptocurrency as a Mode of Payment

Increasingly, many businesses such as online retailers and brick-and-mortar (B&M) stores have begun accepting cryptocurrency as a mode of payment. El Salvador's acceptance of Bitcoin as legal tender in 2021 was a milestone indicative of an increasingly accepting economic environment. By allowing customers to pay via cryptocurrency, businesses have benefited from the low transaction costs, faster and secure processing, and higher access to international markets. It has also helped businesses stand out from their competitors by appealing to a new demographic of tech-savvy consumers.

A user can acquire cryptocurrency in one of two ways:

- Cryptocurrency mining; or
- Trading through exchanges or with another user.

Since cryptocurrency mining involves solving complex math problems, not to mention the huge outlay on infrastructure, electricity and other equipment, the easiest way for most users to acquire cryptocurrency is by purchasing it via a regulated cryptocurrency exchange or directly from another owner. An exchange allows users to exchange fiat currency for any cryptocurrency and store it in a digital or e-wallet. A digital wallet can be hot (online) or cold (where holdings are stored offline), and allows users to send and receive payments via cryptocurrency.

Today, cryptocurrency transactions can be using any smartphone or device; it is as quick and easy as making a UPI payment. The digital wallets create key pairs for the user (a public key and a private key), which represent ownership of the digital asset. The private key acts as a unique digital signature, without which a user cannot access any cryptocurrency purchased or deposited in their wallet. Private keys are usually expressed as a string of alphanumeric characters. The public key is created from the private key and is used to generate a receiving address, similar to an email address that is used to send and receive payments.

Business That Accept Cryptocurrency Payments

Microsoft was one of the first major businesses to start accepting cryptocurrency payments in 2014. Other notable businesses that now accept crypto payments include AT&T, Emirates, Wikipedia, Overstock, and Twitch.

U.S. PayPal customers can not only buy and sell cryptocurrency but also make payments via the same. This means that a user can make payments via cryptocurrency at any of the 30 million merchants that accept PayPal.

Starbucks has partnered with a third-party crypto company, Bakkt, to accept Bitcoin payments via the Starbucks app.

NFTs – The New Rage

Non-fungible tokens (NFTs) have become another hot topic in the crypto world. Each NFT is unique and therefore represents an exclusive, one-of-a-kind digital asset, whereas cryptocurrencies are fungible, meaning that, for e.g., one Bitcoin is indistinguishable from another Bitcoin. In 2017, a new kind of trading card called CryptoKitties became all the rage, trading for as much as USD 150,000 per card. Nowadays, many brands use NFTs as a marketing strategy, and it has become common to sell albums, art pieces, and collectible items in the form of NFTs.

Nike recently launched a Web3 platform, called Swoosh, to boost its product presence in NFTs, and has acquired virtual sneaker designer RTFKT to release Cryptokicks iRL – a collection of 20,000 sneakers that are sold as NFTs at prices between USD 5,000 and 9,000 per sneaker.

Reddit, an online discussion platform, launched NFT avatars on Polygon (an Ethereum sidechain network) in 2020. By October 2022, the trading volume of Reddit's NFTs had reached an all-time high of USD 1.5 million. As of January 2023, there are 6 million distinct owners of the Reddit NFT avatars on Polygon. An important factor behind the success of Reddit's NFTs is the absence of any technical jargon such as 'cryptocurrency' or 'NFTs', and retaining simply the appeal for the creation of a unique, personal avatar, making the process less intimidating to new consumers.

El Salvador's Bitcoin Affair

El Salvador requires a special mention in this section, as it was one of the first countries in the world to accept Bitcoin as a legal tender in 2021 alongside the US dollar. On 5 June 2021, the government made the announcement and gave USD 30 in Bitcoin to every citizen as well as discounted gasoline paid for using Bitcoin. The decision led to large-scale protests in the country over fears it would bring instability and inflation.While this milestone caused a 6% spike in the price of Bitcoin, El Salvador lost around USD 60 million one year into its Bitcoin experiment. In January 2022, the IMF urged the authorities to remove Bitcoin's legal status, warning that the country's gamble may not be paying off, and has held off on approving a loan to El Salvador. Further, a survey conducted in September 2022 noted that around 86% of El Salvadoran businesses have never used Bitcoin for transactions.

Cryptocurrency Challenges and Risks

For a new investor wishing to get into crypto trading or using cryptocurrency to make purchases, it may be helpful to start with cryptocurrencies that are commonly traded and which have high market capitalization, thus making them less volatile in comparison to the newer and relatively unknown cryptocurrencies.

Below are some of the risks associated with using cryptocurrency as a mode of payment:

Acceptance

Despite cryptocurrencies being the shiny new technological toy, its acceptance is far from universal. While the barrier to entry is decreasing, acquiring cryptocurrencies and making crypto payments still requires a higher level of technical knowledge by the user than using a credit or debit card. Additionally, a buyer is spoilt for choice between thousands of active cryptocurrencies. It may well happen that a user purchases one cryptocurrency only to discover that its popularity has plummeted in favour of the next big thing.

There is also still a great deal of controversy around the concept itself. Some experts have called Bitcoin as being worse than a Ponzi scheme, arguing that since cryptocurrency does not promise any yield nor any principle on maturity, it is a negative sum game from a social perspective.

Volatility

Cryptocurrencies are generally considered immune from inflation. However, this can also pose a risk, because cryptocurrencies, by nature, are very volatile, and businesses may face challenges in factoring such volatility into the pricing of their products. It may also cause issues with returns and refunds of items purchased with a certain cryptocurrency, in case the price of that cryptocurrency dips. As a result, many businesses that accept cryptocurrency payments price their products in US dollars, and match the dollar price for returns.

Regulation

Cryptocurrencies are currently unregulated by either banks or governments. Such investments therefore do not have any legal protection, although some countries are now planning to introduce regulations on cryptocurrency. Such regulations also emerge from a growing concern among countries that cryptocurrency may be used as a means to route black money and finance criminal activities.

Lack of Privacy

Despite blockchain being a secure, peer-to-peer network, most cryptocurrency transactions take place on a public blockchain. This means that not all cryptocurrency transactions are anonymous, and at least some transaction data and wallet information can be traced to identify the user or users involved.

8. Blockchain, Web3 & DeFi: The New Frontiers

Web3

Web3 has become the catch-all term for the new internet. Since it is a relatively new space, there is no strict definition for Web3, but it has some common features, namely, blockchain technology, artificial intelligence (AI), and the metaverse:

Blockchain Technology

Decentralization is a big part of the new Web3. An internet built using decentralized blockchain technology ensures that instead of a centralised group of companies controlling the growth of a community, users can control their own content. Decentralized platforms allow users to better monetize their products and content, and target engagement with the user, rather than scale.

Blockchains are generally of three types: public blockchains, which are fully decentralized and which allow any party to participate in the network, permissioned chains, where the participation of an entity in the blockchain is evaluated by an administrator(s), and private blockchains, where write permissions are entrusted to one participant, and read to all other participants. Layer 1 blockchains refer to a base blockchain protocol such as Bitcoin or Ethereum. Layer 2 blockchains are third-party protocols built with integrated functionality with the base blockchain protocol.

Blockchain-based Web3 platforms market themselves as offering primarily the following benefits:

- These platforms use native payments such as cryptocurrencies or NFTs via the user's crypto wallets.

- They incorporate decentralized autonomous organizations (DAOs), which use blockchain technology to automate certain aspects of voting and transaction processing.

- Users will not require separate logins for every site they visit and will instead have a centralized identity (such as their crypto wallet) that carries their information.

- Users control and own their own content, for e.g., rewards earned on Web3 applications such as games belong to the user and remain on the blockchain even if the company or the creator of such application ceases to exist.

Artificial Intelligence (AI)

The new Web3 is expected to integrate artificial intelligence (AI) and machine learning, along with other tools such as the Internet of Things (IoT) and Big Data. Web3 applications will include features such as machine-to-machine communication and decision-making, for e.g., similar to that provided by the Apple assistant, Siri, or the new chatbot, Chat GPT.

Metaverse

In terms of Web3, the metaverse concept means that the new internet will be a more immersive experience for the user, and will incorporate virtual reality (VR) and augmented reality (AR) technologies, enabling deeper interactions between the digital domain and the natural world.

Decentralized Finance (DeFI)

While Web3 and DeFi are both applications of blockchain technology, DeFi is the Web3 version of a decentralized financial system. Decentralized finance offers traditional financial applications via peer-to-peer digital exchanges by executing smart contracts on a blockchain network (initially this network was Ethereum). DeFi empowers individuals to use financial instruments without the need for intermediaries and processing fees. Smart contracts are typically run using open-source software that is built and maintained by a community of developers.

For example, in a DeFi market, securing a loan is fast, easy, and ensures the anonymity of both the borrower and the lender. All it requires is the use of blockchain technology and a crypto wallet as collateral. DeFi platforms allow the lending and borrowing of funds, speculation using derivatives, trading of cryptocurrencies, and earning interest in savings-like accounts.

Although many have argued that blockchain and Web3 are the defining points of the future of technology, it is still in the nascent stage of implementation, and there is no consensus on what that future will look like. As more and more countries look to regulate this disruptive new technology, we examine below some of the limitations of the blockchain-based Web3.

Blockchain Limitations

Expensive

Technology experts have opined that building a new 'trustless' technology which is only capable of processing a few transactions per minute, is complicated, inefficient, and costly. The technology can be made more efficient by adding more layers, which, in turn, defeats blockchain's core concept of decentralization.

Scalability

A major problem with current blockchain networks is their scalability. In layman terms, the scaling trilemma implies that a functional blockchain network can only have only two out of the three crucial traits, namely, decentralization, security, and scalability. One option is to use Layer 2 scaling solutions, such as the ones employed by Ethereum, to achieve a multichain functionality.

Speculative

Web3 is rife with financial speculation, because it integrates all the existing risks of using cryptocurrency, including its volatility, susceptibility to scams, manipulative market practices, etc. User engagement, which is a key feature of the new Web3, may simply mean the financialization of human existence, and perhaps not in a healthy way.

The scaling trilemma implies that a functional blockchain network can only have only two out of the three crucial traits, namely, decentralization, security, and scalability.

Environmental Impact

Blockchain mining has a huge environmental impact because of its energy and tech use. As per a research conducted in May 2021, Bitcoin's e-waste added up to 30.7 metric kilotons annually. The energy consumption of a single cryptocurrency is often compared to that of small countries. For this reason, many blockchains have updated from a proof-of-work (PoW) consensus to a proof-of-stake (PoS) consensus. In the case of Ethereum, this has led to a 98% reduction in the overall amount of energy used on the network. However, a sustainable and environment-friendly way forward is still unclear.

Web3 is rife with financial speculation, because it integrates all the existing risks of using cryptocurrency, including its volatility, susceptibility to scams, and manipulative market practices.

Security Risk

Blockchain technologies can provide transaction security, however, they still pose risks to the cyber wallet or associated account. There are also cyber security risks to the blockchain network if over 51% of the network nodes are taken over and controlled by a person or group of people.

Interoperability

As more and more blockchain networks enter the market, it is becoming increasingly difficult to create a global standard for blockchain technology. Viable operability cannot be achieved if involved parties are not connected on the same blockchain network.

9. Blockchain and Web3 Applications in India

India is set to be a key player in the emerging Web3 and decentralized finance (DeFi) landscape. In 2021, there was an influx of USD 30 billion in the form of venture capital funding in the blockchain and cryptocurrency market in India. According to a Nasscom report, 450+ start-ups in the Web3 space managed to raise around USD 1.3 billion in funding by April 2022. Although 60% of these start-ups are established outside India, 11% of the global talent pool in the Web3 sector is in India, which, combined with the deployment of 5G, puts India is a unique position to leverage the cryptocurrency and Web3 sectors. Web 3 innovations are predicted to result in a USD 1.1 trillion contribution to India's GDP over the next decade.

Some of the Indian banks and corporates are among the pioneers for exploring blockchain in India. India's Flipkart recently launched a metaverse space, Flipverse. Polkadot recently became the latest entrant in India's web3 start-ups ecosystem. Polkadot, which was created by Ethereum founder Gavin Wood – who also coined the term Web3 – is a blockchain network designed to function as a shared chain similar to Ethereum.

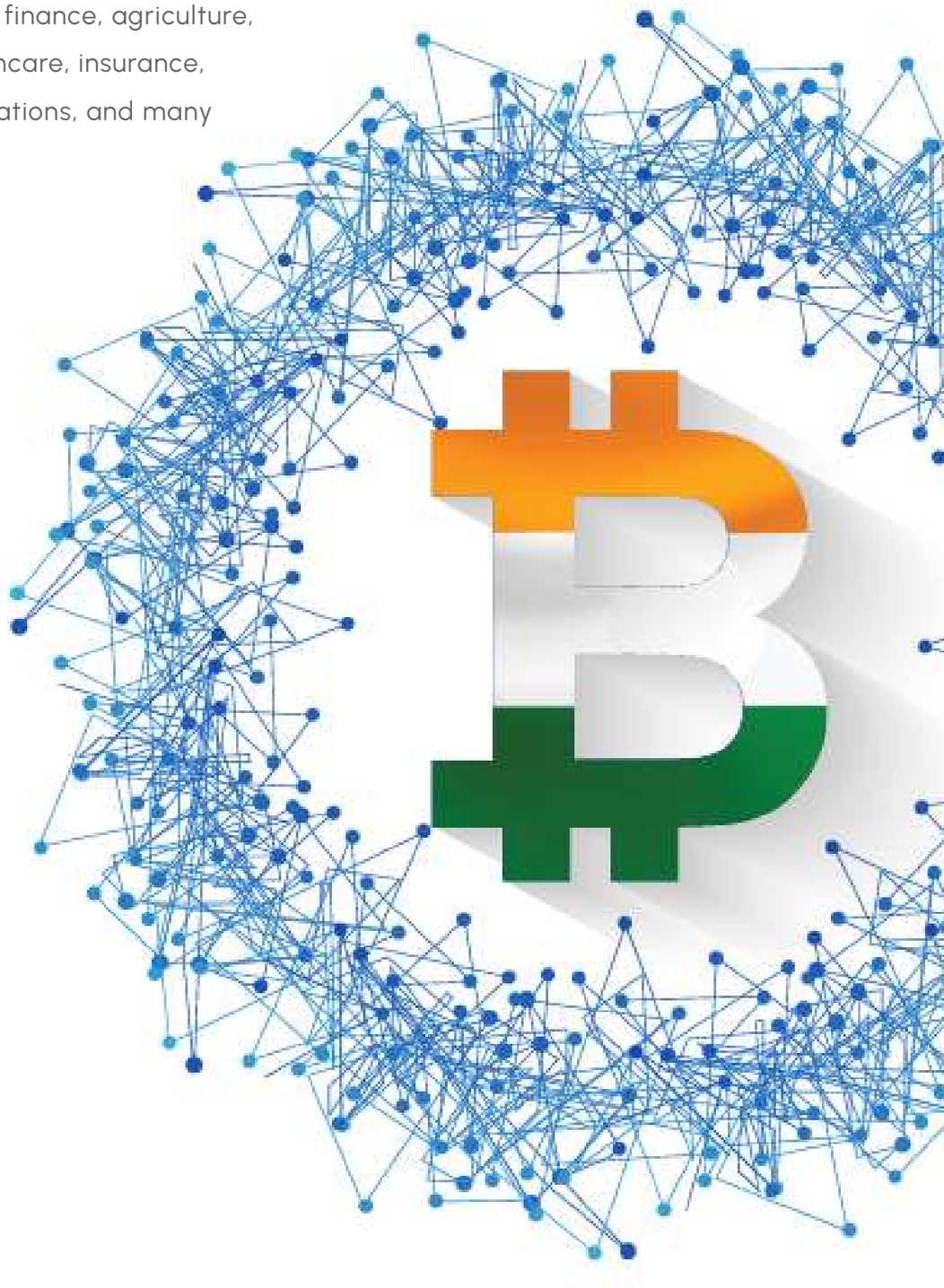
The success of Polygon, an Indian blockchain technology company, is worth mentioning. Polygon is a Layer-2 scalability solution set up on the Ethereum network offering low transaction fees, and is described as Ethereum's Internet of Blockchains. Polygon's popularity surged when it received an undisclosed investment from Mark Cuban in 2021. Polygon is now involved with some of the hottest areas in cryptocurrencies, and has also partnered up with Meta, Reddit, Starbucks, and others to offer scalability solutions in the Web3 space. Its native cryptocurrency, MATIC, with a market cap of USD 12 billion, has become one of the top 10 altcoins of 2023.

450+ Indian start-ups in the Web3 space managed to raise around USD 1.3 billion in funding by April 2022.

Potential Blockchain Applications

The Indian government is actively exploring the applications of the underlying technology behind cryptocurrency, i.e., blockchain. The National Strategy on Blockchain issued in December 2021 highlights the government's plan to adopt blockchain technology in several industries including e-governance, healthtech, agritech, fintech, and edtech. Globally, the applications of blockchain technology in sectors such as banking, healthcare, supply chain management, etc. have already been proved as a success. Blockchain applications are also being implemented across various sectors such as oil and gas, trade finance, agriculture, land transfers, healthcare, insurance, retail, telecommunications, and many more.

Experts have also lauded the underlying blockchain technology behind cryptocurrency as the way ahead, but as of now, globally, most blockchain applications (including Web3) do not function without using cryptocurrencies as the native payments. In theory, it is possible to develop blockchain platforms that are not powered by cryptocurrency. However, it is argued that public decentralization cannot be achieved without cryptocurrency because a good token economy model is required as an incentive for those involved, including the miners themselves. India's introduction of its own CBDC, the e-Rupee, may alleviate some of these problems, allowing the application of blockchain technology in several promising areas.



The Indian government is planning to establish a national blockchain infrastructure in as many as 44 sectors. It has also advocated the creation of a Distributed Ledger Technology (DLT) platform for maintenance of statutory information.

- The Indian government's think-tank Niti Aayog has advocated the use of blockchain in a number of fields, including:
  - Tracking the pharmaceutical supply chain;
  - Improving claim verification and approval in the disbursement of fertiliser subsidies;
  - Verifying university education certificates by recruiters and universities; and
  - Managing the land and property rights transfer process.

- The government of Telangana has taken steps towards the development of blockchain products in a regulatory sandbox environment with the help of selected startups for testing solutions.
  .
- Jharkhand became the first Indian state to implement blockchain in the country to track seed distribution.

- Startup India has launched a blockchain-based certification verification system, which will enable instant verification and access to certificates of recognition.

- The Andhra Pradesh state government is working on using blockchain in land titling, health records, and supply chains.

In theory, it is possible to develop blockchain platforms that are not powered by cryptocurrency. However, it is argued that public decentralization cannot be achieved without cryptocurrency because a good token economy model is required as an incentive for those involved, including the miners themselves.

Below are some examples of sectors in which standalone blockchain technology can be applied:

Capital Markets

The National Stock Exchange of India (NSE), together with a few Indian banks, is using Blockchain start-up Elemental's blockchain to test know-your-customer (KYC) procedures and real-time information updates using blockchain. Securities and Exchange Board of India (SEBI) has instructed all depositories to make use of blockchain technology, in order to increase transparency in the process of record-keeping as well as the creation of securities. Stock exchanges globally and in India have begun to experiment with blockchain technology for clearing and settlement, post trading, as well as in security issuances.

Blockchain applications in capital markets can improve trade settlements, transfer of securities and payments and reduced trading costs. Smart contracts can also be developed for issuing commercial papers and for settlements. New securities exchanges are being considered that will use blockchain technology to tokenize and host not only equity, bonds, and funds, but also physical assets such as the fractional ownership of real estate, vehicles, or land.

Theoretically, an IPO issuance can be made using a private-permissioned blockchain (owing to the confidential nature of an IPO), including using smart contracts to execute disbursements and corporate events. However, a rigid Proof-of-Concept (PoC) would need to be developed to significantly reduce counterparty risk.

Banking and Finance Sector

The RBI is exploring and monitoring the applications of blockchain technology in the banking and financial services sector. Several private as well as public banks in India have begun incorporating blockchain technology in its processes. The banking sector has also seen application of blockchain technology for streamlining banking and lending processes and reducing transaction processing times.

The Institute for Development and Research in Banking Technology in India has created a Proof-of-Concept (PoC) on the applicability of blockchain to a trade finance application.

New securities exchanges are being considered that will use blockchain technology to tokenize and host not only equity, bonds, and funds, but also physical assets such as the fractional ownership of real estate, vehicles, or land.

Telecom Sector

The Telecom Regulatory Authority of India (TRAI) has instructed all telecom companies to start incorporating blockchain technology, to help in tackling issues such as spam calls and unregistered telemarketing.

Supply Chain Management

Blockchain technology is being implemented to track supply chains in various areas, for e.g., recycling. Because blockchain provides a public, immutable record of transactions, it can help track a product which is on the blockchain from its source to each step of the process. Walmart Canada's use of blockchain technology to automate its supply chains has already been touted as a success within 2 years of its implementation in 2019.

The Tea Board of India is planning to adopt blockchain technology to help increase the quality of tea and to ensure traceability across the entire supply chain.

Secured Voting

The Election Commission of India is working with IIT-Madras for using blockchain technology to enable app-based e-voting by 2024.

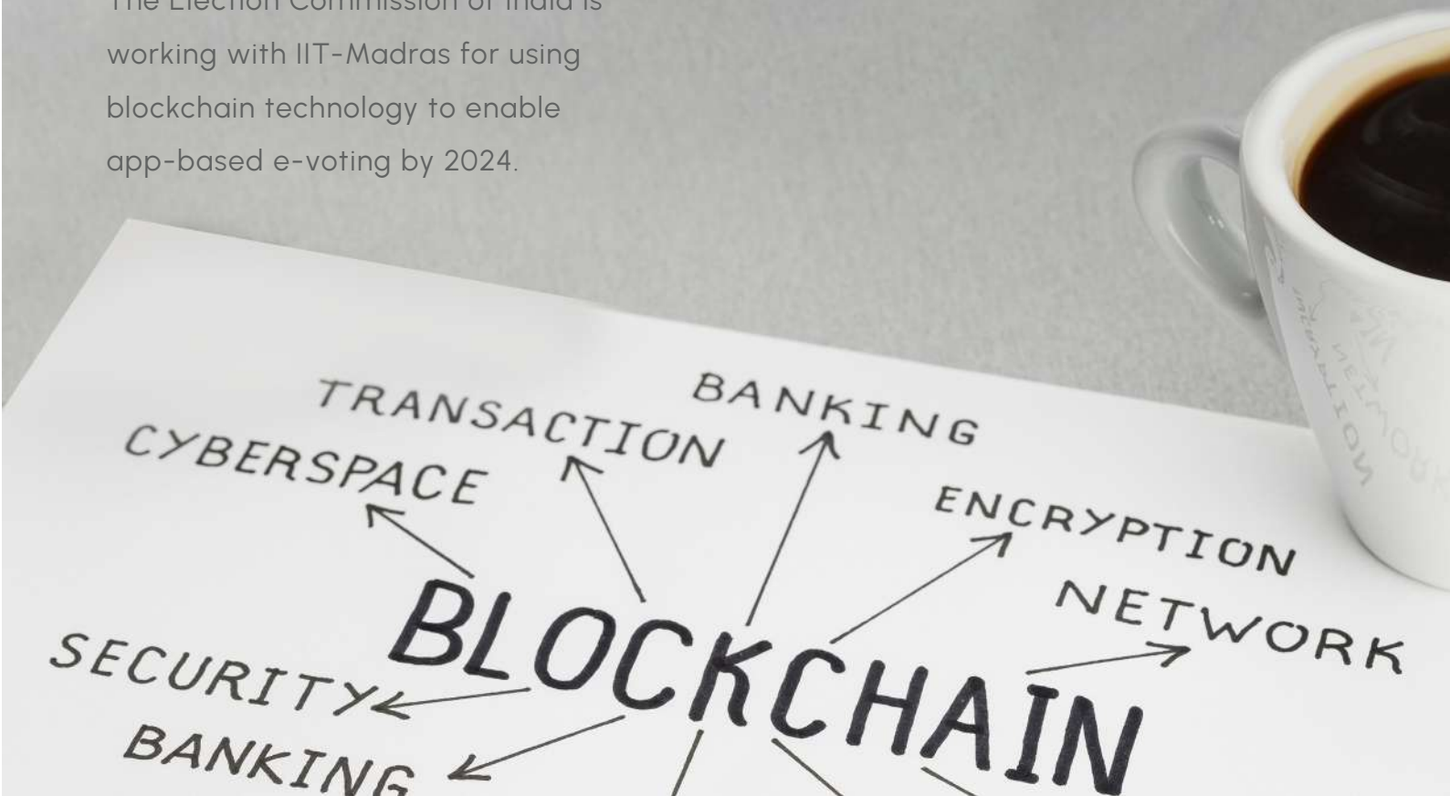
Governance

IT Kanpur is working on blockchain technology focused on developing e-governance solutions.

Identity Platforms

Blockchain-based identity platforms are already in use, which helps a user access their personal records at any time, from anywhere. This is already being used in Austin, Texas for homeless people, and for Syrian refugees in Jordan.

We must remember that blockchain technology is still being explored as a potential solution for increasing transparency and maintaining anonymity in many areas. Once the testing phase is completed and regulations are in place for ensuring security and complete decentralization, we may expect this technology to be used in many more sectors in India as well, such as maintaining personal health and pharmaceutical records, privacy and identity platforms, efficient carpooling or ridesharing, and much more.



10. The Future of Cryptocurrency & Blockchain Regulations

After the collapse of Terra, Celsius Network and Voyager Digital, and finally, the collapse of FTX, lawmakers and regulators across the world are picking up the pace on regularizing the digital assets and cryptocurrency market. Many countries have reached a consensus that a clear, regulatory framework is required for cryptocurrency and blockchain payments.

The European Union is in stages of finalising the new Markets in Crypto-Assets Regulation, which is expected to be made into law by 2024. The EU regulation would require cryptocurrency issuers to hold enough reserves to prevent a collapse, and would require cryptocurrency miners to disclose energy consumption. Cryptocurrency exchanges in the EU will also be monitored by a financial regulator.

In the US, the debate is regarding the classification of cryptocurrency as a traditional security. The US is also proposing new cryptocurrency regulations for data collection on crypto exchanges and wallets. Dubai is setting up an authority that focuses on the regulation of virtual assets. Many countries, including India, Canada, and Italy have introduced taxation on cryptocurrencies.

Since 2019, Canadian exchanges are essentially regulated similar to traditional fintech businesses. Some countries such as Japan, El Salvador, and the Central African Republic, have established friendly regulations for cryptocurrencies.

India's 2023 Economic Survey has highlighted the need for a unified approach to regulating the cryptocurrency space. The government has announced plans to introduce regulatory measures around cryptocurrency in 2023. As India's G20 presidency looms and the world's largest economies prepare to gather in India for the G20 Summit in September 2023, all eyes will be on upcoming cryptocurrency regulations and international collaborative measures in this space. The G20 Summit can help facilitate the development and implementation of CBDCs as well as the taxation of cryptocurrencies by fostering a dialogue among the G20 nations.

Blockchain technology as it stands today, can be compared to what the Internet was in the early 1990s. India stands poised to tap into its talent pool to shape the future of technology – assuming that Web3 is the future. However, with the government's lack of clarity on cryptocurrency and its focus on launching its own CBDC, there is still hesitancy on India's part when it comes to the adoption of cryptocurrency and Web3 into the ecosystem.

In contrast, US brands like Nike and NBA have aggressively adopted NFTs and Web3 to target millennials and gen-Z customers.

2023 comes with its fair share of problems. However, Ethereum's transition to Proof-of-Stake (PoS) is a positive milestone, along with Bitcoin's price jumping up from USD 16,000 in December 2022 to USD 24,540 in May 2023. 2023 will also see events such as the distribution of the Bitcoin from Mt. Gox. DeFi and Web3 gaming are also seeing a boost for 2023. The cryptocurrency market has thus far shown resilience and investors' enthusiasm is not expected to dampen any time soon.

In India, sectors such as Information Technology (IT), Artificial Intelligence (AI), the Internet of Things (IoT), big data, cloud computing, etc. are already contributing to India's GDP. Blockchain technology and Web3, could additionally contribute another USD 1 trillion to India's GDP over the next decade. As India prepares to become a USD 5 trillion economy, the crypto and Web3 industry are at the cusp of transformation.

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